Suicide in the German Novel 1945-1989

by

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Abstract

This dissertation examines the theme of suicide in German novels published between 1945 and 1989.

Within the period defined, novels have been divided into three groups: novels published between 1945 and 1949, novels of the German Democratic Republic, and novels of the Federal Republic of Germany.

In order to facilitate discussion of the psycho-social phenomemon of suicide in the literary context, this study makes use of suicidologist Edwin Shneidman's "common characteristics of suicide" as contained in his work *Definition of Suicide* (1985). Each work is further examined in terms of its meaning within the literary context, and for this the study relies on the concepts of instrumental and expressive meaning as outlined in David Wood's essay "Suicide as Instrument and Expression." The parameters of the topic and an explanation of the concepts to be discussed are contained in the introduction.

Chapter 2 examines Theodor Plievier's *Stalingrad* and Hans Fallada's *Jeder stirbt für sich allein.* An examination of the novels reveals the connection of suicide in these early works to the horrors of Nazism, thereby singling out socio-political conditions as the motivating factor for suicide.

In Chapter 3, attention is focussed on four novels of the GDR: Jurek Becker's *Jakob der Lügner*, Ulrich Plenzdorf's *Die neuen Leiden des jungen W.*, Christa

Wolf's *Kein Ort. Nirgends*, and Christoph Hein's *Horns Ende.* The examination reveals suicide as a represention of the consequence of conflict between the individual and socialism.

The final chapter examines Walter Jens' *Nein. Die Welt der Angeklagten*, Wolfgang Koeppen's *Das Treibhaus*, Gert Heidenreich's *Der Ausstieg*, and Siegfried Sommer's *Und keiner weint mir nach.* In these novels the motivation for suicide is again associated with the moral burden of Germany's past, a fact which distinguishes this depiction of suicide from that of the GDR.

The role of the intellectual in the depiction of suicide is also a recurrent theme in the novels. Whether naïve and unsophisticated, as in the cases of Edgar Wibeau and Leonhard Knie, or with the learned perceptiveness of characters such as Walter Sturm, Heinrich Keetenheuve or Heinrich Bode, the protagonists demonstrate an acute awareness and sensitivity to their surroundings which ultimately prove inimical to life.

This study establishes a connection between the literary depiction of suicide and socio-political conditions of the period examined, and represents the first time that such a study has been done for this period. The theme of suicide is used by authors as an expressive tool to signify the desire for egression resulting from guilt and the conflict between individual and state.

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Contents

Abstract.....iv

Acknowledgements.....vi

Introduction.....1

Defining Suicide.....9

Methodology.....12

Shneidman's Common Charateristics: An Interface Between Reality and Fiction.....14

State of Research.....19

Scholarly Contribution.....23

CHAPTER I: THE GERMAN NOVEL 1945-49.....25

The Anti-Fascist Message.....25

Theodor Plievier's *Stalingrad* (1945): Collective Suicide.....27

Colonel Vilshofen: Vision of the New Man.....32

Suicide Considered.....33

Suicide Rejected.....36

"Schuld--Sühne".....40

The Meaning of Suicide.....42

Hans Fallada's *Jeder stirbt für sich allein* (1947): Suicide and Anti-Fascist Resistance.....44

Suicide as Resignation: Frau Rosenthal.....45

Guilt and Suicide: Escherich.....47

Suicide and Active Resistance: Otto and Anna Quangel....50

Minor Characters.....54

The Meaning of Suicide.....55

Summary.....56

CHAPTER II: SUICIDE IN THE NOVEL OF THE GERMAN DEMOCRATIC REPUBLIC.....59

Political Situation.....59

Jurek Becker's *Jakob der Lügner* (1969): Symbolic Resistance.....62

Benevolent Fiction: A Prophylaxis for Suicide.....63

Professor Kirschbaum: Symbolic Protest.....69

A Tale of Two Endings.....72

The Meaning of Suicide.....76

Ulrich Plenzdorf's *Die neuen Leiden des jungen W* (1972).....80

Hidden Suicide: An Acceptable Alternative.....81

Disintegration and Isolation.....82

Identification with Werther's Suicidal Precedent.....87

From "Über den Jordan": A Distorted View.....88

The Serial Aspect of Edgar's Suicide.....89

Edgar's Suicide Machine.....90

The Meaning of Suicide.....94

Christa Wolf's *Kein Ort. Nirgends* (1979):"Gesellschaftliche Verzweiflung".....96

Kleist: Individual vs. State.....97

Günderrode: Patriarchy and Alienation.....101

The Meaning of Suicide.....104

Christoph Hein's *Horns Ende* (1985): Suicide As Admonition to Remember.....108

Thomas.....110

Horn.....111

The Meaning of Suicide.....116

Summary.....120

CHAPTER III: SUICIDE IN THE NOVEL OF THE FEDERAL REPUBLIC OF GERMANY....129
Political Situation....129
Walter Jens: Nein. *Die Welt der Angeklagten* (1950)....132
Walter Sturm: "Der Letzte"....133
Anti-Utopia and the Intellectual....135
The Motivation of Guilt....138
Passive Suicide....141
The Meaning of Suicide: A Message of Humanity....143
Wolfgang Koeppen: *Das Treibhaus* (1953)....147
Outsiderdom....149
The Meaning of Suicide....156
Siegfried Sommer: *Und keiner weint mir nach* (1953)....159
"Mietshaus 46 in der Mondstraße": Suicide's Social Milieu.160
Political Influence....161
The Betrayal of Leonhard Knie....162
The Meaning of Suicide....168
Gert Heidenreich: *Der Ausstieg* (1982)....171
Motivation: Politics Past and Present....172
Transgenerational Egression from Political Conditions....179
Suicide in Symbol and Metaphor....181
Sickness and the German Condition....185
German Legacy of Guilt....185
The Meaning of Suicide....187
Summary....188
CHAPTER IV: SUMMARY: SUICIDE IN THE GERMAN NOVEL 1945-1989....191
BIBLIOGRAPHY....201
Primary Sources....201
Secondary Sources....203

Introduction

I am for suicide, I recommend
suicide! Suicide--the only
solution, the logical way out!
I preach self-destruction, I
praise voluntary death!
May many follow my example!
May suicide be the fashion
of the intellectual élite!
May the best, the men of
integrity and good will perish
by their own hands!
Words have lost their meaning,
their validity. Action?
For whom? In whose service?
For what cause?
DEATH is my answer,
SUICIDE, my program! [1] (Mann 62)

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[1]The quotation is one of the last writings of Klaus Mann and is included here in the form originally written by Mann and reproduced by Hans Stempel. It is presumed to be an excerpt from Klaus Mann's novel-fragment "The Last Day."

The above quotation, from an unfinished work by Klaus Mann (1906-49), elevates the concept of suicide to the status of personal credo and provocation to others. Klaus Mann, an intellectual and literary figure of the pre- and post-World War II period, articulates in these words a startling espousal of suicide as a philosophical tenet. Suicide is here suggested as an alternative to "words." One might respond by asking, "Suicide? For whom? In whose service? For what cause?" On the surface, one can presume that suicide is presented as an instrument to achieve a "way out" of an intolerable situation. Not seen as something left to the morally infirm, something forbidden, or to be quieted, suicide is a choice recommended for the élite, people of integrity and good will. At the very least, the conviction represented in this quotation champions the right to self-determination through self-destruction. In view of the fact that Klaus Mann himself committed suicide in 1949, one is compelled to question to what extend this credo is cathartic, reflecting the actual views of its author. One is further led to the question as to whether these were the psychopathologically induced musings of a single individual or whether the literary invitation to others reflects an existential struggle common to many in the wake of the Second World War, and if it is the latter, for what reasons such a struggle might exist. Beyond the realm of literary biography, however, it is clear that suicide fulfils a function within the literary work itself.

The present study examines the theme of suicide as it is depicted in German novels from the period after the Second World War until the time of the dismantling of the division between East and West Germany. The temporal delineation of the

suicide theme presupposes historical and political relevance. George Rosen supports an historical approach to suicide:

> History provides perspective . . . . An historical approach makes it possible to see suicide in different temporal contexts, and to try to understand the meaning it has for people of varying backgrounds and experiences . . . . The relation of changing social conditions, value systems and ideologies to the occurrence of suicide . . . may possibly establish the circumstances under which social groups accept or reject human self-destruction. (3-4)

It is the position of this study that the acceptance or rejection of human self-destruction is also reflected in a society's literature, and it is here contended that much can be learned from an examination of suicide in literature.

It is difficult to imagine a time in recent German history when social conditions, value systems, and ideologies have undergone as much visible change as they have during and following the Nazi regime. This study operates under the premise that the reflection of suicide in the literature of Germany during this period also demonstrates uniqueness, be it in a perhaps different way from sociologically or epidemiologically observable trends. For the purposes of historical delimitation, "German" is not just a linguistic designation, rather it reflects a political restriction upon the term. Although a division of German literature based on national boundaries is not universally favoured, the present author believes it to be warranted, especially in view of the circumstances following the consequential events of the Second World War, most

significantly the creation of two German states along an ideological boundary, the tenuous coexistence of which was to become a dominant force in German relations until 1989. The view here taken is that unique political circumstances produce literature which reflects this uniqueness. In the same way that Canadian literature is treated separately from American or British literature, so too should the literature of the German Democratic Republic be treated separately from the literature of the Federal Republic of Germany, a fact attested to by the very existence of works such as Wolfgang Emmerich's *Kleine Literaturgeschichte der DDR* (1981, 1989), Konrad Franke's *Die Literatur der Deutschen Demokratischen Republik* (1974), and Erich Loest's *Der vierte Zensor* (1984), to name just a few. Austria and Switzerland are excluded from this study on the basis of their separate political and social circumstances following the war. Austria, which inherited less responsibility for the war than Germany, evinced by the withdrawal of occupying forces pursuant to the "Staatsvertrag,"[2] experienced less call for moral renewal and re-examination (Bangerter 19). Bangerter asserts that the pursuit of "Austrianness" favoured a climate in which continuity, conservatism and traditionalism flourished (19). Guilt was even less an issue in post-war Switzerland, which had been neutral during the war, rendering the concept of *Stunde Null* and the need for change less significant there (Bangerter 27). Instead, provincialism and a commitment to "Swissness" impeded significant literary change until the 1970s (Bangerter 31). In both Austria

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[2] On May 15, 1955, the treaty made Austria sovereign again, returning it to its pre-1938 frontiers. "Austria," *Encyclopedia Britannica* 15th ed.

and Switzerland, the legacy of the war led to the promotion of distinctness from Germany, rather than conformity with it.

Mindful of the famous treatment of suicide in the post-war radio play and drama *Draußen vor der Tür* (1947) by Wolfgang Borchert, this study nevertheless restricts itself to the theme of suicide in the novel, contending that the novel offers the best opportunity for development of suicidal ideation through the psychogram of the protagonist(s). In his discussion of suicide in literature, François Jost asserts that, "preparation for the final deed is usually finer in the novel than in the drama, where characters necessarily develop in a rather rapid series of events and where, as a rule, only concise psychological analyses are possible" (237), and Philip Stevick states, in his introduction to *The Theory of the Novel* (1967), that the novel is better able to produce developed and consistent images of people and reflect the societal, historical, and cultural attitudes in which it is created (3).

Evidence of suicide in novels between 1945 and 1989 is abundant, and an extensive initial list of novels was compiled from which ten novels were selected for inclusion in the present study. Novels were selected on objective and subjective criteria. More than simply showing evidence of suicide, the novels had to demonstrate a significant amount of suicidal ideation, that being evidence within the text which gives clues to suicide, thus allowing for analysis. Further to this, the suicide or significant suicidal ideation had to be connected to the protagonist or a main character in the novel. These novels are representative in the sense that they all demonstrate a significant amount of evidence of suicidal ideation and were not selected if suicide

was merely tangential or inconsequential. This criterion is based on the reasoning that suicide, when more developed, is of greater significance and value both to the author and reader and is also more likely the result of conscious inclusion by the author. To an extent, of course, what is central or tangential is subjective, both to the author and to the reader. "You are all ornithologists," states Jurek Becker, "and I am a bird" (*Resistance* 270), in describing the relative positions of literary critic/reader and author, attesting to the very subjective nature of interpretation.

This study includes not only straightforward, unambiguous examples of suicide, but also novels, such as Ulrich Plenzdorf's *Die neuen Leiden des jungen W.* (1972), in which the very existence of suicide, central to the interpretation of the novel in the German Democratic Republic, is in dispute; Walter Jens's *Nein. Die Welt der Angeklagten* (1950), arguably a case of passive suicide; and Siegfried Sommer's *Und keiner weint mir nach* (1953), which, in contradistinction to other novels of the period, presents suicide in a popular, light form, in what appears to be complete absence of politically motivating factors.

Of the ten novels to be examined, two are of the immediate post-war period (1945-49), four from the German Democratic Republic, and four from the Federal Republic of Germany. As with any classification, the boundaries between time periods are fluid. The respective influences of East and West following the war did not begin in 1949. Although the occupying forces of the eastern and western German zones undoubtedly began to exert influence on the people and institutions they occupied, a clear ideological division is certain only after the creation of two separate states in

1949. In 1947, for example, the First Writers' Conference included authors from both east and west, and, despite evidence of growing division, did produce a common antifascist manifesto (Emmerich *Kleine Literaturgeschichte* 58). The separate treatment of literature from the GDR and the FRG does not pretend to unravel the Gordian knot of two German literatures, rather separate treatment is based on the acknowledgement of uniqueness in the literatures of the politically divided Germany, which can be understood in terms of convergence and divergence (Buck 183-192). Put another way, the literatures of all countries are similar in some respects. It is the differences which set them apart. Given the wealth of primary works, this study cannot be exhaustive, but represents a selection of novels based on an extensive review of the literature.

Why suicide? It is a melancholy subject, generally approached with trepidation, because it involves not only the contemplation of death, but also the consideration of the wilful imposition of death upon the self. The German word *Selbstmord* connotes the human self-prohibition of the subject, inculcated by the pervasive religious interdiction contained in the Sixth Commandment. Despite and perhaps because of the taboo associated with suicide, the subject has enjoyed wide interest and currency in society,[3] reflected in the often quoted statements of celebrated intellects,[4] and

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[3] A survey of the German magazine *Der Spiegel* reveals that suicide has been the subject of an average of twelve articles per year for the last thirty years, associating suicide with such diverse factors as political leadership (41 1989: 290+), political ideology (21 1994: 58+; 36 1976: 36+), biology (24 1982: 221), and suggestibility (45 1986: 262+).

[4] Other famous voices which express the importance of the examination of suicide are Novalis, in his *Fragmente* (see Jost 225) and Camus in his *The Myth of Sisyphus*.

continued expression in serious theoretical treatments. Suicide also reverberates in common social parlance, in phrases such as suicide doctor, suicide box, suicide connection, suicide season, suicide sale, and suicide-blond (Barraclough and Shepherd 249), giving to each phrase the effect of hyperbole.

At its most fundamental, suicide is an idea, existing first in the mind, then finding expression in language and in deed. It is a part of the "social logic," which is reflected in social institutions, among them, religion, law, and literature (Kral 249). Suicide in fictional literature derives from and becomes a constituent of the general discourse on suicide. It also has the potential to contribute valuable insight into society's understanding of suicide as an idea (Kral 253; Willemsen, Introduction 15; Ringel, *Leben wegwerfen* 9-10). Goethe and the "Werther Effect," now also a part of general suicidological discourse, provide an apt example of the influence that fictional literature can have in the study of suicide (Evans and Farberow 139-140; Kral 251; Van Del 55; Phillips and Carstensen 101).

With Goethe's words as a beacon, the present study endeavours to contribute to the general understanding of suicide: "Der Selbstmord ist ein Ereignis der menschlichen Natur, welches, mag auch darüber schon so viel gesprochen und gehandelt sein als da will, doch einen jeden Menschen zur Teilnahme fordert, in jeder Zeitepoche wieder einmal verhandelt werden muß" (*Dichtung und Wahrheit* 583; vol.9).

Defining Suicide

"Suicide" is a deceptively straightforward concept, but any attempt at definition soon calls attention to the elusiveness of the subject. Even in naming this phenomenon, the German language observes more semantic breadth than English. Whereas English is content to use the noun "suicide" for most situations,[5] German frequently uses no fewer than three substantives: *Selbstmord*, *Suizid* (Spelt "Suicid" in articles within *Selbstvernichtung*, ed. Charles Zwingmann), and *Freitod*.[6] *Selbstmord*, the most frequently occurring form of the substantive in modern German, developed from the expression *sich ermorden*, introduced in 1514 by Thomas Murner, carries with it the connotation of the injunction against murder (Daube 159). The word *Suizid* often reflects the desire to depart from blaming references to murder (Daube 158). And *Freitod*, a term introduced by Fritz Mauthner, and a concept employed by Nietzsche, is a word that reflects the meaning contained in the phrase *mors voluntaria*, a more dignified or even glorified form of self-killing (Daube 175-176). Apart from single-word substantives, language exhibits an array of circumlocutory, euphemistic, and metaphorical phrases to denote suicide. In German some examples

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[5] The first published use of the word "suicide" was in Sir Thomas Browne's *Religio Medici* (1643) (Barraclough and Shepherd 115).

[6] Dubitscher provides an example of the controversy surrounding an appropriate term for suicide. He rejects "Selbstmord" as too value laden, "Freitod" as incommensurate with all circumstances and "Selbsttötung" as unfamiliar, choosing "Suizid" as least prejudicial (11-12).

are: "sich das Leben nehmen"(Becker *Jakob der Lügner*), "den Löffel abgeben,"[7] and "Hand an sich legen" (also the title of the theoretical work on suicide by Jean Améry). Although this study will necessarily employ the conveniently simpler English term "suicide," explication of the various German terms will be provided as they arise within the literary texts.

Variation in terminology is the surface manifestation of a deeper elusiveness of concept. Evans and Farberow point to the fact that the term has still to be defined satisfactorily, stating that "scores of definitions have been employed by writers in the field of suicidology" (84). The lack of a consistent definition is largely the result of differences in theoretical orientation and the specific phenomena under study. In order to provide a suitable definitional framework within which to work, the present study relies, primarily, on suicidologist Edwin Shneidman's *Definition of Suicide* (1985).[8] Shneidman's work, which "is considered by authorities as . . . a major theoretical treatment of self-destruction" (Evans and Farberow 84), also contains within it Shneidman's own caveat: "In suicide, overall, there are no universals, absolutes, or 'alls'" (121). Far from undermining a serious or fruitful study of suicide, however, the very lack of absolutes has the fortuitous effect of opening up the discourse

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[7] In Ulrich Plenzdorf's *Die neuen Leiden des jungen W. An Historical Dictionary of German Figurative Usage* (Spalding) identifies variations of the expression, extending back to Johann Fischart's *Gargantua* (1575). The expression can also be found in Rilke's "Das Lied des Selbstmörders":

> Halten sie mir den Löffel her,
> diesen Löffel Leben.Nein,
> ich will und ich will nicht mehr,
> lasst mich mich übergeben. (7-10)

[8] The common characteristics of suicide described in his *Definition of Suicide* (1985) are reiterated in his more recent work *The Suicidal Mind* (1996).

on suicide. Shneidman not only encourages new ways of approaching the subject (4), but uses Herman Melville's *Moby Dick* as a "case illustration" for his "common characteristics of suicide," thereby drawing a connection between clinical observations and fictional literature. These "common characteristics of suicide," to be explained in greater detail in the section entitled "Methodology," provide a framework through which to describe the literary occurrences of suicide. That an examination of suicide in literature should contain an element of interdisciplinarity is only reasonable. Suicide exists as an actual psycho-social event, of which its manifestation in literature is a reflection or an interpretation. In order for literary suicide to be recognizable as suicide, it should reflect the real-life phenomenon of suicide. In quasi-Platonic terms, one can argue that suicide is of several kinds: in one sense, suicide exists as an idea in the minds of individuals; it also exists as an act, committed by individuals in real life; a third type of suicide is represented in the work of the artist, in the case of literature, a writer. In literature, suicide does not have a static existence, but rather it takes on unique forms as it is interpreted by the literary audience and in further derivative works of art. One clear example of this phenomenon can be seen in the impact of Goethe's *Die Leiden des jungen Werther* (1774). The novel was many times imitated in other works of fiction and was purported to have led to actual instances of suicide.[9] Important to this study is the application of Goethe's novel in Ulrich

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[9] Two early examples of parodies generated by Goethe's work are F. Nicolai's *Die Freuden des jungen Werthers* (1775) and J. F. Kringsteiner's *Werthers Leiden* (1806). Christel von Laßberg, apparently drowned herself in the Ilm River carrying a copy of Goethe's *Werther*. (See "Die Leiden des jungen Werthers." *The Oxford Companion to German Literature*).

Plenzdorf's *Die neuen Leiden des jungen W.* (1972).[10] The literary representation, while not necessarily the accurate depiction of an actual instance of suicide, must be consistent with the reader's idea of suicide. If the suicide, as represented in literature, deviates too greatly from the reader's concept of suicide, the theme becomes unrecognizable or implausible. Only through a reader's socially constructed understanding of suicide is one able to relate to the depiction of suicide in a literary context.

Methodology

The method to be used can be described as a qualitative, case-study approach to works of literature, appropriate because it recognizes each work as an individual and idiosyncratic artefact, a fact which is also true of actual suicides (Shneidman, *Definition* 121), yet does not preclude the finding of commonalities among works. The present study conducts what might be termed a "psycho-literary autopsy"[11] on each of the novels, in order to amass and reconstruct, postdictively,[12] evidence from which to understand the fictional suicidal event(s). The evidence gathered is in the form of statements or actions in the text. The works can thus exist autonomously as products of individual authors and depictions of individual protagonists, yet be connected by the

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[10] See Chapter II.

[11] This term has been adapted from "psychological autopsy," used by Shneidman (*Definition*).

[12] "Postdictive" is a term used by Shneidman, referring to the gathering of information after a suicide, with its opposite being "paradictive" (*Definition* 121).

theme of suicide, which is located in and is an expression of socio-politically similar conditions. The information gathered is distinctly literary, since the suicide and its clues exist as part of a fictional, literary artefact, constructed by an author and mediated through various forms of narration. What is presented is no longer a real event, rather it is the image of an idea, created by an author and interpreted by a reader.

One of the most significant conclusions to be discussed in the course of the dissertation is the apparent difference in motivation for suicide as represented in the novels of the FRG and the GDR. Whereas suicide in the FRG is closely tied to the guilt, real or assumed, for the Nazi regime, suicide in the GDR is the result of the confrontation between the individual and socialist society. The results of this study could find application in the social sciences by contributing to a general understanding of suicidal ideation, and, more specifically, to an understanding of suicide within the German context. In his work *Das Leben wegwerfen?* suicide researcher Erwin Ringel emphasizes the insights that literature contributes to psychiatry by referring to a letter that Sigmund Freud wrote to Arthur Schnitzler:

> Ich habe mich oft verwundert gefragt, woher Sie diese oder jene geheime Kenntnis nehmen konnten, die ich mir durch mühselige Erforschung des Objektes erworben, und endlich kam ich dazu, den Dichter zu beneiden, den ich sonst bewundert. So habe ich den Eindruck gewonnen, daß Sie durch Intuition--eigentlich aber infolge feiner Selbstwahrnehmung--all

> das wissen, was ich in mühsamer Arbeit an anderen Menschen aufgedeckt habe. (qtd. in Ringel 10)

This study contributes to the knowledge of the theme of suicide, lending itself well to comparative studies with other periods within German literature and the literature of other countries and languages.

Shneidman's common characteristics provide the present study with an interface between observed reality and suicide as a literary event. A basic description of these characteristics follows.

Shneidman's Common Characteristics: An Interface Between Reality and Fiction

Because the analysis of suicidal ideation will be facilitated by using Shneidman's common characteristics, some familiarity with his terminology is essential. What follows is an abbreviated explanation of Shneidman's concepts, as outlined in his *Definition of Suicide* (1985), interpreted and applied in the present study.

Shneidman describes six "aspects of suicide" ("situational," "conative," "affective," "cognitive," "relational," and "serial") under which are subsumed ten common characteristics. He discusses "characteristics that accrue to most committed suicides . . . in as reasonable and as ordinary a language as possible "(*Definition* 121-122).

The "situational" aspect encompasses the external or environmental causes of suicide and those events which act upon an individual from without. These external factors produce what Shneidman calls "unendurable psychological pain" and "frustrated psychological needs." Unable to live as one desires, an individual experiences metapain, to the extent that self-inflicted death becomes the preferred alternative to life. Important in the examination of suicide is cognizance of the fact that the perception of frustrated needs is wholly subjective and idiosyncratic. What causes one individual to experience extreme psychological pain may have an entirely different effect on another individual. Broadly speaking, the conditions in Germany during and after the Second World War form the basis for the situational aspect of the novels to be examined here.

The "conative" aspect has to do with the volitional component of suicide. Intentionality of the self-destructive act is an important constraint to the definition of suicide, because this separates suicides from accidental and other forms of death. Simply put, a suicide must intend his own death. Central to the intentionality of suicide are its purpose and goal. Shneidman states that the purpose of suicide is to "seek a solution," and the goal of suicide the "cessation of consciousness." Suicide is not a random act, but rather the solution to a problem. Important here is that the solution found is in extremis. Total cessation of consciousness or "death" becomes the ultimate goal of the suicide. In Plievier's *Stalingrad*, for example, soldiers seek a solution to the intense horror of war. Because they do not perceive other alternatives, the goal becomes cessation of consciousness or death.

The "affective" aspect of suicide relates to suicide's emotional component. Subsumed under this aspect are feelings of "hopelessness-helplessness" and "ambivalence." "Hopelessness-helplessness," the first of these two components is characterised by the extreme and utter resignation of an individual to his fate, an emotion underlying many other feelings such as shame, guilt, impotence, and loneliness. Jurek Becker's novel *Jakob der Lügner* illustrates well the existence of hopelessness-helplessness, an emotion which is combatted in the Jewish ghetto by Jakob's fiction of immanent rescue. "Ambivalence" is not as commonly understood, but is necessary in the understanding of what might otherwise be considered an emotion contrary to a suicidal mind. Ambivalence defines an internal attitude of conflict, where one feels compelled to commit suicide, yet longs for intervention. In Walter Jens's *Nein. Die Welt der Angeklagten*, the protagonist Walter Sturm wrestles with the decision to be killed.

In contrast to the emotion of suicide, the "cognitive" aspect represents the logical or reasoned part of suicide and the fact that the suicidal person has a subjectively sound reason for the act. The term "constriction" refers to the state of "dichotomous thinking," in which an individual is unable to consider a range of options to death as a means of escaping intolerable conditions. Although to the outside observer/reader it may seem that many of the characters in the novels have choices other than suicide, empirical studies in suicidology observe that suicide exhibits individual or subjective kinds of reasoning. One might feel, for example, that the protagonist Bode in Gert Heidenreich's *Der Ausstieg* presents too limited a view of the German situation and

that the author has created a suicide which is unbelievable, but his suicide exemplifies the idiosyncratic nature of the act.

"Communication of intention" and "egression" form what are the "relational" aspects of suicide. The first of these aspects is especially important in the literary context, because it refers to the many clues embedded within the text which help to explain the eventual suicide, such as suicide notes, journal entries, or direct statements. The literary text provides an additional kind of relational information. Clues to suicide can also be provided by other characters in the text or by the narrator itself. Plenzdorf's *Die neuen Leiden des jungen W.* is probably the most complex example of relational information to be dealt with here, because the deceased narrator, who exhibits a changed point-of-view, contributes to the interpretation of his own death from beyond the grave. The term "egression" in the discussion of suicide simply means escape, suicide being the ultimate form of self-escape.

Probably the least developed of Shneidman's aspects within the fictional literature is the "serial" aspect, which refers to suicide as part of an individual's consistent coping pattern when confronted with difficulties. This would include a pattern of self-destructive behaviour, even suicide attempts, prior to a completed suicide. Plenzdorf's Edgar demonstrates a pattern of self-destructive behaviour when confronted with problems, a fact which bolsters the argument that his death was also an act of self-destruction. In the same way, Leonhard Knie in Siegfried Sommer's *Und keiner weint mir nach* develops a pattern of behaviour which forms clues to his eventual suicide.

Shneidman's aspects provide a framework upon which specific textual information is built. Knowing, for example, that intentionality is critical as evidence of suicide, the textual information supporting a character's intention to commit suicide, be it certain described behaviour, narrated commentary, inner monologue, or direct speech, is able not only to demonstrate suicide, but also give specific reasons for suicide. At this point the novel has an identity unique from its suicidological framework and theory. That identity is German, but like the literature in which it is reflected, German identity is fluid, unique to a particular period in history, yet joined to the periods preceding and following it. The theme of suicide in the works to be examined reflects this German identity.

Still connected through the historical, social, and political context, suicide is distinctly literary. Not bound by the constraints of empirical veracity, it is filtered through the works of its authors, conveying meaning outside the bounds of suicidological theory. In order to examine this meaning, the concepts of the instrumental and expressive meanings of suicide will be used, based on concepts articulated in David Wood's article "Suicide as Instrument and Expression" (1980). Purely instrumental suicide is suicide "in which the result aimed at is an empirical consequence of the fact of one's death" (Wood 154), such as the avoidance of suffering, financial hardship, and humiliation. The suicide of soldiers in Plievier's *Stalingrad* illustrates suicide of this type. Wood defines purely expressive suicide as that "which is exhausted by its meaning" (154), that is to say, suicide in which the communicative intent and a desire to be understood is all. Suicide rarely falls strictly into this

category, and most cases are a hybrid type, defined by Wood as "expressively instrumental" (154-155). Literature infuses these categories with an added level of interpretation. The suicide of a protagonist within a novel, may be examined with regard to instrumental and expressive meaning. Kleist and Günderrode, in Wolf's *Kein Ort. Nirgends* (1979), commit suicide in order to escape suffering (instrumental), but the suicides have very obvious meaning for one another (expressive). One may also examine suicide's meaning with regard to the relationship between author/work and reading audience. Again, in the case of Wolf's work to be dealt with here, one can examine the meaning intended and/or effected by the work, i.e. why suicide was included in the novel and with what result.

State of Research

"The study of suicide has produced a body of knowledge, suicidology," write Barraclough and Shepherd, "and those who study and apply it, the suicidologist (sic)" (121). In addition to works which examine suicide in a literary context, preparatio n for this study necessitated a review of the scientific literature on suicide. Suicide as a scientific discipline is reflected in an abundance of material, whereas the treatment of suicide in a literary context is much more limited.

In terms of scientific literature, Shneidman's *Definition of Suicide*, as has been discussed, provides an important framework for a discussion of the suicidal process in human beings. These ideas are again reflected in his more popular treatment of the subject entitled *The Suicidal Mind* (1996).

Contributing to general theory about suicide is a compilation of articles entitled *Suizid: Ergebnisse und Therapie* (1982), edited by Christian Reimer. Although articles devoted to the recognition of suicide and the association of certain factors such as depression and addiction are useful for general knowledge, only one of these articles, "Der Suizid in der Dichtung," by P. Dettmering, looks at suicide in literature. The article examines suicide in Oedipus and Elizabethan dramas, Goethe's *Werther* and others, but mainly from the point of view of the Freudian introjected love object, a theory not applied to the present study.

Bridging the gap somewhat between the scientific and literary discussions is Erwin Ringel's *Das Leben wegwerfen: Reflexionen über Selbstmord* (1978), which provides, in addition to an excellent foreword by the author, an in-depth critical look at some of the fundamental psychosocial factors involved in suicide. In discussing the subject, Ringel makes continued use of examples of the suicidal process from literature. Many of the same concepts described by Shneidman are found here, constriction being referred to as "Einengung," and communication of intention (relational aspect) called "Selbstmordankündigungen," for example. Injecting his moral stance into his discussion, Ringel opposes the view that suicide is ever justifiable.

Another important work in the more general discussion about suicide is Roger Willemsen's *Der Selbstmord* (1986). Willemsen presents suicide in a diversity of forms and brings together texts from an array of sources, both fictional and non-fictional. Included are examples of letters, conversations, autopsy findings, essays, stories, anecdotes, biographical sketches, interviews, legal documents, and other textual forms.

Although the work emphasizes German content, it does not restrict itself thereto. This approach provides valuable information when tracing influences between literature, sociology, and history, underlining the reciprocal nature of the different discourses about suicide.

The journal *Suicide and Life-Threatening Behavior* provides a range of very useful articles. David Daube's "The Linguistics of Suicide" provides a good overview of the concept and etymology of suicide.[13] More recent general treatments of suicide are contained in Kral's "Suicide as Social Logic" and Litman's "Suicidology: A Look Backward and Ahead." "War and Suicide" by Rojcewicz and "Suicides in the Nazi Concentration Camps" by Ryn supply specific information about suicide in war. Information relating to suicide in literature is contained in Lester's "Suicide in Ibsen's Plays," Simone et al.'s "Suicide in the Literary Work of Cesare Pavese," and Slaby's "Creativity, Depression, and Suicide."

As an author and someone personally afflicted with suicidal ideation Alfred Alvarez's work, *The Savage God: A Study of Suicide* (1972), provides a more popularised treatment of suicide. His work provides valuable information concerning the various fallacies and theories of suicide, then traces suicide from the literature of the Middle Ages to the twentieth century.

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[13] Barraclough and Shepherd disagree with Daube's assertion that the English word "suicide" first appears in Charleton's *The Ephesian Matron* (1659), and maintain that Sir Thomas Browne's *Religio Medici* (1643) is the first instance.

In *Literatur und Selbstmord* (1965) Hans Jürgen Baden examines the motif of suicide from the point of view of three authors who committed suicide (Cesare Pavese, Klaus Mann, Ernest Hemingway). Although an important study, Baden's work falls more in the area of literary biography. He examines the melding of life and work as the seismograph of personal destiny. The chapter devoted to Klaus Mann is informative because it describes the political engagement of the author and the intellectual background of the period.

"Die Darstellung des Suizids in der deutschsprachigen Literatur seit Goethe" (1992), a dissertation by Gabriele Adler,[14] investigates, from a clinical point of view, the relationship between the actual lives of German-speaking authors and their works. Her discussion is limited to authors for whom there is a demonstrable propensity toward suicide, many of whom succeeded in taking their own lives. Her study does not extend to authors and works of the second half of the twentieth century, however. Once again Adler, like Baden, relates the theme of suicide in the literary work to the demonstrated suicidal tendency of the author.

In addition to these larger works, Michael Rohrwasser's "Das Selbstmordmotiv in der DDR-Literatur" (1983) is an important article for the examination of suicide in the context of the German Democratic Republic. Rohrwasser outlines the treatment of the suicide motif in GDR literature, elucidating important concepts in the ideology of socialism and its influence on society.

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[14] This dissertation was obtained through the Staats- und Stadtbibliothek in Augsburg, which has a collection of literature on the subject of suicide.

In addition to constituting a list of works cited, the bibliography of this dissertation provides the reader with additional and relevant material on the subject of suicide.

Scholarly Contribution

This study, which is in part an application of suicidological theory, examines the theme of suicide as it relates to the German novel during roughly forty years after the Second World War. Many novels in this period relate suicide directly to the political fallout of the war in Germany. Significant too is the discovery that the theme of suicide is depicted differently in the two German states.

As will be shown, connections between the literary depiction of suicide and the real-life phenomenon can be drawn, thus imbuing the study with relevance beyond the strictly literary sphere. Primarily, however, the study examines suicide in the literary context, demonstrating how this theme is used by authors to put forward certain ideas, such as the discourse on German guilt and the conflict between individual and society.

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Chapter I

Suicide in the German Novel 1945-49

The Anti-fascist Message

The period from the end of the Second World War until the establishment of two Germanies in 1949 witnessed the gradual alignment of the Soviet zone and the Western zones with the ideologies of the respective occupying powers. Despite the developing disunity between authors of East and West, evident at the First German Writers' Congress in Berlin in 1947 (Bangerter 4), the writers did pass an anti-fascist resolution, a posture already evident in works such as Theodor Plievier's *Stalingrad* (1945) and Hans Fallada's *Jeder stirbt für sich allein* (1947).

As will be shown, a prominent theme used in the communication of the anti-fascist message is suicide. Although differentiated in their depictions of suicide, the novels share much in common. Suicide is shown to be a product of fascism and the circumstances surrounding the Nazi regime. Within this context, one of the primary motivating factors is guilt. This is especially true of Plievier's novel *Stalingrad*, where suicide is largely a collective event. In Fallada's novel, on the other hand, suicides motivated by the guilt of association with the regime are contrasted with the suicides of those oppressed by the Nazi regime.

Although similar in that they wrote anti-fascist novels in the immediate post-war period, the circumstances under which Plievier and Fallada produced their novels

differed. Plievier[1] was forced into what Dieter Sevin describes as "unfreiwillige[s] Exil in der Sowjetunion" in 1934 ("Das Grauenhafte" 296), after having sought refuge in Hungary, France, and Sweden. Neither Plievier's stay in the Soviet Union, nor his writing of *Stalingrad*, were born out of ideological commitment to the tenets of Communism. The fact that Plievier refused membership in the Communist Party actually jeopardised his existence in the Soviet Union, leading to years of stagnation and the near refusal of permission for him to write the novel. *Stalingrad*, one of several treatments of the decisive military campaign, is the first (Balzer 461) and best-known novel (Wagener 150) to deal with the subject. Other treatments of the Stalingrad theme include Heinrich Gerlach's *Die verratene Armee* (1957), Fritz Wöss's *Hunde, wollt ihr ewig leben* (1958), Alexander Kluge's *Schlachtbeschreibung* (1966), Johannes R. Becher's drama *Winterschlacht* (1945), Franz Fühmann's poem "Die Fahrt nach Stalingrad" (1953), and Heiner Müller's more recent drama *Germania Tod in Berlin* (1977). Peitsch points out that Plievier's novel was the first big literary success after 1945 and, next to Thomas Mann's *Doktor Faustus* (1947), the work of exile literature most reviewed in newspapers (93). Plievier's work also provided some of the inspiration for Wolfgang Borchert's well-known work *Draußen vor der Tür* (1947) (Sevin "Das Grauenhafte" 295).

The ideological conflict between German writers in exile and writers of the so-called "inner emigration" was to become a source of vitriol in the post-war period.

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[1] Spelt "Plivier" until 1933 ("Plievier," *Deutsches Literatur Lexikon*).

Fallada,[2] who remained in Germany, falls into the latter category of writers. Although Fallada's *Jeder stirbt für sich allein* castigates the Nazi regime, Fallada has been criticised for his inconsistent literary stance against Nazism in works such as *Wir hatten mal ein Kind* (1934) (Wolff 15) and, despite his popularity since World War II, was for a long time neglected by western critics as being too closely aligned with the German Democratic Republic (Zachau 12-13). Nevertheless, *Jeder stirbt für sich allein* has been described as the first work of anti-fascist literature produced in Germany after the war (Gessler 156). Fallada, who was largely ignorant of anti-fascist resistance during the war, was encouraged by Johannes R. Becher to assume the task of writing a book about it (Zachau 185). Fallada was given a Gestapo file about the resistance of a Berlin couple who began to write and distribute cards discrediting Hitler. After two years of activity, the couple was found out and given the death sentence. Intended at first as an article and then as a film manuscript, Fallada's book grew into a novel.

Theodor Plievier's *Stalingrad* (1945): Collective Suicide

> Da erschießt sich einer, da räumt sich einer noch totaler weg. Das geschieht in jeder Stunde, hier und im Umkreis, einzeln und serienweise

[2] Actually Rudolf Ditzen.

> (das mündliche Verbot des OB ist kein Kraut dagegen). (Plievier, *Stalingrad* 303; henceforth *STA*)

This excerpt, taken from Theodor Plievier's *Stalingrad*, is but one of many indications of suicide in a novel which deals in a graphic way with the fate of the German Sixth Army during its campaign in and near the Russian city of Stalingrad between November 18, 1942 and the capitulation of the army on February 2, 1943. Suicide, as it is being conveyed here by an omniscient narrator, is represented as a pervasive problem, and the instances of completed suicide and suicidal ideation occur with a frequency and purposefulness which make them a question of central importance. Whether for reasons of "patriotism, social integration, and national purpose" (Grollman 55; Rojcewicz 47-48) or the purgative effect of externalised aggression (Ringel 68; Rojcewicz 47-48), suicide rates in actual wartime conditions tend to fall. The high degree of suicide described in the novel would seem to indicate unusual circumstances. And indeed, as shall be shown, the German Sixth Army at Stalingrad, as depicted in the novel, lacks the integration and sense of common patriotic purpose otherwise common in war.

Stalingrad does not pursue suicide in the psychic development of any one single character in a linear, comprehensive fashion. Instead, the novel depicts suicide as a collective event,[3] the result of politically created circumstances. The rapidly changing scenes are joined one to another through repeated phrases such as "Und da gab es,"

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[3] Jennifer E. Michaels also discusses Plievier's novel in terms of a "collective protagonist" (126).

"Und einige Meter weiter," and "Und sechs Kilometer entfernt von dieser Stelle," contributing to the simultaneity of place and time. *Stalingrad* examines in detail the suffering and fate of an army "eingekesselt" by its Russian counterparts. Rendered impotent, the aggression of the German Army and its soldiers begins to turn inward. These situational factors define the environment in which suicide is produced and lead directly to what Shneidman refers to as unendurable psychological pain and frustrated psychological needs (*Definition* 124-126).

Psychological pain and frustrated psychological needs are, in part, a product of the neglect of physical needs. The novel presents the immediacy of war-time conditions through a near-overabundance of vivid and realistic descriptions of the misery and brutality experienced by the soldiers. Referring to the dead as "16 Kubikmeter Menschenfleisches," "Teile und rosiges Geschlinge," and "erdige Gestalten, mit verzerrten Gesichtern, mit sinnlos aufgerissenen Augen, mit losgetrennten Beinen, Armen, halbierten Körpern, unkenntlichen Fleischstücken" (*STA* 10), the novel accentuates the devaluation of human life which attends physical suffering. Plievier comes very close to producing inurement in the reader to the carnage described, but is able to effectively rehumanise the victims of war by juxtaposing graphic descriptions of death with excerpts from soldiers' personal correspondence with families. The inclusion of personal letters underscores not only that these men were individuals who were denied their homes and families, but also that these soldiers had been thrust into a single cause and stripped of their identities.

An important element in the determination of suicide is its conative aspect (Shneidman *Definition* 128-130). For death to be defined as suicide, it must be shown that a person has intentionally done something to bring about his own death. Only then is death removed from the realm of the accidental or arbitrary, and motivations for self-inflicted death may be pursued. As Shneidman indicates, intentionality is commonly characterised by one's search for a solution and a movement towards a cessation of consciousness. The novel provides many examples of suicide, exhibiting a wide range of lethal methods and much evidence of intentionality. Names are sometimes attached to the perpetrators, but often are not, and individual suicides are developed little, creating a collage of gruesome snapshots. In many instances, the narrator communicates unequivocal examples of suicide in the words of other characters: "Im Kom, der Sekretär hat sich erschossen" (*STA* 27), "heute morgen hat sich Feldwebel Pöhls erschossen" (*STA* 133), and "der Oberveterinär hat sich durch den Mund geschossen!" (*STA* 261). In other instances, suicide is circumstantially deducible: "Einer sagte zu ihm: 'Mensch, machen Sie doch keinen Quatsch.' Doch er lief davon. . . . Und da auf dem Gang . . . . Da liegt er. Einschuß in die rechte Schläfe. Er hatte bereits gestern den Divisionsarzt gefragt, wo man am besten hinschießen müsse . . . (*STA* 302-303). So pervasive is suicide among the soldiers that it is sometimes recognisable to other soldiers in a person's gait: "'Machen Sie doch keinen Quatsch, Kumitsch!' Aber Lawkow sah den Unteroffizier davongehen mit diesem eigentümlichen Schritt, den er bereits kannte" (*STA* 360). For some, suicide is

methodical and thoughtful, with an air of honour (*STA* 225), for others, suicide is hidden or indirect, typified by one who intentionally places himself in a situation which brings about certain death through an external force (*STA* 227; 296; 326). Suicide is often interpreted and communicated to the reader through other characters, in passages such as "jetzt erst begriffen sie: Er will ja gar nicht ausbrechen, der will ja was anderes" (*STA* 326). The fact that suicide was widely observed and understood gives further evidence of the degree to which suicide had become a collective event. At one point, the phenomenon is described in terms of "eine Selbstmordwelle nach der andern" (*STA* 361-362).

To a large degree, the collectivization of the suicidal phenomenon creates the impression that the German Sixth Army and, by extension, the German people have turned against themselves. Hitler's orders for "Einigelung" and the destruction of non-transportable munitions (*STA* 40) and provisions (*STA* 219) are nothing less than acts of self-destruction. The sick are shot and buried (*STA* 81), the desperately hungry are also condemned to death (*STA* 200). In the face of the German Command's refusal to accept the humane terms of capitulation as offered by the Soviets, the Germans assume the responsibility for their own destruction (*STA* 71).

Although the entire army is united in a common fate, which produces extreme psychic suffering and the contemplation and commission of suicide, Plievier is careful to give responsibility to the system that has bred a suicidal military zeal, a zeal inculcated in organisations such as the *Hitlerjugend*. "Kraftgefühl, physisches und

moralisches (und Moral als Überlegenheit eines angenommenen Herren- und Übermenschentums gegenüber einem angenommenen Sklaven- und Untermenschentum)," the novel writes of one of the army's indoctrinated, "war in ihm entwickelt worden, und darauf gepfropt eine besondere Art, nicht auf Selbsterhaltung, oft sogar auf Selbstvernichtung gerichteten bedenkenlosen Mutes" (*STA* 108). The fostering of a willingness to die for the aspirations or ideology of one's country is not something confined to fascism, rather is a foundation of military thinking.

The novel levels criticism at members of the officer class as representatives of German military authority. Criticism comes by way of the vision of change from within, primarily in the character of Colonel Vilshofen, who gives voice to German guilt and, eventually, the hope for German renewal.

Colonel Vilshofen: Vision of The New Man

Colonel Manfred Vilshofen, the conduit of much commentary, is introduced by the narrator:

> Und da war Vilshofen.
>
> Aber Vilshofen, das war noch etwas anderes als nur das Gesicht und die Art eines Mannes, es war die Vorstellung einer Welt, wie sie aus Blut und Tränen neu erstehen, und die Vorstellung einer Gesellschaft, wie sie aus Krämpfen in neuer Gestalt mit veränderten Völkergrenzen und mit geänderten Herrschaftsverhältnissen hervorgehen sollte. (*STA* 12)

Although Vilshofen eventually experiences the senselessness of Hitler's campaign, Sevin points out that Vilshofen is a committed officer of the old school, who, like Vilshofen's teacher von Seekt, dreams of an expansion of German territory in the east (Sevin *Individuum* 85). The terms "Blut," "Boden," "Völkergrenzen," and "Herrschaftsverhältnissen" initially give Vilshofen the image of the hero of a novel of *Blut- und Boden* literature. This very association with Nazism, however, contrasts sharply with the figure that Vilshofen becomes as the novel progresses.

Suicide Considered

Introduced thus by the narrator, Vilshofen assumes, whether as a fascist or not, a pivotal position in the novel and is the figure through which important themes are discussed (Sevin *Individuum* 74). Representing an idea which, in the words of the narrator, "should" arise from the suffering and the vicissitudes of the war, the points of view of Vilshofen and the narrator are linked. As the novel unfolds, the theme of suicide is advanced to the greatest extent by Vilshofen and the narrator.

Stalingrad is not to be the source of military pride. As the German Sixth Army suffers, ample evidence of suicides among the common soldiery is detailed. Not surprisingly, as the war progresses, Vilshofen becomes worried and disillusioned, but not as a result of the inability of his soldiers to carry out the task given them. As the military situation becomes hopeless, Vilshofen realises that the men are dying needlessly. Vilshofen gives voice to the tragic enormity of the Stalingrad campaign, identifying the source of so much suffering: "Die Stätte der verlorenen Schlacht, des

verlorenen Krieges, der Zenithöhe deutschen Machtstrebens, der schwersten Niederlage in der deutschen Kriegsgeschichte, des tiefsten moralischen und politischen Falles des deutschen Volkes" (*STA* 323). Stalingrad is not only a lost battle, but also the moral and political low point for the entire German people. Despite the concentration of action within the field of battle, Vilshofen broadens the scope of responsibility, situating it squarely with the German people.

Vilshofen is portrayed as uncharacteristic in his criticism of German military tactics and his defiance of authority. Increasingly sceptical of the direction and leadership of National Socialism, Vilshofen toils over the idea of suicide, at first promoting it as the logical consequence of the hopelessness-helplessness of the situation, a common emotion of suicide (Shneidman, *Definition* 131). In conveying ideas and opinions, the convergent voice of the narrator is often indistinguishable from the inner thoughts of Vilshofen. In one typical example, Vilshofen considers suicide as an inevitability, given the hopelessness of the circumstances:

> Man hat zu warten, auf das Ereignis, und zwar von außen. Von außen muß die Tür aufgemacht werden. Die Hand, die sie von innen geöffnet hätte, ist nicht da. Des eigenen Entschlusses hat man sich begeben. Das ist die Tragödie der Männer hier im Keller, der ganzen Armee, eines ganzen Volkes! Das war es, was Vilshofen dachte, und weiter dachte er: Das einzige, was zu beschließen bleibt, ist der Griff nach der Pistolentasche. (*STA* 291)

Euphemistically contained in the expression "Griff nach der Pistolentasche," the act is somewhat distanced, still just the contemplation of a violent self-destructive act. The novel describes men who are impotent to act and yet unable to decide their own fates. Suicide, though a forbidden act, constituting surrender or desertion, is perceived as the only alternative. In their constricted state of thinking, the soldiers' options are reduced to murder from without or suicide from within. Suicide represents a kind of *Freitod*, and although this word is never used in the novel, suicide remains the only act of freedom left to them. The fate of the encircled army is generalised to include the tragedy of the entire German people. Suicide thus becomes the contemplated solution for all, as a way of assuming control over oneself. Although the narrator distances himself slightly from the character of Vilshofen through phrases such as "das war es, was Vilshofen, dachte, und weiter dachte er . . ." (*STA* 291), the identification between Vilshofen and the narrator is sufficiently established so that Vilshofen's thoughts are little more than the preaching of the narrator.

Despite the generalised pronouncements of German guilt, the plight of the ordinary soldier, however desperate, is shown to be qualitatively different from that of the officer class. Through Vilshofen, criticism is levelled at the officers, who, as the crisis intensifies, can be seen looking for "Schutz und Schild" in a hymn book (*STA* 295), or reading Goethe's *Faust*, dreaming of an heroic death (*STA* 294). "Die haben noch die Wahl," Vilshofen says to himself, "und wir werden sehen, ja, das will ich noch sehen, was sie wählen" (*STA* 295). Vilshofen here refers to the choice that he sees open to the officers, a choice which he thinks improbable as they elect to hide behind

reasons such as religion: "der Oberstleutnant hat sich deutlich darüber ausgesprochen, daß ihm religiöse Gründe gewisse Handlungen, und dazu gehöre der Selbstmord, verbieten" (*STA* 295). Apart from the religious injunction against suicide, obedience in the military chain of command provides as persuasive a reason as any not to commit suicide.

Suicide Rejected

Vilshofen himself contemplates suicide, but, paradoxically, in the presence of so much violence, is unsure of how to accomplish it. "Aber wie geht das vor," he says to himself," wie geht dieser letzte Akt vonstatten! Wie? Wie?" (*STA* 295). The question of suicide, reintroduced in the narratorial statement "Da war die Frage wieder, die unvermeidliche" (*STA* 298), becomes pervasive, not only in the thoughts of Vilshofen, but among the other officers as well. The central dilemma becomes "was tut man, und wann tut man es, und wie tut man es?" (*STA* 299), a consideration met with the military prohibition: ". . . der Oberbefehlshaber hat sich mündlich gegen den Selbstmord entschieden und hat den Selbstmord verboten!" (*STA* 299). Notwithstanding the injunctions already mentioned, one officer admits the obvious: "Es ist nicht so einfach, sich selbst zu erschießen!" (*STA* 299).

Defeat and disgrace at the hands of the Russians are also connected to the contemplation of suicide:

> Baron von Bauske führte das Wort. Thema: Selbstmord in aussichtsloser Lage. Er erzählte eine Geschichte aus seiner Heimat, aus Rakwere in Kurland, wo im Jahre 1625 von Russen eingeschlossene Deutsche sich mit Frauen und Kindern in die Luft gesprengt hätten; und er wußte noch andere ähnliche Beispiele. (*STA* 38)

But suicide in such circumstances constitutes desertion (Dubitscher 11), unless it becomes the official order of a commanding body, in which case it constitutes altruistic suicide.[4]

In his schematization of the commonalities of suicide Shneidman discusses the cognitive aspect of constriction, the dichotomous thinking that accompanies suicide. This constriction is succinctly expressed by one officer in the novel as, "Gefangenschaft gehen--erschießen?" (*STA* 375). Many are unable to conceive of any other option than suicide, and to be captured by the enemy was tantamount to death. Because Hitler, contrary to sound military judgement, has proclaimed "Kapitulation ausgeschlossen," the allegiance of the officer corps to Nazi leadership begins to break down, causing one general to state openly "ich Selbstmord begehen, für diesen hergelaufenen Lumpenkerl? Nein!" (*STA* 299). The reaction to this anti-Hitler admission is described as a kind of revelation among other officers for whom outward allegiance to the Führer had been almost sacrosanct:

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[4] Altruistic suicide is a concept developed by Emile Durkheim and is characterised by immoderate identification of an individual with a social group, to the extent that one sacrifices oneself for the causes of the group (Evans and Farberow 11). An example of altruistic suicide is found in the case of the Masada. In A.D. 72-73 many Jews committed mass suicide in order to prevent capture by the Romans (Evans and Farberow 196).

> Da war Staunen, war Fassungslosigkeit und Bestürzung, war Angst, sogar panische Angst. Ist es denn möglich--ein Götzenbild wird umgeworfen, und kein Donner und Feuerstrahl fährt vom Himmel und vernichtet den Frevler? (*STA* 299)

What to a present-day audience might be a laughable reaction to an innocuous statement of non-compliance, must certainly have been powerful to a post-war audience, whose memories of ruthless totalitarian rule were still fresh. Sevin identifies the breach of military fealty as being a turning point in Vilshofen's own consideration of suicide (*Individuum* 102), offering as proof the following passage:

> Gegenstoß oder Bahndamm oder einfacher Selbstmord gilt dabei gleichviel . . . . Mit dem toten Mann macht man was man will. Der tote Mann ist dann schließlich für die Sache gestorben, für die verruchte, bis ins Herz stinkige Sache, und mit seinen Knochen wird getrommelt, auf daß der Zug des Todes weitergehe. (*STA* 301)

This passage is a legitimation of a growing sentiment that death in any form advances Hitler's cause and would be as senseless as Hitler's cause itself. Although Sevin attributes the commentary to Vilshofen, it would seem more likely a part of the more general commentary of the narrator, because there is much to suggest that Vilshofen himself continues to consider suicide as an option. "Eine Frage gestatten Sie mir noch, meine Herren!" Vilshofen later asks: "Ich habe vorher die Tendenz bemerkt, nichts zu tun und das Ereignis an sich herantreten zu lassen. Auch nichts gegen sich selbst zu tun, ich meine, auch nicht die Hand gegen sich selbst zu erheben" (*STA* 320). The

officers' immediate responses to Vilshofen's unabated pursuit of the question of suicide clearly depict him as still heavily involved in the contemplation of suicide as the following quotations would indicate: "Mein Gott, geht das nun schon wieder los!", "Dieser Vilshofen ist ja geradezu wie der rauhe Strick, den wir nötig haben, um uns aufzuhängen!", and "Es ist zum Verzweifeln, aber andererseits ist es wahr, die Frage ist in der Tat nicht geklärt!" (*STA* 320). Appealing to the consciences of these men, Vilshofen argues that to remain alive when all other soldiers have died is unacceptable, but to jump from a sinking ship, something denied the common soldiery (*STA* 320), would be inconsistent, an argument which illustrates further the dichotomy between self-preservation and self-destruction.

Vilshofen does eventually abandon suicide as an alternative to intolerable circumstances. His new position observes life as the morally highest road, the road of greatest responsibility. Vilshofen now urges one to reject death for one's country, a lie which has been perpetuated in the phrase "Sie starben, damit Deutschland lebe!" (*STA* 320), and asserts that to die because of the crimes committed would be too much. He offers instead what he perceives to be the fate of those Germans who remain alive:

> Das ist die Lage, unsere besondere Lage, meine Herren: das hebt die Folgewidrigkeit des Trotzdem-am-Leben-Bleibens auf. Das Leben empfangen Sie wieder als Lebensurteil! Nur gegen den: nur gegen ihn und gegen das an Deutschland und den andern Völkern begangene Verbrechen! (*STA* 321)

Vilshofen phrases the fate of Germans in a juridical way, as a "life sentence," implying that one will carry the responsibility and the guilt associated with the injustices of the war. In pronouncing his sentence, Vilshofen describes "das Verbrechen" as having been committed not just against other people, but against Germany as well, once again placing blame on the officers of the German military.

"Schuld–Sühne"

> Schuld--Sühne!
>
> Wenn Ursache ohne Wirkung, wenn Schuld ohne Sühne bleiben könnte--das Gleichgewicht der Welt wäre gestört, und kein Bestand der Dinge wäre, und nur noch Verkehrung.
>
> Und das kann nicht sein! (*STA* 157-158)

The thoughts of an army pastor as he gives last rites to the dying express the theme of guilt which is inextricably bound to the theme of suicide. Self-sacrifice as atonement for sin with its ultimate expression in the Crucifixion, is alluded to in the novel when Vilshofen states, "meine Herren, begreifen Sie . . . das grüne Flackern des Weltuntergangs und Ostermorgenlicht zugleich am Himmel!" describing himself as "noch nicht gestorben und schon wiedergeboren" (*STA* 301). Whereas Christ dies for the sins of the world, the character Vilshofen describes absolution for wrongdoing without the necessity of death.

There is a continuing religious presence throughout the novel, as army chaplains are described ministering to the dead and dying. Near the beginning of the novel, as officers discuss suicide as an honourable way out of an inescapable situation, a minister is asked his opinion about suicide, to which it is stated that, "der Pfarrer hatte eine Reihe Argumente gegen den Selbstmord, die er vorbrachte" (*STA* 38). Although the reasons are not elaborated on in the text, it can be assumed that the central argument relates to the religious prohibition of murder, as reflected in the word *Selbstmord*. As the clergy constantly witness senseless death, the war is increasingly associated with guilt. "Mit jedem Sterbenden starb er," is written of one such chaplain "und mit jedem Leidenden fühlte er eigene Schuld anwachsen" (*STA* 157). As the novel progresses and conditions become worse, religious disposition changes in favour of suicide as a merciful termination of pain: ". . . und ich verstehe es, ich kann es verstehen," says one minister, "wenn heute einer mit sich Schluß macht und sich das Leben nimmt" (*STA* 260).

"Ohne den Weg der Reinigung aus der Tiefe des Schuldbewußtseins," states Karl Jaspers, "ist keine Wahrheit für den Deutschen zu verwirklichen" (*Schuldfrage* 84). It is with this consciousness of guilt that the novel grapples:

> Wie schwer wiegt die Schuld?
>
> Wieviel wiegt die tote Stalingradarmee, wieviel wiegt dieser gespenstische Gefangenenzug, und was ist noch auf die Schale zu legen?
>
> Ist die Schuld aufzuwiegen, wie ist sie aufzuwiegen? (*STA* 391)

Although the novel imputes to Germans criminal, political, moral, and metaphysical guilt,[5] emphasis is clearly placed on the responsibility of the military: "Artillerie, Granatwerfer, Panzer--eine ganze Maschinerie der Hölle, wie deutsche Technik sie entwickelt, deutsche Arbeit sie überdimensioniert, eine deutsche Generalität sie mißbraucht hat, um andere Völker zu zertreten" (*STA* 206). Appealing to a Germany, "desselben Volks, das einen Gutenberg, einen Matthias Grünewald, einen Martin Luther, einen Beethoven, einen Immanuel Kant hervorgebracht hat" (*STA* 391), the narrator implores the reader to summon courage and the knowledge of a different German identity and history, with a view to the rebuilding of Germany. "Stalingrad war der Preis für Sterben und Krankheit, für Verstümmelung und Hunger und Strapazen und Schwären, und es bedeutete die Vergebung aller Sünden" (*STA* 65). This hopeful statement by the narrator early in the novel expresses a rather naïve optimism. Although the people of the Federal Republic of Germany would rebound economically following the war, the chasm which would divide Germany as a result of war has had effects which seem to have outlasted even reunification, perhaps one reason why the book has lost the popularity it first enjoyed.

The Meaning of Suicide

In an attempt to convey historical authenticity Plievier interweaves his novel with actual documents such as soldiers' letters, eye witness accounts, Russian offers

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[5] For a discussion of these terms, see Jaspers, *Die Schuldfrage*.

of capitulation, and speeches by Goebbels and Hitler (Sevin, "Das Grauenhafte" 297). Although based on actual documents of German soldiers, there is no evidence to suggest that suicide took place on the massive scale depicted in Plievier's novel, reasonable though it would have been in such circumstances. The theme of suicide, however consciously developed by the author, performs a function that goes beyond Shneidman's largely descriptive classification.

By connecting the collective condition of suicide to the moral conscience of the repentant officer Vilshofen, Plievier creates the perception that contrition was a widespread sentiment, something which was obviously welcomed in the wake of the war. Suicide or the contemplation thereof represents the ultimate existential crisis and *Stalingrad* was often praised for the cathartic effect it had on its readers (Peitsch 94). It might be said that the novel's pronouncement of collective guilt and the contemplation of suicide allow the German reader of the day to be purged of feelings of self-blame, and thus to move away from self-destruction.

The eventual rejection of suicide as an option is consistent with the affirmative example of the socialist "positive hero," but many critics would suggest that Plievier's novel is not an example of tendentious socialist literature (Peitsch 94-95). Comparing *Stalingrad* to Johannes R. Becher's *Winterschlacht: Eine deutsche Tragödie* (1953), Michaels posits that whereas Becher's work is influenced by an ideology similar to that of the Soviet Union, Plievier, through his documentary approach is able to avoid such ideology (123).

The description of a "Selbstmordwelle" is testament to the fact that suicide is depicted in Plievier's novel as having a suggestive effect on soldiers, that is to say that the observation of suicide often led to suicide in others. The representation of suicide in the novel as an epidemic brings the issue of suicide as a serious problem to the consciousness of the reader, augmenting, in combination with Vilshofen's overt comtemplation of suicide, the overall presence of the theme.

The most salient function of the theme in the novel is one of expressive meaning from the author/narrator to the reader. Suicide in the fictional context represents the height of German guilt and anguish following the war. But the expressive message to the reader is an injunction against suicide as a logical way out.

Hans Fallada's *Jeder stirbt für sich allein* (1947): Suicide and Anti-Fascist Resistance

Like Plievier's *Stalingrad*, Fallada's postwar novel *Jeder stirbt für sich allein* (Henceforth *JSA*)[6] presents the Second World War and National Socialism as the precipitating historical and political events of suicide. Whereas *Stalingrad* deals with German issues in a foreign setting, the action of Fallada's novel is situated within Germany, and thus the physical locations of the authors are mirrored in their novels. Although guilt and egression from intolerable circumstances are associated, to an

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[6] Fallada's novel *Der Alpdruck* (1947) also contains much suicidal ideation, although the novel leaves the fate of the protagonists open. In the novel, egression takes the form of pharmacothemia, producing a state referred to in the novel as "der kleine Tod."

extent, with suicide in Fallada's novel, *Jeder stirbt für sich allein* is primarily a novel of resistance, perhaps even the first postwar novel to treat the subject of anti-fascist resistance (Gessler 156). The material for Fallada's novel is based on actual Gestapo documents and was first published as an article entitled "Über den doch vorhandenen Widerstand der Deutschen gegen den Hitlerterror" (Gessler 155).

Suicide as Resignation: Frau Rosenthal

Common to all suicides in the novel, the terror of the Nazi regime creates a climate in which injustices are committed against human beings. This is particularly the case for someone of the Jewish faith, and Fallada, unlike Plievier, devotes at least a small amount of attention to this significant aspect of Nazi terrorism. The novel's character Frau Rosenthal is a victim of Jewish persecution, probably the aspect of the war most commonly associated with Nazism.

The persecution of Frau Rosenthal is revealed in its extreme, at a time when the machinery of hate has created a sense of constant threat for her and those like her. Thus it is the presence of fear which contributes to Frau Rosenthal's psychological pain: "Seit Monaten hatte sie in Furcht und Unordnung gelebt, zwischen gepackten Sachen, stets gewärtig des brutalsten Überfalls. Seit Monaten kannte sie weder Heim noch Ruhe, noch Frieden, noch Behagen" (*JSA* 85). Dignity, peace, and security are psychological needs of which Frau Rosenthal has been robbed. Only a memory now are the times that she and her husband "noch angesehene, geachtete Menschen waren,

nicht gehetztes Ungeziefer, das zu vertilgen Pflicht ist" (*JSA* 86). Frau Rosenthal's opinion of herself reveals a sense of dehumanisation and an external threat to her very existence. Her existence, so closely associated with that of her husband, has already been partially destroyed in that her husband has been incarcerated by the authorities. The uncertainty of his fate is an additional source of psychological pain for Frau Rosenthal.

The very real elimination of freedom in Frau Rosenthal's life leads to a constricted view of life itself. As if to mirror her mental state of constriction, Frau Rosenthal is obliged to take up "Schutzhaft" with a neighbour, a refuge which becomes a prison. Desiring escape from her imprisonment, she reflects "das schlimmste war nicht so schlimm wie dieses tatenlose Eingesperrtsein" (*JSA* 126). In order to attain partial egression from, and to cope with, her circumstances, Frau Rosenthal resorts to sleeping pills: "Nun schüttelt sie alle, zwölf oder vierzehn an der Zahl, in ihre hohle Hand, geht zum Waschtisch und spült sie mit einem Glas Wasser hinunter" (*JSA* 127). Part of Frau Rosenthal's frustration lies in her admitted inability to act. The act of taking drugs gives her at least a modicum of control over herself. In a state of hallucination and wakeful sleep, Frau Rosenthal imagines her husband to be returning home and ventures out of the safety of her neighbour's room. Symbolic of her liberation, she is not wearing the compulsory "Judenstern," and eventually returns home only to be met by three members of the SA. Interrogated and beaten, she seeks an end to her pain in total cessation of consciousness. Her leap from a window is fatal.

In a study of the novel Kieser-Reinke devotes little space to the aspect of suicide. Of Frau Rosenthal's suicide she says: "Frau Rosenthal, die als Jüdin von der Leser-Erwartung her als Opfer par excellence prädestiniert sein dürfte, müßte eigentlich ungleich stärkere Sympathie erwecken als ein Kommissar Escherich" (121-122). Although it is true that Frau Rosenthal's suicide evokes great sympathy in the reader, such short commentary does not do justice to Frau Rosenthal's plight. Her suicide is fundamentally different from that of other characters, and not just in the degree to which it affects the reader. Frau Rosenthal has been dehumanised and isolated by the Nazi regime. Deprived of her husband and her belongings, she loses her connection with her home, a home which has become unrecognisable and inhospitable. Although she too is German, she has been defined out of society solely because of supposed "non-Aryan" ethnicity. Legalised brutality towards Jews denies her the most basic rights in society. She, unlike all others in the novel, does not even have the option of quiet conformity.

Guilt and Suicide: Escherich

Unlike Frau Rosenthal, Escherich is a figure who, as a Nazi official, is in a position of power. Quite rightly Kieser-Reinke asserts that the suicide of Frau Rosenthal should evoke much stronger sympathy in the reader than that of Kommissar Escherich, because, as a Nazi officer, he was the source of pain for others (122). Escherich's suicide, Kieser-Reinke continues, "selbst wenn man ihn als eine Art Sühne

verstehen will," is "kaum mehr als eine Kompensation allzu grosser Antipathie" (122). Although it is true that Escherich is part of the grisly Nazi machinery, he does not present quite the negative picture that Kieser-Reinke would suggest. Although Escherich is a Gestapo official, his actions and the opinions of others portray him as rather different than the typical Nazi official. In his interrogation of one Frau Gesch, Frau Gesch contrasts him favourably with others in the Gestapo and thus he is purposely distanced from the brutality associated with that agency. Escherich is clearly in a state of conflict about his function. Although he despises his superiors, he nevertheless continues to operate with them out of cowardliness and opportunism. Like Vilshofen in Plievier's novel, Escherich is presented as someone who is fundamentally different from those around him, and it is during his involvement with the case of the "Klabautermann" (here, someone involved in the dissemination of anti-Nazi cards), that he begins to experience the feelings of guilt that eventually lead to his suicide. His less aggressive approach to the solving of the crime meets with the disapproval of his superiors, who find his methods suspicious (*JSA* 338). Escherich arranges for the care of the sick Anna Quangel, one of those responsible for the Klabautermann actions of resistance, and is even judged by Otto Quangel to be "kein schlechter Mann" (*JSA* 419). Escherich himself eventually becomes a direct victim of Nazi terror, when he is tortured for the lack of progress in his investigation, again underscoring his distinctness from his fellow Gestapo. Escherisch witnesses the beating of Otto Quangel and is profoundly affected. Following the beating Quangel appeals to Escherich's conscience: "Sie arbeiten für einen Mörder, und Sie liefern dem

Mörder stets neue Beute." He says of Escherich after the beating, "Sie tun's für Geld, vielleicht glauben Sie nicht mal an den Mann. Nein, Sie glauben bestimmt nicht an ihn. Bloß für Geld . . ." (*JSA* 426). It is these statements that cause Escherich to seriously ponder his own existence, realising the truth in what Quangel has said. He feels remorse and responsibility for Quangel's torture and asks, "was hat das alles für einen Sinn?" (*JSA* 429). His question is reminiscent of Vilshofen's contemplation of the war in *Stalingrad.*

Deeply disturbed by his own responsibility for the mistreatment of Quangel, Escherich's thinking becomes constricted. He considers emulating Quangel's courage: "Wäre es noch möglich, ich würde fortgehen von hier, ich würde etwas beginnen wie Otto Quangel . . ." (*JSA* 429), but is compelled to admit his cowardice. In the logic typical of constriction, Escherich perceives his only alternative to be suicide. His reason is clearly related to his feelings of guilt as he contrasts his actions with Quangel's activities of political resistance:

> "Hier stehe ich, wahrscheinlich der einzige Mann, den Otto Quangel durch seine Karten bekehrt hat. Aber ich bin dir nichts nutze, Otto Quangel, ich kann dein Werk nicht fortsetzen. Ich bin zu feige dazu. Dein einziger Anhänger, Otto Quangel!"
>
> Er zog rasch die Pistole hervor und schoß. (*JSA* 430)

Fallada's inclusion of the converted Nazi is implausible only if one considers Germans to be inherently evil. Just as Fallada portrays certain individuals as completely unremorseful and committed to the tenets of National Socialism, it is also reasonable

that he present one case where a high ranking official is capable of regret and feelings of guilt. Unlike Plievier's Vilshofen, however, Escherich is not spared death. Escherich demonstrates recognition of error and a repentant spirit, but for him atonement does not include the continuation of his existence. The cowardice that he admits to proves fatal, the act of suicide the result of his unwillingness to submit to the Nazi torture he saw inflicted on so many others. Fallada it seems does not allow for the rehabilitation of even this contrite Nazi.

Suicide and Active Resistance: Otto and Anna Quangel

For Otto and Anna Quangel, the distributors of anti-Nazi material and the two main characters in the novel, the initial link in the chain of suicidal development is one characterised by the guilt which follows the reception of a letter announcing the death of their son Otto in the war. Anna Quangel clearly connects her son's death to the war, blaming not only fascism, but also her husband, whom she sees as having aligned himself with the Führer. "Aber das [death of her son] habt ihr angerichtet mit eurem elenden Krieg," she says to her husband, "du und dein Führer!" (*JSA* 17). Forced to examine his relationship to fascism, Otto Quangel realises the degree to which he has been apathetic in his political stance (Gessler 158). Similar to the effect later produced by Otto himself on Escherich, a Nazi official, Anna's accusations bring about a transformation in Otto, and he devises a plan. Disappointment at the

revelation of Otto's plan of resistance, in which anti-fascist cards will be distributed, Anna ponders what she perceives to be her husband's cowardice and inadequacy:

> Mein Gott, was hatte sich dieser Mann da ausgedacht! Sie [Anna] hatte an große Taten gedacht (und sich auch vor ihnen gefürchtet), an ein Attentat auf den Führer, zum mindesten aber an einen tätigen Kampf gegen die Bonzen und die Partei.
>
> Und was wollte er tun? Gar nichts, etwas lächerlich Kleines, so etwas, das so ganz in seiner Art lag, etwas Stilles, Abseitiges, das ihm seine Ruhe bewahrte. (*JSA* 149)

In time, Anna's contempt for the plan gives way to admiration and even fear that the initiative may be too dangerous, especially in view of the fact that the cards are being methodically hand printed by her husband (*JSA* 151). The decision to continue disseminating the anti-fascist cards marks the couple's assumption of greater risk and danger and the development toward suicide. "Wir haben keine Angst," Otto Quangel says to his wife, "wir wissen, was uns droht, und wir sind bereit, zu jeder Stunde sind wir bereit--aber hoffentlich geschieht es zu einer möglichst späten Stunde" (*JSA* 332). As the possible consequences of their actions are examined, Otto Quangel begins to elicit the constriction typical of suicidal thought. For him, the only alternative to his resistance activity is death. Death, however, is for a time still seen by Otto as something imposed from without.

Ambivalence, one of the common affective aspects of suicide described by Shneidman, is characterised here by the willingness to die for a cause and a coexisting desire to live:

> Wer will denn sterben . . . . Auch ich will noch leben. Aber es ist vielleicht gut, Anna schon im ruhigen Leben an ein schweres Sterben zu denken, sich darauf vorzubereiten. Daß man weiß, man wird anständig sterben können, ohne Gewimmer und Geschrei. Das fände ich ekelhaft. (*JSA* 335)

Otto Quangel now speaks of "anständig sterben," dying with dignity, an indication that he contemplates more control over the method of death. The contemplation of suicide replaces death by the hand of others as a way to preserve his freedom.

In Kieser-Reinke's opinion, neither of the Quangels ever commits suicide. The present study differs somewhat in its interpretation of the events. It is clear that the Quangels engage in their activity distributing cards with mutual commitment. When it comes to suicidal ideation, however, they differ markedly from one another. The reason, very simply, lies in their differing views toward religion. For Anna Quangel, who has a strong faith, fate is left in the hands of God. Although she accepts the cyanide capsule provided to her by the retired magistrate Fromm, she eventually disposes of it, leaving her fate to God, and eventually dies in a bombing raid. Otto Quangel, on the other hand, has lost his faith: "An Gott konnte niemand mehr glauben," he says, " es war unmöglich, daß ein gütiger Gott solche Schande, wie sie heute auf der Welt war, zuließ" (*JSA* 350). The very possibility of suicide, provided by

the capsule of poison Otto carried in his mouth, provided liberation and gave him control over his own death:

> Dieses Röhrchen mit der wasserhellen Blausäurelösung hatte ihn frei gemacht. Die andern, seine Leidensgefährten, sie mußten den letzten bitteren Weg gehen; er hatte die Wahl. Er konnte in jeder Minute sterben, er mußte nur wollen . . . . Er, der Besitzer dieses Glasröhrchens, fürchtete den Tod nicht. Der Tod zu jeder Stunde bei ihm, er war sein Freund.
>
> Und in der Gewißheit, daß ihm nichts mehr geschehen konnte, daß er hier--vielleicht zum erstenmal in seinem Leben--ganz er selbst sein konnte, unverstellt er selbst, in dieser Gewißheit fand er Ruhe, Heiterkeit, Frieden. (*JSA* 534-535)

"To choose suicide is not to choose to die," David Wood has stated, "Being mortal, we have no choice about dying. What the suicide chooses is how, when, and where he will die, and perhaps to what end and with what meaning" (151). For Otto Quangel control over his own death, during a time when the threat of death from without is immanent, gives new meaning and peace to his life.

> Jetzt! dachte es auch in ihm, und seine Zähne wollten die Zyankaliampulle zerbeißen . . .
>
> Da würgte es in ihm, ein Strom von Erbrochenem füllte seinen Mund, riß das Glasröhrchen mit . . .

> O Gott, dachte er, Ich habe zu lange gewartet . . . (*JSA* 562; ellipses in original)

Quangel is robbed of control over his own death, but his intention to bite the cyanide capsule and commit suicide is clear. His body continues in symbolic protest for three minutes after he has been beheaded. By robbing Otto Quangel of control over his own death, Fallada presents an inconsistent and pessimistic view of resistance in the novel. For Otto Quangel, suicide was another aspect of the resistance he had so valiantly carried out and in the end the meaning of his anti-fascist activity is diminished.

Minor Characters

The suicides of minor characters in the novel, while not adding significantly to the representation of the development of suicide, do contribute to the presence of suicide as a frequent act of egression common among German people who clashed with the totalitarian system.

The suicide of Enno Kluge comes about as a direct result of the coercion exerted by Escherich. Kluge, a hapless profligate without real political conviction, becomes the gratuitous victim of Escherich in a bizarre example of kindness. Knowing that Kluge will be interrogated and tortured by the *Gestapo* for the "Klabautermann" crimes, Escherich convinces Kluge that suicide is the only act of freedom possible (*JSA* 304). Kluge, who is desperately afraid of drowning, finally shoots himself when Escherich threatens to throw him into the water.

Trudel Hergesell, who has become involved in the dissemination of Otto Quangel's cards, eventually loses husband and son to the Nazis. In the desperation she experiences as a result of her incarceration by the Nazis, she gains access to the stairwell and throws herself down (*JSA* 495). For her, death is equated with "Frieden" (*JSA* 494).

The Meaning of Suicide

Fallada's novel presents suicide in a more differentiated way than does Plievier's novel, partly because of the more limited setting of *Stalingrad*. Unlike Plievier's novel, where suicide seems to be considered and rejected by Vilshofen, the narrator, and by the author as senseless, Fallada's novel justifies the use of suicide in extreme circumstances. Frau Rosenthal's and Trudel Hergesell's suicides are the natural rejection of an oppressive existence. There is never the suggestion that these characters had other reasonable recourse. They, like the common soldiery in Plievier's novel, had very limited power within the system. In the example of Escherich, Fallada shows how suicide can constitute at least partial atonement for wrongdoing. He, like Vilshofen, did have power and was therefore portrayed as more responsible for the continuation of Nazi ideology. Fallada does not foist upon the reader a religious belief in the rejection of suicide, but rather seems to provide justification for the suicide of each character. The overwhelming message is one of freedom to choose death.

Summary

In the novels examined thus far, suicide is shown to be a consequence of the fascist regime in Germany during Second World War. The narrative present of the novels is the war itself. The fact that suicide is linked directly to fascism gives definition to suicide, connecting it to Germany and the German state of mind to a specific historical and political period. A strong message emanating from these early post-war works is that Germans themselves contemplated and committed suicide for reasons of guilt, shame, egression, and freedom.

Plievier's novel depicts suicide as the nearly exclusive domain of men, although brief references to suicidal utterances of women at home during the war are communicated in a few letters. In desperation, one woman writes, ". . . ich könnte den Gashahn aufdrehen, so zumute ist mir" (*STA* 208), and a mother writes, ". . . wenn ich Dich nicht mehr vor meine Augen bekomme, Sohndl, dann brauche ich auch nicht mehr zu leben" (*STA* 208). Apart from these few references, *Stalingrad*, it must be said, presents suicide as a masculine phenomenon during the war, reflecting perhaps a general androcentric view that war is a masculine experience. In this respect, Fallada's view, not only in *Jeder stirbt für sich allein* but also in his highly biographical *Der Alpdruck*, presents a much broader view of suicide. Although the reprentativeness of female figures is open to dispute, Frau Rosenthal, Trudel Baumann, and Anna Quangel represent at least the attempt to make the desperation of the war and the possibility of suicide a more inclusive experience.

Unlike epidemiological, sociological, or psychological studies, where suicide is measured and described as it is observed in real life, suicide in literature is directed and manipulated by its authors and must also be interpreted as an idea presented by the author. Plievier and Fallada react to what must be an internalised sense of guilt and expectation in the German readership and the rest of the world. The many speeches about sin and atonement by Vilshofen and various chaplains in *Stalingrad* and Escherich's expression of remorse are clearly designed to bring the issues before the German readership. Suicide, as an expression of the extent of one's remorse is more safely contemplated through the fictional work than acted out in real life.

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Chapter II

Suicide in the Novel of the German Democratic Republic

Political Situation

It is the purpose of this chapter to examine the motif of suicide in novels of the German Democratic Republic. In the works to be examined, suicide is used in a manner critical of the GDR and thus subversive of the GDR's official use of literature as an organ designed to further the interests of the state. The motif of suicide takes on especial significance in view of the fact that the actual rate of suicide in the former GDR has been estimated to have been among the highest in the world (Rohrwasser 213).

There is little doubt that the conditions under which literature was produced in the GDR were different from those influencing writers of the Federal Republic of Germany, and yet the question of separate German literatures is a much debated topic. "Ich glaube, daß es bislang eine deutsche Literatur gab," states Christoph Hein, "aber ich glaube, . . . daß spätestens beginnend mit meiner Generation, man schon von zwei verschiedenen Literaturen sprechen muß" (qtd. in Jachimczak 358). The principal method by which control over literary works was exerted in the GDR was censorship. The process of censorship is vividly described in Erich Loest's novel about a novel, *Der vierte Zensor* (1984), carrying the subtitle *Vom Entstehen und Sterben eines Romans in der DDR*. Loest writes about the repression experienced while attempting to

publish his novel *Es geht seinen Gang oder Mühen in unserer Ebene* (1978), and in so doing describes a mechanism which, although experienced to varying degrees by different authors, nevertheless reflects an existing "Grundmuster" (Spittmann 3). The official theory of socialist realism was promulgated in an address by Andrei Zhdanov at the All-Union Congress of Writers of 1934 in Moscow. Its interpretation in the GDR created a close relationship between literature and cultural politics (Einhorn vi-vii). Einhorn points out that a society in its nascent stages relies on literature to support and further its existence until the society is firmly established (vii). Socialist realism required that support take the form of an exemplary "positiver Held," who, after wrestling with the past, eventually confirms and champions the new system (vii). In a post-reunification article, Jurek Becker describes censorship in the GDR in the following way:

> Jedes in der DDR geschriebene Buch--wovon immer es handelt und welche Intention ihm immer zugrundelag--war zugleich eine Reaktion auf die Zensur. Kein Autor konnte sich davor schützen, denn jedes Buch war entweder erlaubt oder verboten, etwas Drittes gab es nicht. (Becker *Wiedervereinigung* 360)

One of the main differences in literary production between the two Germanies had to do with the fact that the GDR ascribed greater political efficacy to literature than did the FRG, resulting in control through official censorship. Whereas the Federal Republic has tended to doubt the political force of literature, the GDR viewed literature "als Medium, von dessen Produkten das Gelingen der Gesellschaft mit abhängig ist"

(Jäger 138-139). The literature of the GDR found itself, however, in the awkward and contradictory position of demonstrating that socialism could produce exemplary individuals, while, at the same time, necessarily denying society's full development. Literature was, in essence, to promote improvement and change while affirming the status quo (Jäger 141-142). Fundamental to the interpretation of socialist realism was the question whether literature should limit itself to a portrayal of reality as something which already depicted the potentially utopian, or whether literature should present a kind of utopian anticipation of reality (Jäger 142). Despite the hope brought about by Honecker's proclamation in 1971 that there would be no taboos in the area of art and literature provided that one remained committed to the positions of socialism, censorship, in practice, seems to have been based on criteria largely extraneous to the works themselves and meted out somewhat arbitrarily (Jäger 144).

In the tradition of Marxist literature, the motif of suicide was taboo when depicting a character committed to the tenets of socialism. Marxist thought has traditionally viewed suicide as being non-revolutionary or weak, in contrast to its existence in a situation of anarchy, where it could be viewed as an act of freedom (Rohrwasser 212). Rohrwasser points out that in the context of the workers' movement, one must distinguish between the suicides of "comrades" and "non-comrades," the latter being viewed as "Klassenfeinde," whose suicides represent a logical interpretation of history (10). He goes on to state that the Marxist view of suicide is characterised by a willingness toward ignorance or silence (213), demonstrated vividly by the fact that Johannes R. Becher's own suicide attempt(s)

were for so long kept quiet (Rohrwasser 211). Referring to Marxist literature of the 1930s, Rohrwasser offers the following opinion about the function of suicides in literature:

> In dieser Parteiliteratur ist folgendes zu beobachten: alle Todesfiguren, insbesondere aber die Selbstmörder, haben einen funktionalen Charakter, sie dienen als Sinnbilder, die Entwicklungen hervorrufen und an denen richtiges und abweichendes Verhalten exemplifiziert werden kann. Der Blick des Autors gilt dem Tod seiner Figur und im Sterben erfüllt diese ihre Funktion. In gewissem Sinn wird sie dem Geschichtsplan geopfert. (215)

In Marxist literature self-inflicted death often takes the form of altruistic suicide, where, through self-sacrifice, the suicide offers hope to the collective and represents an instrument for the building of the future (Rohrwasser 215). In contrast to the party-oriented function performed by suicide in literature, the novels to be examined here demonstrate a stance critical of GDR society, albeit a stance which has been moderated by historical remoteness from the narrated present.

Jurek Becker's *Jakob der Lügner*: Symbolic Resistance

Unlike the novels in the previous chapter, which dealt very little with the fate of Jews in the Nazi regime, Jurek Becker's *Jakob der Lügner* (1969) focusses on the issue of the Jewish witness and survivor. Himself a Jew, Becker was born in Lodz in

1937, living until 1945 in ghettos and camps (Wieczorek 640). The initial impulse for writing his novel came from a report that his father had brought from the concentration camp Sachsenhausen, which told of a radio kept hidden in a Polish ghetto. In this report the hope of the Jewish community was sustained by continued reports of the approach of Russian soldiers (White 208). Becker's novel diverges from the actual report in that the radio does not actually exist, making hope founded on a lie. A question which arises in the present study is the extent to which Jakob, the creator of the lie, is responsible for the lives of the others.

The following discussion of Becker's novel will address the motif of suicide as a symptom of resistance in the GDR. In doing so it will first explore suicide as it functions within the context of the depicted Jewish ghetto during World War II. Thereafter, this study will look at the applicability and significance of the work for the readership of the GDR.

Benevolent Fiction: A Prophylaxis for Suicide

> Hört auf, euch das Leben zu nehmen, bald werdet ihr es wieder brauchen. Hört auf, keine Hoffnung zu haben, die Tage unseres Jammers sind gezählt. Strengt euch an zu überleben . . . . Überlebt bloß noch die letzten vierhundert Kilometer, dann hört das Überleben auf, dann beginnt das Leben. (Becker *Jakob der Lügner* 31; henceforth *JdL*)

This apodeictic example of narratorial commentary, which addresses the inhabitants of a Jewish ghetto during the Second World War and reflects a somewhat complex narrative structure. The story is narrated by an unnamed person, someone who experienced the narrated events, but who is relating them from a time after the war. Halverson refers to the narrator having a "double identity,"[1] being both "a participant in the story and a witness to another's story" (454). The narrator in the passage quoted above knows the outcome of the war, but offers this exhortation to keep living. On the one hand, he is foreshadowing the theme which is to develop, therefore addressing the characters of the novel. On the other hand, the narrator has just addressed the readers in the present tense, provoking the reader's identification with present conditions. "Wir wissen, was geschehen wird," he says, "Wir haben unsere bescheidenen Erfahrungen darin, wie Geschichten mitunter abzulaufen pflegen" (*JdL* 31). Including himself and the reader in the address of the first person plural, the narrator again fuses past and present.

The passage from Becker's novel quoted above identifies, very starkly, the inextricably connected concepts of hope and suicide in this novel. The maintenance of hope is the very reason that Jakob, the main character, creates a fiction within the context of the ghetto. The fiction created is the existence of a radio, banned from use,

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[1] Halverson uses the terms "intra-homodiegetic" and "extra-homodiegetic" to describe the narrative structure. From Shlomith Rimmon-Kenan's *Narrative Fiction: Contemporary Poetics* (New York: Methuen, 1983) 95-96. Halverson defines an extra-homodiegetic narrator as "a higher narratorial authority in relation to the story he narrates, . . . when narrating the story he knows 'everything' about it . . ." Intra-homodiegetic narrators "narrate stories in which they also participate as characters" (qtd. in Halverson 462).

from which Jakob supposedly receives and consequently communicates hopeful news from without to the others in the ghetto. The effect of this sustained fiction is hope, and with hope, the renewed wish to live. In actual suicidal events the relationship between the affective component of hopelessness and suicide, as described in Edwin Shneidman's work, is significant (*Definition* 131-135). Simply put, in hope lies the reason to live. In the novel the concept of hope is complicated by the fact that hope is not based on reality and is therefore much more fragile. Hope also becomes not just the emotional feeling of optimism within individual figures within the ghetto, but the responsibility of Jakob Heym. By creating the fiction of hope, Heym has deprived others of the right to cope with the situation as it really is, thereby making possible an even greater plunge into despair, should the secret be discovered.

In order to understand the development of suicide here, it is necessary to examine the novel's precipitating events or situational aspect. The novel's setting causes suicide to develop in much the same way as we have seen in the previous chapter. Here too, fascism is at the root of suicidal ideation for characters within the novel. The story takes place within a Jewish ghetto, in which the inhabitants are deprived of nourishment and fundamental freedoms and are under constant threat of indiscriminate abuse from their Nazi oppressors. Despair is thus, to a large extent, a result of external political and military conditions. Within this context, Jakob Heym comes forth as a self-annointed harbinger of hope, creating an ongoing fiction of positive news reports as a prophylaxis against suicide amongst the inhabitants of the ghetto. Jakob's fiction is believed, in part, because he is considered to be lucky, having

survived an ordeal in the ghetto's German administration building, something previously thought to be impossible. Unable to keep the story of his good fortune to himself, he recounts the events to Mischa, a fellow Jew, adding the contrived assertion that the Russians were coming (*JdL* 28). In the same way, the reader, knowing that the story is narrated by a survivor of the ghetto, is lulled into a sense of hope that Jakob's actions will prove successful and that he is therefore justified in his actions. Despite the reader's awareness of Jakob's continued invented news reports, the purity of Jakob's motives gives Jakob's accounts the appearance of a benevolent fiction, a fiction intended to create hope. Fiction and hope become the antidote to suicide.

The reader initially encounters suicide in an almost tangential way in the novel, in connection with a character who finds only brief mention. The narrator, who reconstructs the events of the ghetto as one of its survivors, mentions the death of someone named Piwowa, a former ghetto inhabitant. From the narrator's standpoint speculation surrounds Piwowa's death. "Sein Dahinscheiden ist von gewissen mysteriösen Umständen begleitet gewesen" (*JdL* 20), says the narrator, who goes on to offer conflicting theories, one of murder, the other describing the death as a common "wenn auch sehr geschickt in die Wege geleiteten Selbstmord" (*JdL* 20). The narrator seems to favour the interpretation of suicide, stating that others had come to this conclusion as well (*JdL* 20). What seems a minor issue in the novel becomes a provocative, open question, and the reader is naturally given to speculate about the reasons for a self-inflicted death. As he continues to do throughout the novel, the narrator creates ambiguity about particular events, inviting interpretation on the part

of the reader. Although the narrator has meticulously and painstakingly researched the events as they unfolded, he continues to undermine his diligence by casting doubt on the interpretability of these events. As shall be shown, the narrator actually goes so far as to create a fictional ending which he contrasts with the ostensibly real ending. The reader is thus engaged to a great extent in the interpretation of historical events, based not only on the facts as offered by the narrator, but also on one's own experience.

One of the questions central to the issue of the novel is whether Jakob is justified in perpetuating the fiction or whether the fiction is more harmful than beneficial. The reader, who is aware of Jakob's fiction, can relate in a sense to the perspective of Lina, a young girl, who is cared for and protected by Jakob. In a protective way, Jakob attempts to preserve the illusion of his radio for Lina. Although she eventually becomes aware that Jakob's radio accounts are fictitious, she is able to suspend disbelief for the sake of her love of and trust in Jakob. In a similar way the reader is lulled into a kind of trust that Jakob's fiction, because it creates hope and happiness, will prove to be justified. It is possible to suspend criticism of Jakob's actions, because there is evidence that Jakob's lie is beneficial. Jakob's fictitious news accounts of the approaching Russians give Jakob's friend Mischa reason to believe that the war will soon be over (*JdL* 42) and prevent him from acting suicidally (Lesley 278). Although Jakob has pangs of conscience about what he identifies as his "Lüge" (*JdL* 70), he rationalises his actions as being for the ultimate good of his people, believing they would some day be liberated: "Das ist es wert, die Hoffnung darf nicht einschlafen, sonst werden sie nicht überleben . . ." (*JdL* 70). Jakob is able to continue

his activities even when hope leads indirectly to the death of Herschel Schtamm, who gives his life in order to spread Jakob's fictitious news to others (*JdL* 130). Schtamm's death is suicide-like, but is distinguishable from suicide in that there is no evidence to suggest that he had the lethal intention to destroy himself, rather his benevolence to others leads to a wilful disregard for his own life.

Justification for Jakob's fiction also comes in the form of a story within a story, an incident from the past, in which Jakob lied in support of his friend Kowalski. Just as Jakob was then able to produce a favourable outcome for his friend and the community, in the face of what the community regarded as usurious unfairness, the reader, with the knowledge of the similarity of Jakob's actions, hopes and assumes that Jakob's mendacity will again prevail during this time of arbitrary fascist rule (Lesley 277). Indeed, as Jakob's news reports spread throughout the ghetto, their effect causes a perceptible resumption of normalcy of life:

> Wer es noch nicht weiß, der muß ein Eremit sein, nicht jeder kennt die Herkunft der Nachricht, dazu ist das Ghetto zu groß, aber die Russen sind in jedem Kopf. Alte Schulden beginnen eine Rolle zu spielen, verlegen werden sie angemahnt, Töchter verwandeln sich in Bräute, in der Woche vor dem Neujahrsfest soll Hochzeit gehalten werden, die Leute sind vollkommen verrückt, die Selbstmordziffern sinken auf Null. (*JdL* 78)

"Verrückt" might well be construed here as the absurdity of attaining normalcy in otherwise perilous circumstances. In the midst of so much danger and mistreatment

a paradoxically humorous incident occurs in the novel. In this incident Jakob steals a couple of meaningless grammes of newspaper from a German toilet, in order to maintain the appearance of knowledge and produce "a ton of hope for the people" (*JdL* 96).

Despite their seemingly positive effect, Jakob's actions do not produce unanimous support from his fellow Jews. Professor Kirschbaum, an eminent doctor, criticises Jakob for disseminating his lies. Addressing Kirschbaum's criticisms, Jakob outlines the miserable conditions under which ghetto inhabitants live and points out a purported fact in support of his position: "Seit sich die Nachrichten im Ghetto herumgesprochen haben, ist mir kein Fall bekannt geworden, daß sich jemand das Leben genommen hätte. Ihnen?" (*JdL* 185). Jakob's belief in the ultimate benefit of his actions remains steadfast until the end, evident when he interprets an increase in the transportation of inhabitants out of the ghetto as a sign that the Germans were panicking (*JdL* 221).

Despite Jakob's intentions to stave off suicide by creating hope through fictitious reports, the novel does tell of at least two suicides.

Professor Kirschbaum: Symbolic Protest

Suicide as "symbolic protest" is described by Lebacqz and Engelhardt as "an act . . . against war or imprisonment--and is meant to support in a radical fashion respect for persons generally" (86-87). In the case of the character Professor Kirschbaum, this

is certainly a great part of his motivation for suicide. Professor Kirschbaum, who condemns Jakob's activity as potentially dangerous in the event that the *Gestapo* learn of the radio reports, is asked to give medical attention to a Nazi official. Kirschbaum, who is escorted by two guards, arrives at his destination dead and is therefore unable to help the Nazi official. Although the narrator protests that the manner of Kirschbaum's death is not of major importance, he nevertheless proceeds to retrace his own elaborate reconstruction of events surrounding Kirschbaum's death, in case the reader should doubt the veracity of the facts. It is revealed by one of the attending German officers that Professor Kirschbaum poisoned himself en route to Hardtloff, the Nazi official, to whom Kirschbaum was to attend (*JdL* 197-198). The motives for Kirschbaum's suicide must be circumstantially discerned. The psychological pain that Kirschbaum would endure as a result of aiding his oppressor is greater than the value he places on his own life and it is with intention that Kirschbaum takes his own life. To an outsider, Kirschbaum obviously has the option of helping the officer and preserving his own life, but Kirschbaum, in this situation, experiences what could be termed the constriction which accounts for the limiting of perceived options.[2] Shneidman writes that "It [suicide] is never done pointlessly or without purpose. It is a way out of a problem, dilemma, bind, challenge, difficulty, crisis, or unbearable situation" (129). Within the novel, the intolerable situation as defined by and unique

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[2] Shneidman 138-142. Shneidman describes constriction as "a more or less transient psychological constriction of affect and intellect. Synonyms for constriction are a tunnelling or focusing or narrowing of the range of options usually available to that individual's consciousness when the mind is not panicked into dichotomous thinking: either some specific (almost magical) total solution or cessation; all or nothing" (*Definition* 138).

to the suicide himself, must be deduced by the reader, taking into account all available situational factors.

The intra-novel[3] significance of Kirschbaum's death can be described with regard to its instrumental and expressive value (Wood 150-160). The instrumental value of Kirschbaum's suicide is one of egression from intolerable circumstances. The situation of life in the ghetto was tolerable as long as Kirschbaum could passively exist. The circumstances become intolerable when he is asked to aid actively his enemy, a situation which proves to be the precipitating event in the formation of his psychological constriction and ensuing decision to choose suicide. His self-removal from a position of giving assistance to the oppressors has as its consequence the death of the German officer. Although it is possible that Kirschbaum could have intended his suicide to have expressive meaning, were the self-inflicted death to remain undiscovered, it could not be said to have the intended expressive effect. From the novel it can not be said with certainty whether Kirschbaum intended his suicide to be discovered. What seems clear, however, is that the news of Hardtloff's death, that is the consequence of Kirschbaum's suicide, is welcomed by the people of the ghetto. The death of the oppressor brings only temporary satisfaction to some like Kowalski, who jokes about gladly foregoing a meal as the result of Hardtloff's death (*JdL* 204). News of Kirschbaum's death creates a somber mood in the ghetto. It is clear that Kirschbaum's suicide has expressive meaning for the narrator, who has intentionally

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[3] By "intra-novel significance," I refer not to the meaning the suicide has for the reader, rather the meaning the suicide has for characters within the novel.

and carefully sought out the truth about Kirschbaum's death. Furthermore, the narrator chooses to reconstruct the events surrounding Kirschbaum's suicide in the novel, with the implication that its meaning is also important to the reader. Although the character of Kirschbaum does not condone the actions of Jakob who, it must be said, is a sympathetic figure, Kirschbaum's suicide is nevertheless portrayed as heroic, suicide as a form of symbolic protest.

Elisa Kirschbaum must also been seen as dying a kind of heroic death, a death which can also be likened to suicide. Knowing that her life is in danger, she ignores Jakob's suggestion that she seek refuge with friends, deciding instead to let herself be taken away by the Nazis (*JdL* 231).

A Tale of Two Endings

> Also biete ich sie zur Auswahl an, möge jeder sich den aussuchen, den er nach den eigenen Erfahrungen für den stichhaltigsten hält, vielleicht fallen dem einen oder anderen sogar noch einleuchtendere ein. (*JdL* 257)

Thus the narrator offers two endings to the novel, one a melancholy but true ending, the other an avowedly preferred, idealised ending. The remaining suicides to be discussed are mutually exclusive, depending on which of the endings is followed.

The narrator describes the suicide of Jakob's friend Kowalski, someone who has come to rely on the fiction created by his long-term acquaintance, but who has taken his life at the discovery of the truth. Kowalski's belief in Jakob's accounts is ironic, in

that it was for Kowalski that Jakob once lied in court, successfully freeing Kowalski from a debt. Further description of Kowalski's suicide is interrupted, however, as the narrator elects to relate the second ending which he describes as "unvergleichlich gelungener als das wirkliche Ende" (*JdL* 246). In this, the narrator's fictional ending, Jakob does not admit his secret to Kowalski because he realises "daß dann die Reihe von Selbstmorden, die für einige Zeit glücklich unterbrochen war, von neuem aufleben und ins Unermeßliche wachsen würde" (*JdL* 247). In this version, Jakob becomes reclusive, eventually arranging for Lina's concealment at the place of a friend. He seems racked by guilt as he reviews his actions, calling them, "zu viele Fehler für einen einzigen Mann" (*JdL* 254), eventually coming to a decision (*JdL* 255). He prepares for what appears to be an escape from the ghetto, partial egression from the turmoil of guilt. Reflecting the inner thoughts of Jakob, the narrator ambiguously states: ". . . er hat ja nicht vor, sich das Leben nehmen zu lassen" (*JdL* 255). This means that Jakob will not have life taken from him. It seems that in the interpretation of the narrator, Jakob takes control over his own death, not letting himself be killed by his oppressors.

The narrator admits that in the invented, idealised ending, there is no clear motive for Jakob's flight. Although there are many plausible motives, the narrator is unable to decide on one. The narrator then offers some examples of motives, but leaves the ultimate interpretive decision to the reader, significantly directing the reader to rely on experience in arriving at an answer. This offer of interpretive latitude to the reader is very revealing and yet tantamount to no information at all. It seems to suggest that history, however meticulously researched, is still a matter of

interpretation. Informative, however, is what follows the narrator's seemingly open ending. The narrator envisions Jakob's idealised death as causing high emotion and revenge in the ghetto. In the narrator's fictional ending, Jakob finds his death in the same night that the Russians approach. The shots which kill Jakob begin a deafening retributive attack by the Russians. The question remains as to the nature and purpose of Jakob's death and why the narrator considers this ending to be "unvergleichlich gelungen." The narrator has abstained from determining Jakob's motives for escape, leaving this interpretation to the reader. The effect of Jakob's death, however, is not left to the reader. Instead, the narrator imbues Jakob's death with heroism and martyrdom. In life Jakob promoted hope and solidarity, and his death becomes an act of altruism.

It seems improbable that the narrator had envisioned anything but death as a consequence of Jakob's apparent attempt at escape. It is here contended that the effect intended by the narrator becomes the motive for Jakob's egression in the fictional ending. The narrator, as the creator of a fictional Jakob, is the conscience of the protagonist and since the narrator intends death for Jakob, so too does Jakob intend death for himself. In this fictional ending, Jakob's death is suicide because of the transferred lethal intention from the narrator to the protagonist. The reason or motive can now be discerned and explained in two ways. In this ending, Jakob is described as feeling guilty. His suicide was an attempt at egression from the psychological pain caused by his guilt feelings. These feelings lead to an attempted escape which at the very least can be seen as constituting a wilful disregard for his life. As has been shown

the answer lies in the result intended by the narrator and thus by Jakob himself. Since death caused a vengeful reaction within the Jewish community and a military attack by the Russians, Jakob's demise can be seen as having significant expressive meaning. Jakob's death was a self-sacrifice for the sake of the community of which he was a part. At this point, the reader should be reminded that, at the outset, the narrator states that Jakob did not intend *to let his life be taken* (*JdL* 255; emphasis mine). The inclusion of the verb "lassen" gives to the sentence the meaning that Jakob wanted to take life into his own hands and out of the hands of others. One could reasonably infer that by knowingly engaging in behaviour inimical to his life, his eventual death was self-inflicted. Although Jakob's death in the fictional ending possibly reminds one of the attempted escapes of GDR citizens to the West, Jakob's motives for escape in the fictional ending are the result of his own feelings of guilt for what he has done to his fellow citizens. Furthermore, escape from the ghetto would not mean escape from the Nazis, because Jakob would be escaping into a Germany still controlled by the fascist regime.

It is at this point that the examination of Kowalski's death can be resumed, for it is now that the narrator relates the historically true ending. Kowalski's death is precipitated when Jakob, shattered by the news that Kirschbaum's sister has been taken away, breaks down and reveals to Kowalski that the news reports have been untrue (*JdL* 239-241). Although it is initially unclear whether Kowalski believes that the reports are really untrue, or whether he thinks that Jakob simply wants to put him off, the issue is resolved when Kowalski is found hanging in his apartment, the obvious

result of suicide (*JdL* 243). The intra-novel motivation and meaning of Kowalski's suicide is straightforward. Kowalski's reason for living had become based solely on the reality created for him by Jakob through the fictional reports of immanent liberation. Once this illusion was shattered, the increased psychological pain associated with Kowalski's situation produced a panicked state of mind, a constriction, which reduced his choices to two, be killed by the Nazis or take control over his own death. Jakob's reports had, for a time, been able to keep the looming relocation to a concentration camp at a distance. Kowalski's motivation for suicide must be seen as wholly instrumental, that being egression from his psychological pain. It is improbable that Kowalski, as an individual in the context of the story, intended to relay any expressive meaning of solidarity to other members of the ghetto.

The Meaning of Suicide

It now remains to answer the question of what expressive or extra-novel significance the motif of suicide has, that is to say, what relevance the inclusion of suicide in this novel might have for the reader. Although Becker has claimed that some of his texts are more intelligent than he is, meaning that he is not always able to interpret fully his own writing (Becker *Answering* 290), Becker also admits that in the "special setting" in which he wrote his novel *Jakob der Lügner*, he intended, in part, to write about the role of literature in society (Becker *Answering* 291). "I only want to say," Becker writes, "that its motives do not lie in the past. I presume that any

decent book needs a motive which comes from the time when it is written" (Becker *Resistance* 272). Becker has also stated that the only theme in this book is resistance (Becker *Resistance* 273), and has gone on to define "resistance" as ". . . not to do what they want you to do. Not to behave in the way Big Brother wants" (Becker *Answering* 291), linking resistance to the attainment of mental and physical survival. Gregory Baum has asserted that Jurek Becker may perhaps want "to give courage to all those men and women who at this time are threatened by totalitarian power" (288). It is not improbable that Becker, when writing in the special setting of the German Democratic Republic of the 1960s, was giving hope to those threatened by the totalitarian power experienced there. If indeed resistance is the only or at least a main theme in the book, then one must conclude that resistance is accomplished only through the maintenance of hope. Suicide is depicted as both a means of expressively providing hope, as in the case of Kirschbaum and Jakob (historically accurate ending), and as a consequence of the loss of hope, as in the case of Kowalski. Jakob's expressed intention was to prevent suicide through the creation of a fictional reality, thereby producing hope and resistance in the face of oppression. With this in mind, one may consider to what extent Jakob succeeds.

Evidence of Jakob's success is to be found in the very fact that, even though sent to a death camp, the narrator survived to tell the story of the ghetto, a story in which the narrator sets out to portray Jakob as a hero. Though the narrator has included an idealised ending in which many would have been saved, historical accuracy must, in the end, be acknowledged, despite its ugliness. The idealised ending is absent through

no fault of Jakob's. The transport trains would have come regardless of Jakob's reports of the approaching Russians. Despite the almost singular criticism by Kirschbaum, the news reports gave hope to many, hope which sustained them through their ghetto existence and perhaps even through the death camps. Ultimately, the narrator's story reaffirms Jakob's actions, even over his own objections. Though the brave attempt at escape and the ensuing liberation by the Russians as described in the narrator's fictional ending elevate Jakob's life to more tragic proportions, the effectiveness of Jakob's resistance testifies to the narrator's description of Jakob as a hero.

Although Becker situates his story in the Nazi era, an appropriate subject of criticism for GDR authors (Tate 9), he sends a message to the readership of the GDR that quiet resistance to totalitarian authority prevails in the end. Criticism of Becker's novel has focussed on its trivialisation of the subject of resistance (Wetzel 266) and the fact that Becker does not create a more openly resistant protagonist (Becker, *Answering* 288),[4] but Becker's reason for writing the story transcends the resurrection of the Nazi theme, for condemnation of the Nazi regime was not new. Becker cloaks criticism of the GDR government and promotes quiet resistance through the guise of a condemnation of Jewish persecution during the Nazi reign of power. The points of analogy between the Jewish ghetto and GDR society cannot be overlooked. In each case there exist totalitarian authorities which place physical and psychological

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[4] Becker was put into the ghetto at Lodz as a child. He has said that his father was so angry at his novel that he refused to speak to Becker for two years, claiming that although Becker could cheat others, he couldn't cheat his father. Becker explains that active resistance was the great exception (Warsaw ghetto) rather than the rule and that literature, in contradistinction to reality, has made active resistance the rule (See also Rohrwasser 213).

constraints on another group of people. Information about the outside world is restricted and contravention of rules carries consequences. Condemnation of the Nazi regime was an appropriate subject about which to write. The analogy between fascism and GDR-socialism, while not overt, is thinly veiled. That criticism could be so thinly veiled presumably reflects the growing cultural renaissance in the GDR, the promise of which was to reach a high point with Erich Honecker's proclamation at the fourth sitting of the Socialist Unity Party's Central Committee, which stated that there would be no taboos in art and literature provided one conform to the tenets of socialism (Arnold 290). Ironically, a lack of freedom and access to information within the ghetto are what allow Jakob to create his fiction. In *Jakob der Lügner* the fiction is created by one of the oppressed for the mutual benefit of the oppressed. Becker's novel raises the question of the gravity of consequences in a totalitarian state where the fiction is created by and for the purposes of the oppressors, a situation more analogous to the situation in the GDR. The German Democratic Republic, with its intended direction of literature as a part of the *Kulturpolitik*, long created its own fiction. Becker's role is analogous to that of Jakob, whose role as a writer it is to undermine the power of the state.

Gregory Baum, who examines the Christian perspective in Becker's novel, refers to the choice of the name "Jakob" for the protagonist. Referring to the biblical story in which Jacob lies to Isaac in order to obtain the blessing meant for the first-born, Baum questions whether this lie, upon which "Jewish and Christian religion depends" (286), is not "a beautiful story, a merciful lie, told to console and strengthen people in their

earthly existence. . . . Maybe there is no God. Maybe God has been invented by someone who received a garbled message from a distant radio and then did not have the courage to say that he had probably been mistaken" (286). In Becker's story, Jakob's motives are both challenged and affirmed, leaving the reader to decide the moral justification for Jakob's actions. For Wieczorek, the additional choice of "Heym" for Jakob's last name reminds the reader of Stefan Heym, "who stayed and wrote within the GDR," thereby displaying courage (644).

On the surface, Becker's novel conveys an ambiguous message about suicide. Whereas Kowalski's suicide must be interpreted as undesirable, the suicide of Kirschbaum and the fictional suicide of Jakob seem, at least symbolically, acceptable. Becker seems to make no definitive judgement about suicide apart from the depiction of suicide as an acceptable act when committed altruistically (Durkheim 217-240), for the good of the community. The suicides depicted in this novel represent a departure from rationalised Marxist and socialist depictions of suicide as an illustration of non-conformists.

Ulrich Plenzdorf's *Die neuen Leiden des jungen W.* (1972)

Plenzdorf's novel takes a step nearer to the reality of GDR society, emerging, at least in part, from behind the sheltered guise of historical analogy. Although set in the GDR of the day, it nevertheless uses "Einbeziehung eines klassischen Textes als Folie für die Darstellung von Gegenwartsproblemen" (Brenner 21). It was written at a time

when hopes of new freedom in the literature of the GDR were high. Nevertheless, the work garnered the criticism of the Party at its Ninth Congress. In somewhat couched terms, Kurt Hager criticised Plenzdorf for misrepresenting the image of GDR society and for not giving his audience exemplary heroes and solutions (Neubauer 72).

Hidden Suicide: An Acceptable Alternative

On the 24th of December Edgar Wibeau, a young man of the German Democratic Republic, dies. The cause of death is unequivocal, seemingly beyond dispute. Newspaper reports describe it as an "Unfall" (Plenzdorf *Die neuen Leiden des jungen W.* 7; henceforth *DnL*), even a "tragischer Unfall" (*DnL* 8). A report by the *Volkspolizei* goes further, accusing the deceased of improper handling of electricity, while for the young man's mother, the death is "noch unfaßbar" (*DnL* 8). The unanimity of the official position regarding the protagonist's death is increasingly undermined as the reader pieces together Edgar Wibeau's life and eventually the unanimous conclusion of accidental death comes to look like protesting too much.

This study will endeavour to show that Edgar, in Ulrich Plenzdorf's *Die neuen Leiden des jungen W.*, committed suicide, and that it occurred as a result of his alienation from the society in which he lived. Whether Edgar's death was suicide is an issue which has produced much discussion in the reception and analysis of *Die neuen Leiden des jungen W.* since it first appeared (Fischbeck 343). Although Edgar's death has been variously referred to as a "fatal accident" which is "a logical conclusion

to a life that has been disoriented" (Brandes and Fehn 617), an accidental death which can be equated with suicide (Waiblinger 76; Hsia 159), or a suicide not committed in the "accepted sense" (Shaw 88), the prevalent view, it seems, is that Edgar's death is something other than openly suicidal.[5]

Disintegration and Isolation

Shneidman writes that an "overpowering feeling of loneliness" is closely related to hopelessness-helplessness. Edgar's life evinces much isolation leading up to his death. This isolation becomes evident through the various relationships in his life.

Represented in Edgar's immediate family is a dichotomy fundamental to the novel. Edgar, who lives alone with his mother, idealises a father, with whom he has no contact. His father, whom Edgar believes to be an artist, exemplifies that part of the protagonist which is unattainable and forbidden in his society. Edgar's mother is portrayed as an oppressor, embodying the ideals of the state: efficiency and productivity. She wishes to show that she can raise a productive model citizen, discouraging her son's desire to paint (*DnL* 20), and even attempting to change Edgar's lefthandedness. "Das war ungefähr das einzige, was Mutter Wiebau mir nicht abgewöhnen konnte," Edgar says, "Sie machte alles mögliche, um es zu schaffen, ich Idiot machte auch noch mit. Bis ich anfing zu stottern und ins Bett zu machen" (*DnL*

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[5] Shaw 86. Referring to J.H. Reid's introduction to his English edition of *Die neuen Leiden des jungen W.* (London, 1979), Shaw refers to two interpretations of Edgar's death. One view sees Edgar as a tragic victim, a gifted individual, alienated from society, a modern Werther driven to suicide. The opposing interpretation views Edgar as a figure whose ultimate return to the socialist collective is pre-empted by a fatal accident.

138). Symbolising Edgar's need to be different, he refers to his mother as "Wiebau," a Germanicized version of the French "Wiebeau," which to him signifies her assimilation into GDR society.

Edgar has a seemingly close relationship with his childhood friend Willi, but it is clear that the two are ideologically very different. Although Willi accompanies Edgar on his escape to Berlin, Willi eventually returns to Mittenberg without Edgar. The boys' increasing distance from each other is symbolized in Willi's inability to comprehend the recorded messages which Edgar sends him (*DnL* 65). Eventually, Willi joins with Edgar's mother in trying to persuade Edgar to return to Mittenberg (*DnL* 83). Willi's subsequent function seems reduced to that of a mere receiver of Edgar's missives. The more important function of the production of the letters is as a vehicle for Edgar's self-expression, and a source of expression to the reader.

The personal relationship which is of greatest importance to Edgar during his time in Berlin is his relationship with a young woman named Charlie, a relationship of unfulfilled love. It is through his relationship with Charlie that much of his identification with Goethe's *Die Leiden des jungen Werther* (1774) is displayed.[6] The relationship between the two young people is fraught with tension and a lack of mutual feeling. Edgar often equivocates about his feelings for Charlie: "Ich himmelte Charlie die ganze Zeit an. Ich meine, ich himmelte sie nicht an mit Augenaufschlag und so" (*DnL* 50), and is eventually best able to express himself through the words of

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[6] Hsia 157-158. Hsia notes the difference in sexual maturity between Edgar and Werther and what he calls a "schrittweise Annäherung zur Identifikation mit dem Goetheschen Helden."

Werther: "Nein, ich betrüge mich nicht! Ich lese in ihren schwarzen Augen wahre Teilnehmung an mir und meinem Schicksal. Sie ist mir heilig. Alle Begier schweigt in ihrer Gegenwart. Ende" (*DnL* 58). Despite his protestation that his use of Werther's words were a "Krampf" (*DnL* 58), he resorts to them more and more. Also clear, through Edgar's continued presence at the kindergarten and his recorded missives to Willi, is his infatuation with Charlie. The lopsidedness of the relationship inevitably leads to Edgar's disappointment. In her reconstruction of events after Edgar's death Charlie demonstrates little affection for Edgar, referring to him as a "verbohrter, vernagelter Idiot" (*DnL* 44), someone who couldn't paint, and whose speech she often found incomprehensible (*DnL* 45). She often summarily pronounces that "Edgar war ja nicht zu helfen" (*DnL* 73). Ultimately, their relationship was a reflection of their divergent views regarding the work ethic. Charlie is representative of the successfully socialized youth in the GDR. She considered Edgar to be incorrigibly "arbeitsscheu" (*DnL* 56), and when Edgar revealed that he is working on a construction crew, he perceived Charlie's reaction as confirming her belief that good had finally triumphed in him (*DnL* 122). As in Goethe's *Werther*, Charlie, the object of Edgar's affections, has a fiancé, whose return provides occasion for Edgar's recourse to quotation in order to express himself: "Genug, Wilhelm, der Bräutigam ist da! . . . Glücklicherweise war ich nicht beim Empfange! Das hätte mir das Herz zerrissen. Ende" (*DnL* 72). Curiously, in expressing his feelings more precisely, he distances himself from the language of his environment, that being the colloquial jargon of the GDR. This linguistic

estrangement signifies the alienation he experiences within his own environment. This growing alienation parallels his increasing identification with the Goethean text. As Waiblinger points out, "Edgar erlebt seine Wirklichkeit durchs Zitat hindurch, und die so erlebte Wirklichkeit macht das Zitat wahr. Das führt zu einer weiteren Annäherung an Werther . . . " (83). A moment of intimacy between Edgar and Charlie comes about not as an expression of mutual affection but as a result of Charlie's displeasure with Dieter. The consequences are Charlie's immediate feelings of regret and Edgar's feeling like a "Schwerverbrecher" (*DnL* 135). Closely related to Edgar's expressed consciousness of guilt is a statement connecting this experience to Edgar's immanent death: "Zwei Tage später war ich über den Jordan . . ." (*DnL* 135).

Charlie's fiancé Dieter is a character with whom Edgar is contrasted. Dieter's commitment to the ideology of the party is at odds with Edgar's character. Edgar sarcastically describes Dieter as someone who has all the "guten Bücher. Reihenweise Marx, Engels, Lenin"(*DnL* 80), adding that he [Edgar] doesn't have anything against "Lenin und die. Ich hatte auch nichts gegen den Kommunismus und das, die Abschaffung der Ausbeutung auf der ganzen Welt. Dagegen war ich nicht. Aber gegen alles andere" (*DnL* 80). Edgar is very much for the ideals of the system, yet it is clear that he lives in a society where the goals he describes are not realisable.

Edgar's inability to form healthy personal relationships is also reflected in his unhealthy relationship with the GDR. The rejection and abandonment he feels regarding other characters in the novel is really an extension of society's rejection and abandonment of him. In examining the alienation experienced by Edgar, one can say

that Edgar's suffering and eventual death reflect the "problems of integration experienced by youth in the established GDR" (Brandes and Fehn 608), implicit even in the treatment of the Werther theme as a literary model (Waiblinger 74). Initially, Edgar passively complies with the wishes of his mother and society (Brandes and Fehn 614) and functions as a model citizen, wishing to cause no one trouble (*DnL* 22) and demonstrating the ability to memorize and reproduce the information required to satisfy his superiors and teachers (*DnL* 56). From the safety of reflection "beyond the Jordan," Edgar criticizes his supervisor Flemming and, by extension, the system, of having an "Einstellung aus dem Mittelalter: Manufakturperiode" (*DnL* 13). Edgar's feelings of alienation are partly a result of his need for individual expression and direction:

> Alle forzlang kommt doch einer und will hören ob man ein Vorbild hat und welches, oder man muß in der Woche drei Aufsätze darüber schreiben. Kann schon sein, ich hab eins, aber ich stell mich doch nicht auf den Markt damit. Einmal hab ich geschrieben: Mein größtes Vorbild ist Edgar Wibeau. (*DnL* 15)

Edgar escapes Mittenberg but is again confronted with a system bent on aligning him with its socialist ideology. Unable to feed himself properly and criticized by Charlie, Edgar is forced to work, something synonymous with political alignment and "Eingereihtsein" (Hsia 156). Ironically, Edgar secures employment as an industrial painter, a fact which illustrates the prosaic compromise with his dreams as an artist. Edgar pokes fun at the working crew's song about socialists uniting (*DnL* 92), a

conformist attitude reflected in Addi's description of the group's fundamental work ethic: ". . . wir sind hier eine Truppe und keine ganz schlechte, und du gehörst nun mal dazu, und es wird dir auf die Dauer nicht viel übrigbleiben, als dich einzufügen und mitzuziehen. Und glaub nicht, du wärst unser erster Fall. Wir haben schon ganz andere hingebogen" (*DnL* 98). Indeed, Edgar gives the appearance of having been integrated, but he reveals at the same time his deception and the continued feelings of alienation: "Ich malte brav meine Fußböden mit der Rolle, und sonnabends ging ich sogar manchmal mit kegeln. Ich saß da wie auf Kohlen oder was, während sie kegelten und dachten: Den Wibeau, den haben wir großartig eingereiht. Ich kam mir fast vor wie in Mittenberg" (*DnL* 114). Escape to Berlin has changed nothing. Edgar is still confronted with the aspect of society he wished to escape, that being conformism.

Identification with Werther's Suicidal Precedent

As previously mentioned Edgar develops a kind of relationship with Goethe's *Werther*, one which contributes to his suicidal ideation. Edgar's increasing alienation from society and the people around him is illustrated through his increasing identification with Goethe's *Die Leiden des jungen Werther* (1774). That Edgar initially has no appreciation for the work is shown when he sacrifices the cover, title page, and what is presumed to be the afterword (*DnL* 35) for the practical purpose of hygiene. He is left with a skeletal text, devoid of interpretation by others. The text simply exists, not prejudiced by the identification of the author. He criticizes the work,

throwing "den Vogel" into the corner, only to pick it up five minutes later and finish reading it in the next three hours (*DnL* 36). Although still critical of the book, he nevertheless begins to quote from it more and more in order to give expression to his own feelings, eventually carrying the novel with him in his shirt pocket (*DnL* 70) and admitting "Ich mußte sofort an Old Werther denken. Der Mann wußte Bescheid" (*DnL* 78). Eventually, Edgar's identification with Werther's suicide is complete enough that, in referring to his own state of mind, he admits: "Ich war jedenfalls fast so weit, daß ich Old Werther verstand, wenn er nicht mehr weiterkonnte" (*DnL* 147). As mentioned, Edgar's use of Werther's words, different from the idiom of his elders and the slang of other GDR youth, is itself indicative of his alienation from those around him. Goethe's words set him apart and allow him to admit feelings of isolation and eventual lethal egression, feelings which in his society are taboo.

From "Über den Jordan": A Distorted View

In reconstructing Edgar's motives it is well to consider the narrative structure, which combines first-person commentary by the posthumous narrator Edgar[7] with the direct speech, usually in dialogue form, of other characters associated with Edgar. From the outset, one of the principal functions of the narrator Edgar is to revise constantly and thereby undermine the opinions and reliability of others, as, for example, when he provides the reader with his reasons for dropping a metal object and

[7] To distinguish pre- and post-death Edgars, this study will hereafter refer to them as the "experiencing Edgar" and the "narrator Edgar."

thereby injuring his supervisor (*DnL* 13). His words, albeit emanating from "über den Jordan," command credibility, since Edgar is offering opinions about himself. Viewed more closely, however, Edgar's own reliability and objectivity are called into question. There is evidence to suggest that there are, in fact, two distinct Edgars, Edgar as he experiences life and Edgar as reflective narrator who shows "a more 'positive' socialist point of view than does his former self" (Brandes and Fehn 614, 617). Gisela Shaw writes that he has the "unique opportunity of having his cake and eating it, of remaining loyal to his dreams and yet partaking of reality" (91). After physical death, Edgar comments from a temporally and socially detached position, a kind of utopia, in which there are no social strictures or alignment. He is only an observer and not a participant and therefore no longer subject to the pressures placed on him by others. His death is a logical extension of his increasing self-imposed flight from society.

The Serial Aspect of Edgar's Suicide

Shneidman describes the serial aspect of suicide as reflecting certain "unity thema" (*Definition* 147), consistencies or patterns in the behaviour of suicides. In Plenzdorf's work, more than the other works to be studied, evidence of these patterns of behaviour is given. With Edgar, these take the forms of certain behaviours as well as suicidal ideation.

Evidence of very early self-destructive behaviour is related by Edgar's mother, who failed to understand her young son's act of self-destruction as a cry for help: "Wir

haben uns nie gestritten. Doch, einmal schmiß er sich vor Wut die Treppen runter, weil ich ihn irgendwohin nicht mitnehmen wollte. Da war er fünf . . . " (*DnL* 16). In addition to aggressive behaviour and running away from home, which can be considered clues to suicidal behaviour, Edgar also reveals numerous instances of death ideation. He contemplates the value of his life and death by disease (*DnL* 23), and is unable to conceive of life beyond a certain age. "Ich hab überhaupt manchmal gedacht," Edgar says, "man dürfte nicht älter werden als siebzehn--achtzehn" (*DnL* 27), a statement which illustrates his inability to cope and constitutes a relational clue to the reader of Edgar's approaching death. After Willi's departure from Berlin, Edgar experiences an excessive need to sleep (*DnL* 29)[8] and he considers death again following the row boat incident with Charlie (*DnL* 135). Indeed, one can conclude that Edgar's aggressive and egressive behaviours as well as his preoccupation with death establish a recognizable coping pattern consistent with suicide.

Edgar's Suicide Machine

Alienation or lack of integration which has been demonstrated leads to a constriction of thought for Edgar. In what seems to be one last attempt at social integration, Edgar sets about trying to perfect a paint sprayer, an object which becomes his instrument of lethal egression. His decision to build the machine is not

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[8] Both sleeplessness and the desire to sleep are associated with suicidal depression, when in combination with other symptoms such as "loss of appetite, loneliness, unusual silence and withdrawal from family and friends" (Evans and Farberow 248).

the result of serious deliberation, but rather it is made impulsively following a deeply disturbing anonymous visit to his father. In fact, Edgar himself senses that something is wrong with his decision: "Ich kannte mich damals schon selbst genug, um zu kapieren, daß in dem Fall irgendwas nicht stimmte mit mir. Ich analysierte mich kurz und stellte fest, daß ich sofort damit anfangen wollte, *meine* Spritze zu bauen" (*DnL* 109; italics in original). This is not a real attempt on Edgar's part to assimilate, rather it is an expression of individuality. Edgar emphasizes that the sprayer would be different than his co-worker Addi's, though he, Edgar, is unsure how this can be achieved. Edgar goes about building his device, recklessly pursuing his goal, while admitting that he has insufficient materials, a fact which he from death reveals to have been "der erste Stein zu meinem Grab, Leute. Der erste Nagel zu meinem Sarg" (*DnL* 109-110). Edgar feels despondent and guilty after his intimate moment with Charlie: "Ich wußte nicht was ich machen sollte. Ich wußte *einfach* nicht, was ich machen sollte. Ich war am Boden wie noch nie" (*DnL* 137, italics in original), and although he is nearly run over by a bulldozer, mutters, "Ein paar Tage noch, und ich bin hier weg" (*DnL* 138). During his night of sleepless indecision, it finally becomes clear to him that he has "in Berlin nichts mehr zu bestellen" (*DnL* 139). In a frame of mind which he terms "mulmig" he even contemplates returning to Mittenberg, but receipt of a letter from Willi and the anticipated arrival of his mother induce him to set her arrival as the deadline for completion of his invention. He works in frenzied haste but runs into last minute problems. Intentionally reckless, Edgar ironically says, "Ich

hatte zwar alles, was ich brauchte, bloß nichts paßte richtig zusammen. Ich *mußte* einfach anfangen zu pfuschen. Sonst wäre ich nie im Leben fertig geworden" (*DnL* 142, italics in original). In this society, Edgar is indeed unable to finish his plan. Edgar equates the completion of this project with the solution to his relationship with Charlie and vindication in the eyes of everyone. As Edgar describes in detail the insufficiency of his invention, he is really addressing his own irreconcilability with the demands of society. Just as Edgar wants to be his own "Vorbild," so too must the invention be a product of himself. Edgar has, however, knowingly given his one final attempt too little time, and reveals his last thought before pressing the switch: "Es war normalerweise technisch nicht vertretbar. Aber mir kam es auf das Prinzip an" (*DnL* 145). As he admits, "Schätzungsweise war es am besten so. Ich hätte diesen Reinfall sowieso nicht überlebt. Ich war jedenfalls fast so weit, daß ich Old Werther verstand, wenn er nicht mehr weiterkonnte" (*DnL* 147). The term "Reinfall" is intentionally ambiguous, providing for the interpretation of Edgar's life as a whole. Edgar's tunnelling of vision left him with only two choices, the success of his invention or death, and his final state of mind is discernible, though partially concealed in the statements which follow: "Ich meine, ich hätte nie im Leben freiwillig den Löffel abgegeben. Mich an den nächsten Haken gehängt oder was. Das nie. Aber ich wär doch nie *wirklich* nach Mittenberg zurückgegangen. Ich weiß nicht ob das einer versteht" (*DnL* 147, italics in original). Edgar's statement seems to indicate that he would never have committed suicide, and yet Edgar's words are filled with contradiction and

ambiguity, undoubtedly the intended effect of the author. While it is true that Edgar denies the possibility of hanging himself, an overt, violent, and unequivocal suicide, something specifically denied in the words "*Das* nie" (italics mine), Edgar also indicates that he would not have returned to Mittenberg. This increasingly constricted thinking allows for very few alternatives. A suicide as obvious as Werther's death by gunshot wound would be unthinkable for a protagonist in GDR literature. Edgar combines his admirable attempt to create a machine which would increase productivity in painting with unnecessarily high risk. From Edgar's admission that Berlin had nothing more to offer him, coupled with the statement that he would never have returned to Mittenberg, one can deduce that Edgar contemplated the approaching end of his existence. His death constitutes a form of egression which represents a solution to his dilemma. Had Edgar actually successfully finished work on his machine, his life may not have been better. Despite Edgar's obvious ability, his attempt to create an efficient machine to carry out the mundane work of wall-painting was an aberration. He had already rejected the idea of productivity as an apprentice. Nothing in his fundamental beliefs had changed. In reality, Edgar had nowhere else to go. The continuation of life would have guaranteed nothing more than an existence inconsistent with Edgar's nature.

Though Rohrwasser characterises Edgar's death as lacking the "Tatbestand" of suicide, he considers it to be social suicide, where alienation and escape are part of a process of self-discovery (219). Rohrwasser continues on to say that the novel is not roundly critical of the *Kollektiv*, but rather questions the ability of the state to

integrate its members: "der Anspruch des sozialistischen Staates zu erziehen, zu integrieren und glücklich zu machen, wird in Frage gestellt: ein Suicidant flieht aus den Armen des allesumschlingenden Kollektivs, das legitimationsheischend geneigt ist, jeden Selbstmord zu negieren" (219).

Through the use of Goethe's *Werther* Plenzdorf is able to depict Edgar's alienation from society and the progression toward hidden suicide, while, at the same time, using Goethe's novel to create historical remoteness. The question of the extent to which Plenzdorf's protagonist identifies with Goethe's hero, as well as the difference in the specific nature of their deaths, generate sufficient ambiguity as to Edgar's death that the novel can still be interpreted in a way favourable to socialist doctrine. Significant is the fact that Edgar Wibeau is not able to commit suicide in the "accepted sense."

The Meaning of Suicide

The suicide of the protagonist is the result of the conflict between individual and state in Plenzdorf's novel. This polarization takes place because Edgar is set apart as a non-conformist in his society. Although Edgar is not part of a "large, well-defined and self-conscious group" (Brym 11) of intellectuals in GDR society, he nevertheless, perhaps in a naïve way, demonstrates characteristics which one would associate with intellectuals. Brym defines intellectuals as "persons who, occupationally, are involved chiefly in the production of ideas (scholars, artists, reporters, performers in the arts,

scientists, etc., as well as students in post-secondary institutions, who are apprentices to these occupational roles" (12). Edgar conforms to the definition in that his entire existence concerns itself with ideas. In fact, his inability to integrate into society permits him greater independence of thought than someone like Dieter, the Germanist, whose ideas typify state-directed intellectualism. Edgar's artistic desires, his criticism of Dieter's adherence to socialist dogma, and Edgar's ability to relate to the high literary work of Goethe, define him as a person of ideas. Edgar represents the fate of the non-conforming intellectual in socialist society. The unwillingness of the state to accept not only dissenting views but also individuality makes life unbearable. Suicide is an inevitability in the novel because of the pervasive confrontation between the individual and the totalitarian state. The ideological conflict is evident in every relationship that Edgar has.

Schopenhauer speaks of the possibility of regarding suicide as an experiment and a question that one poses to nature in order to find out what change in existence and knowledge death brings about. Schopenhauer ultimately rejects the logic of this experiment arguing that death "hebt die Identität des Bewußtseins, welches die Antwort zu vernehmen hätte, auf" (337). In reality, Schopenhauer is probably right, but in the literary death created by Plenzdorf, Edgar is able to circumvent Schopenhauer's concept of the destruction of consciousness. Edgar is able to examine his own death from beyond the grave. It must be kept in mind that Edgar speaks from the safety of death and position of reflection that it allows, a place beyond the harsh

reality of the socialist society from which he felt alienated and in which a series of events led to his death.

Christa Wolf's *Kein Ort. Nirgends* (1979): "Gesellschaftliche Verzweiflung"

Through the analogy of an historically distant setting Christa Wolf discusses the subject of suicide as the consequence of alienation within GDR society. Christa Wolf's work *Kein Ort. Nirgends* (Henceforth *KON*)[9] depicts two historical and literary personalities, Heinrich von Kleist (1777-1811) and Karoline von Günderrode (1780-1806), as protagonists in a fictional social gathering at Winkel am Rhein in 1804.[10] History attests to the suicides of Günderrode and Kleist in 1806 and 1811 respectively, and inclusion of suicide in the novel is, therefore, simply the recounting of an historical fact, not the fictional creation of the author. Suicide is discussed throughout the work, though the deeds themselves, confirmed by history and by the work itself, lie beyond the narrated time of the novel. The motif of suicide is of central importance in Wolf's work, because it represents the ultimate act caused by the protagonists' psychic suffering.

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[9] This text was published without generic description. Ulrike Growe and Peter F. Teupe classify the work as a novel. The present study also considers it to be a novel.

[10] Anton Krättli indicates that documentation about Kleist's life reveals a gap for this period. Kleist's letters from October 1803 and June 1804 are not extant and Wolf chooses to situate her novel within this biographical vacuum (463-464).

The narrator characterises the act as "Verfehlung gegen das Gesetz" (*KON* 6) and the actors as "Schuldige." Kleist and Günderrode languish because they are at odds with the times in which they live, a fact which is repeatedly shown in the text. A greater challenge of interpretation is the question to what extent Wolf identifies the suffering of her protagonists with the contemporary situation in the German Democratic Republic. In this connection Anton Krättli says of Wolf's work: "Für einige Schriftsteller in der DDR scheint es geradezu eine Metapher für das zu sein, was sie anders nicht sagen könnten" (*KON* 464).

The text is replete with instances of suicidal ideation connected to feelings of estrangement, isolation, and inner conflict. This study will first examine the reasons which lead each of the protagonists to his/her act of desperation, then the wider relevance and application of the novel will be established through connection of the protagonists to the narrator, reader, and citizens of the German Democratic Republic.

Kleist: Individual versus State

The novel itself is preceded by quotations from the historical figures of Kleist and Günderrode, statements which allude to the psychic dilemma to unfold throughout the rest of the work, situating the dilemma in the historical past and thus out of the way of the censors. "Ich trage ein Herz mit mir herum," the historical Kleist says, "wie ein nördliches Land, den Keim Südfrucht. Es treibt und treibt und es kann nicht reifen" (*KON* 5). This quotation from the historical Kleist reveals a sense of

displacement as Kleist's words draw an analogy between himself and fruit unable to ripen in an inimical climate. This establishes the conflict between Kleist as an individual and the environment in which he lives. Kleist, it is written, is "geschlagen mit diesem überscharfen Gehör, [er] flieht unter Vorwänden, die er nicht durchschauen darf . . . " (*KON* 5), words which connote aggression ("geschlagen") and egression ("flieht"). It is clear that whatever plagues him is also more powerful than he, forcing him to flee.

Kleist is plagued by a "zweite Stimme," the suppression of which is already described as a kind of death: "Diese dröhnenden, niemals abreißenden Monologe in seinem armen Kopf. Er weiß es ja, was seine Rettung wäre: die Stimme in sich knebeln, die da reizt und höhnt und weitertreibt, auf die wunden Punkte hin. Und wenn er sie zum Schweigen brächte? Eine andre Art von Tod" (*KON* 14). The suicidal impulse is described as a pre-existing condition and pattern which is revealed when the reader learns that Kleist previously experienced a breakdown associated with the destruction of his work *Guiscard*. Kleist contemplated a suicide pact but was unable to persuade his friend Pfuel to accompany him on his deadly course (*KON* 16). Indeed, death as a form of egression is mentioned as he reflects on his failed relationship with Wilhelmine von Zenge and the inevitable censure of the Frankfurt society: "lieber sterben, als das" (*KON* 24). Kleist also expresses his existential malaise in the form of societal or political displacement when his thoughts reveal an "angeborene Unart, immer an Orten zu sein, wo ich nicht lebe, oder in einer Zeit, die vergangen oder noch

nicht gekommen ist" (*KON* 36). Kleist's constriction of thought is revealed when he considers his choices: "das verzehrende Ungenügen, sein bestes Teil, planvoll in sich abzutöten oder ihm freien Lauf zu lassen und am irdischen Elend zugrunde zu gehn" (*KON* 38). Yet Kleist is determined to take control over his destiny: "Das wird die einzige Genugtuung sein, die er in seinem Leben erfährt. Und er wird sich ebenbürtig zeigen. Kein andrer wird das Urteil an ihm vollstrecken als er selbst. Die Hand, die schuldig werden mußte, vollzieht die Strafe. Ein Schicksal nach seinem Geschmack" (*KON* 39). Kleist experiences a pain so severe that he believes it must either abate or kill him (*KON* 50).

As in Plenzdorf's *Leiden*, the psychological suffering is characterised by an impediment to expression. In Kleist's case the inability to write and his belief "daß Worte die Seele nicht malen können" (*KON* 50), are symptoms of frustrated psychological needs. Finally, the source of Kleist's frustration is revealed. Kleist identifies the State as the origin of his suffering, saying that he has been living "in seiner Idee von einem Staat" (*KON* 83). He inveighs against the state as subjugating the interests of the individual to its own:

> Soll der Staat meine Ansprüche an ihn, soll er mich verwerfen. Wenn er mich nur überzeugen könnte, daß er dem Bauern, dem Kaufmann gerecht wird: daß er uns nicht alle zwingt, unsere höheren Zwecke seinem Interesse zu unterwerfen. Die Menge, heißt es. Soll ich meine Zwecke und Ansichten künstlich zu den ihren machen? (*KON* 85-86)

The interests of the state, the collective, which take precedence, constitute to him a denial of the self. In addressing the specific aspects of the state which cause his affliction, Kleist recalls Rousseau, who questioned whether beauty and art have been sacrificed to science and progress:

> Die Wege von Wissenschaft und Kunst haben sich getrennt, so redet er, lahm genug. Der Gang unserer heutigen Kultur geht dahin, das Gebiet des Verstandes mehr und mehr zu erweitern, das Gebiet der Einbildung mehr und mehr zu verengen. Fast kann man das Ende der Künste errechnen. (*KON* 101)

Marion Stock describes Kleist's dilemma of individual and society in terms of a "Normkonflikt" (192-202).[11] Kleist considers possibilities for resolving his problem, but is ultimately unable to live with the attendant consequences and compromise to himself. Projecting an internalised societal alienation, Kleist uses juridical terms in the pronouncement of his own guilt and punishment (*KON* 39; Stock 202). His thinking becomes constricted and his choice is eventually reduced to one in which a solution is sought in suicide.[12] Having internalised the norms of society, Kleist comes to view his own position as sickness, imploring Dr. Wedekind to open up his head and extract the defect (*KON* 104). Kleist experiences internal turmoil produced by the conflict between societal norms and his need for individual expression, rendering him

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[11] In her study, Stock examines suicide in terms of "Normkonflikt," "Lösungsmöglichkeiten," "Traumatisierung," and "Unlösbarkeit des Normkonflikts."

[12] One should be reminded that Shneidman, in discussing the conative aspect of suicide, states that each suicide "has an inexorable logic and impetus of its own" (129).

unable to separate the world into good and evil, healthy and sick, a situation which he perceives as requiring "die Axt an mich selber legen" (*KON* 107). He equates his fate with that of the protagonist in a tragedy, where one is damned "sich selber zu zerstören" (*KON* 108).

Günderrode: Patriarchy and Alienation

Wolf's choice of Günderrode as Kleist's companion in suicide is due to the fact that she represents, as Christa Wolf herself says, "die Unstimmigkeit der Zeit" (Wolf *Schatten* 225). The historical Günderrode displayed a tendency toward suicide (*Schatten* 225), a trait readily incorporated into the novel and fused with Kleist's own self-destructive tendencies. Joining fictional present with the historical figure of the past, an anticipatory quotation also sets the stage for subsequent information about Günderrode's fictional character within the novel. "Deswegen kömmt es mir aber vor," read Günderrode's words, "als sähe ich mich im Sarg liegen und meine beiden Ichs starren sich ganz verwundert an" (*KON* 5). The passage reveals a splitting of the self into parts and the destruction of one of them. She too experiences alienation in the face of the society's normative demands. In the following example of inner monologue Günderrode considers her relationship to the world: "Ich fühle zu nichts Neigung, was die Welt behauptet. Ihre Forderungen, ihre Gesetze und Zwecke kommen mir allesamt so verkehrt vor" (*KON* 9).

The novel takes place amidst a social gathering. Nevertheless, the protagonist Günderrode experiences alienation. Her separateness from the rest of the company is not simply self-perceived. To Kleist also, she appears "unpassend" (*KON* 25), her distinctiveness defying definition: "Dame. Mädchen. Weib. Frau. Alle Benennungen gleiten von ihr ab. Jungfrau: lächerlich, beleidigend sogar; später will ich darüber nachdenken, wieso. Jünglingin. Kurioser Einfall, weg damit" (*KON* 25). Günderrode suffers from the irreconcilability of her aspirations as a writer with the expectations of society, at a time when serious writing is reserved for men, as well as her need for a loving relationship. The role to which Günderrode is reduced has been imposed by a patriarchal system. She is objectified and held back by men, unable to reconcile her existence as a writer with her desires as a woman (Schulz-Jander 235-236). It is Günderrode's desire to express her life in lasting form, though she admits that she is still far from realising that wish (*KON* 31). "Daß die Günderrode schreibt und sogar einen gewissen Anspruch auf literarischen Wert erhebt," Sigrun Leonhard writes of Günderrode's literary aspirations, "ist selbst schon ein Verstoß gegen die Regeln" (100). A prevailing patriarchal sentiment is reflected in Kleist's inner thoughts when, with reference to Günderrode, he condescendingly intimates that women's role in literature is a frivolous pastime: "Sie dichtet? Fatal. Hat sie das nötig? Kennt sie nichts Besseres, sich die Langeweile zu vertreiben?" (*KON* 26).

It is thus the external circumstances which are at the foundation of Günderrode's suicidal ideation. Her desire to be a serious writer and her need for a relationship, mutually exclusive in this society, are the psychological needs which are

frustrated. This frustration develops to the extent that Günderrode seriously contemplates suicide:

> Sie kennt die Stelle unter der Brust, wo sie den Dolch ansetzen muß, ein Chirurg, den sie scherzhaft fragte, hat sie ihr mit einem Druck seines Fingers bezeichnet. Seitdem, wenn sie sich sammelt, spürt sie den Druck und ist augenblicklich ruhig. Es wird leicht sein und sicher, sie muß nur achten, daß sie die Waffe immer bei sich hat. Was man lange und oft genug denkt, verliert allen Schrecken. (*KON* 11)

The passage gives strong indication that Günderrode actively and often fantasizes about the method of death to the extent that she is actually comforted by thoughts of suicide and the sensation of the knife; they come to represent autonomy and control over life.

Despite the comfort that the contemplation of suicide brings, Günderrode is troubled by the religious and social injunction against it. Referring to the "zehn Gebote" as the "zehn Verbote," she maintains that suicide is regarded as more egregious than a transgression of any other of the Ten Commandments: "Es ist eine Gier jener verbohrten, heillosen Art, die uns mit Recht verboten ist, so daß die andern zehn Verbote davor verblassen. Vater und Mutter töten: böse, doch sühnbar. Sich selbst vernichten: Unnatur" (*KON* 97).

The novel describes the increasing understanding and identification between the two protagonists, whose alienation and inner conflict lead to the propensity to flee from circumstances and, ultimately, suicide. Günderrode speaks of "unseren nahen Tod"

(*KON* 92); it is said that she speaks "als spräche sie für ihn [Kleist]" (*KON* 105), and that she reads his thoughts (*KON* 118), both indications of their increasingly common feelings, until their very identities seem as one: "Der Nachmittag hat ihr gegeben, was in ihm war. Sie möchte fort" (*KON* 94). Kleist, in an expression of mutuality of feeling, gives definition to their similitude: "Der Geheime Rat, sagt Kleist, doch auch Herr Merten preisen mir die Vorzüge der neuen Zeit gegenüber denen der alten. Ich aber, Günderrode, ich und Sie, denk ich, wir leiden unter den Übeln der neuen" (*KON* 109). The reference to the evils of a new time can be construed as referring also to the period in which the novel is being read, a consequence of the ambiguous use of the pronoun "wir," as will be discussed further in the section that follows.

The Meaning of Suicide

Beyond the historical confines and distance of the novel, it remains to discuss the significance of suicide here for the readership of the GDR. Part of the novel's meaning is to be found in the intention of the author. Wolf herself expressed a motivation for the writing of her work in an interview which took place in 1982: "'Kein Ort. Nirgends habe ich 1977 geschrieben. Das war in einer Zeit, da ich mich selbst veranlaßt sah, die Voraussetzungen von Scheitern zu untersuchen, den Zusammenhang von gesellschaftlicher Verzweiflung und Scheitern in der Literatur'" (qtd. in Schulz-Jander 233). According to the novelist herself, the germination of the

novel is to be found in the GDR of the 1970s, and links social despair to the failure of literature.

Identification of the reader with the characters of the novel is accomplished, in part, through Wolf's narrative technique. "The blending together of author-voice and protagonist-voices establishes a link between past and present, writer and literary figures" (Schulz-Jander 240). Wolf's technique of fusing actual historical quotation with her own fictional passages, referred to by Sigrun Leonhard as the "Verschmelzung von Subjektivem und Objektivem," the ambiguous use of the narratorial pronoun "wir," and the often blurry transitions between character voices, establish reciprocal and inclusive identification between narrator, reader, and protagonists, often prompting the reader to pose the narrator's question "Wer spricht?" (*KON* 6). The narratorial structure is dialogic, addressing both the "Vorgänger" protagonists and the reader (Schulz-Jander 234). Despite this relationship, distance and identification between protagonist, narrator, and reader exist in precarious balance. Distance between reader and protagonists exists by virtue of the protagonists' historical remoteness from the readership, but this distance is dissolved by the narrator, who establishes a nexus between herself and the reader: "Und wir, immer noch gierig auf den Aschegeschmack der Worte" (*KON* 5), the narrator states, making the connection between history and the reader. Connected by the identity contained in the word "wir" the reader relates to the fates of the protagonists as they unfold.

Thematic parallels regarding technical progress as well as the roles of the sexes also exist between the nineteenth-century setting and present day society (S. Leonhard

104-105). Identification of the reader with the protagonists is maintained through Wolf's citation technique and use of parataxis, both of which demand more active participation and thus greater identification on the reader's part (Schulz-Jander 241). The distance between narrator, protagonists, and reader seems completely dissolved when, near the end of the novel the question of identity is raised: "Ich bin nicht ich. Du bist nicht du. Wer ist wir?" (*KON* 138). In the opinion of Siegfried Streller the novel thus becomes "eine Aufforderung an den mündigen Leser zu selbständiger Auseinandersetzung mit Existenzfragen unserer so bedrohten Gegenwart im Spiegel der Vergangenheit" (362).

How is the very obvious inclusion of the suicide motif to be interpreted? The intra-novel significance is wholly instrumental. Both Kleist and Günderrode commit suicide in order to escape the psychological suffering associated with the societal pressure to conform and compromise and, though the characters have shunned conformity and exerted control over their destinies, they have been forced to deny their individuality and ultimately their own existence. Although the protagonists' psychograms have been developed within the context of historically distant characters, expressive significance attaches to the novel as one examines it in relation to the GDR. Growe warns against too positive an interpretation of the freedom gained by the protagonists' choice of suicide, arguing that, within their specific context, suicide is the only freedom which remains to them (97), raising the question whether suicide, in the absence of other choices, is, in fact, a free decision at all. Although the protagonists of the novel eventually commit suicide, a fact which necessarily creates pessimism,

there is evidence to suggest that room for hope in Wolf's novel does exist. Sigrun Leonhard makes reference to the fact that a dichotomy of position is reflected in the title of the novel. In one sense the title suggests that a place of individual fulfilment will never exist. On the other hand, the title, which is a translation of the Greek *ou topos*, and the basis of the word "utopia," calls to mind the more popular association of an ideal place. Rohrwasser maintains that suicide in Wolf's novel is an act of "Ich-Stärke," where the protagonists' suicides reflect deliberation and a sense of conviction (220).[13] Wolf's work is delivering a message of caution against complacency and directing attention to problems within the GDR. The words "Einfach weitergehen, denken sie" (*KON* 151) expose the resignation with which the protagonists meet their fate in a society where life is, for them, unlivable. Yet hope is projected in Günderrode's statement " Wenn wir zu hoffen aufhören, kommt, was wir befürchten, bestimmt" (*KON* 148). The protagonists are only an "Entwurf," but hope remains in the possibility that their example may some day be taken up again. Their suffering and death is offered as an admonition to their successors to stay the course in the attainment of a place in which "unser unausrottbarer Glaube, der Mensch sei bestimmt, sich zu vervollkommnen" (*KON* 150) is realised. Through the safety of historical distance and the power of analogy, the author presents the suffering of two people, driven to suicide by a society in which individuality is not tolerated.

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[13] Rohrwasser identifies in Wolf's novel the concept of "Sich-Finden vor dem Absprung," as examined in Jean Améry's *Hand an sich Legen*.

Christoph Hein's *Horns Ende* (1985): Suicide as an Admonition to Remember

Of Christoph Hein's novel *Horns Ende* Phillip McKnight says: "Hein creates a new reality, an artistic reality in which Horn's function is to provide a metaphor for the social and political contradictoriness of the period of time framed within the period" (41). Horn is the protagonist of a novel which has the events of the 1950s as a substantial part of its backdrop, but which is historically multi-layered, joining together the Nazi era, the 1950s and the establishment of the GDR, the primary subject of the novel, and the early 1980s, which is the "narrative present" (McKnight 40). The 1950s were a period of change and ideological instability in the GDR, and as McKnight notes, "a period of transition from the Nazi past to a form of socialism" (78). The reform movement, triggered by Stalin's death and Kruschev's securing of power, led to a period of *Tauwetter* in communist countries, and a direction among intellectuals, politicians, and writers in the GDR known as "Der dritte Weg," proponents of which were Walter Janka, Gustav Just, and Wolfgang Harich (McKnight 79). At first tolerant of the democratization of socialism, the East German authorities swiftly resorted to suppression to maintain stability in the GDR, following the quelling of the Hungarian rebellion in 1956 by the Soviet Union (McKnight 80).

Based loosely on the life of one Heinz Horn, who hanged himself on January 8, 1958, the novel is not concerned with achieving an accurate chronicling of the

historical figure's life,[14] but rather seeks to "recall what effect the unjust fates of those who struggled for truth and integrity in the socialist world had on them and on society at large, on the history of what Hein calls 'social autobiography'" (McKnight 81). At the centre of this "social autobiography" is the biography and the reconstruction of the protagonist Horn's life and suicide which, McKnight asserts, "represent the victimization of many prominent intellectuals who attempted in good faith to democratize the socialist movement in the 1950s" (41). It will be shown that Horn's suicide fulfils an instructive function to a newer generation of GDR citizens, as it links the past with the present in a depiction of suicide which is the result of an oppressive system.

The novel is divided into eight chapters, each of which is subdivided into individual monologic voices of various characters within the novel, who relate events from their subjective points-of-view, revealing also "the historical milieu of developments in East Germany which affect all the characters, socially and psychologically influencing their progress into the present" (McKnight 40). As the narrators examine their memories of Horn and the effect his suicide has had, so too do they explore their relationship to the society in which they live (Jäkel 193). Suicide thus becomes relevant to more than just Horn's individual case. The novel represents an appeal to its readers not to compromise historical truth for the tenets of an abusive system. The reasons for the protagonist's suicide, an historical given from the outset,

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[14] In conversation with Krzysztof Jachimczak, Hein refers to the historical figure, a philosopher named Horn, who committed suicide in the 1950s. Hein describes the relationship between the fictional and historical figures as "eine ganz ferne Beziehung" (Jachimczak 353; See also McKnight 78).

are reconstructed in scattered details through the perspectives of the many characters. Aspects of Horn's life and suicide are not presented chronologically, but rather are taken up sporadically, in a technique which constantly re-engages the reader, who is forced to re-examine repeatedly the question of Horn's suicide.

Thomas

Occupying a special position in the constellation of characters is Thomas, a boy of about twelve years of age at the time of Horn's suicide. Thomas is not only one of the monologic voices within each chapter, but is also one of the partners in an extended dialogue which precedes each chapter.[15] As more details are supplied, this dialogue assumes an anticipatory as well as an exegetic function. Structurally and temporally outside the more realistic limitations of the rest of the novel, the dreamlike dialogue supplies a unified message to the reader, one more reflective of an omniscient narrator. "Erinnere dich" (*HE* 5), the first two words of the novel, are a charge both to the novel's reader and to an adult Thomas, subsequent to which Thomas's perspective is joined to that of the reader throughout the remainder of the novel.

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[15] When asked about the meaning of these dialogues, Christoph Hein validated several possibilites: "Es kann ein Dialog des älter gewordenen Thomas mit dem toten Horn sein, es kann ein Selbstgespräch des Autors oder des Erzählers sein, was dann nicht identisch ist mit dem Autor, es kann dann ein Dialog zwischen den Zeiten sein" (Jachimczak 353).

Horn

In establishing the motivation for Horn's suicide, the reader is able to glean clues to his psychological dilemma from scattered details throughout the novel. The story is clearly situated within the GDR and Hein himself provides information regarding its temporal setting:

> Der Roman selbst spielt auf drei Zeitebenen: 1957, die Jahre davor, also vor allem die Nazizeit, das Ende des Krieges und Beginn des Aufbaus der DDR, und die dritte Zeitebene sind diese 25 Jahre später, nach 1957, wo alle Figuren sprechen, egal ob sie noch leben oder nicht. . . . Das sind die achtziger Jahre, also fast die Zeit, in der der Text von mir geschrieben ist. (Jachimczak 353)

Horn's frustration is unquestionably linked to his conflict with the socialist system, the genesis of which antedates his experiences in Bad Guldenberg. Thomas's father reveals that Horn was forced to give up a meaningful position in Leipzig as a result of a situation he characterizes as "Eine dunkle Geschichte, . . . etwas Politisches" (*HE* 65). Details of the circumstances are gradually revealed, primarily through the "pseudosozialistischer Politiker" Kruschkatz (Snamenskaja 511), mayor of Guldenberg, who, in speaking about Horn, connects past events with present ones:

> Er wollte Leipzig nicht vergessen, und verstehen konnte er es nicht. Ihm war dort Unrecht geschehen, gewiß, und an diesem Unrecht hatte ich meinen Anteil, ich habe es nie bestritten. Aber es gibt eine höhere

> Moral, vor der sich Recht und Unrecht die Waage halten oder gemeinsam zu fragwürdigen Werten schrumpfen. Es war ihm ein geschichtlich notwendiges Unrecht angetan worden im Namen eines höheren Rechts, im Namen der Geschichte. (*HE* 69)

Kruschkatz, instrumental in Horn's demise in Leipzig, admits that actions taken against Horn were unjust, but is able to explain the actions as being a necessary wrong for the good of a higher purpose. Though Kruschkatz offers only one of several perspectives regarding Horn's death, he provides essential information regarding the political reasons for Horn's departure from Leipzig. In a statement revealing political determinism Kruschkatz describes Horn's death as disturbing, but explains that Horn dies "weil er für diesen Tod vorgesehen war" (*HE* 26). These attitudes reflect the view that sacrifices must be made for the greater good of the society, that progress demands a blood toll, and Kruschkatz's further assertion that "das schrecklichste Opfer, das der Gang der Geschichte fordert, ist der Tod von Schuldlosen" (*HE* 73). Kruschkatz, the compliant party official, absolves himself of personal responsibility for Horn's death, reasoning that it is simply a consequence of nonconformism within the society:

> Drei Jahre nach meinem Amtsantritt als Bürgermeister verübte er [Horn] Selbstmord. Ich habe ihn nicht davon abhalten können, und ich weiß, daß einige Leute in der Stadt mir die Schuld an seinem Tod geben. Das ist unsinnig. Horn war für diesen Tod bestimmt wie ein Ochse für den Schlachthof. Er war nicht lebenstüchtig. (*HE* 72)

The simile employed by Kruschkatz not only indicates Horn's inevitable destruction, but also reveals the power imbalance and lack of individual rights within the socialist system, as well as the cruel view that people are as expendable as animals. "Lebenstüchtig" is an ideological term, reminiscent of both the Nazis and of socialism, embodied in the character of Kruschkatz. Horn was not a party adherent and was therefore an understandable consequence of the conflict between state and dissident individualism. Horn's inability as an individual to survive within the monolithic, unbending power structure of socialism reinforces the expendability of nonconformist views. On a personal level, Kruschkatz blames Horn for the death of his (Kruschkatz's) wife, and views Horn's suicide as an act of revenge for events in Leipzig. Kruschkatz's presence in Bad Guldenberg connects Horn's experience in Leipzig with his life in Bad Guldenberg, and relations between the two men are strained, though Kruschkatz attempts a reconciliation between them.

The continuity of political ideology and the suppression of dissident views are presented in the renewed persecution of Horn in Bad Guldenberg. Kruschkatz's opportunistic underling Bachofen denounces one of Horn's historical writings as containing encoded revisionist messages inimical to socialist society (*HE* 102). He identifies Horn as follows:

> . . . ein typischer Vertreter intellektuellen Kleinbürgertums . . . [s]ein Unglaube an die Kraft der Arbeiterklasse und ihrer Partei habe ihn genötigt, der bürgerlichen Ideologie Zugeständnisse zu machen und im

> Chor mit liberalistischen Schwätzern eine sogenannte Erweiterung der Demokratie zu fordern. (*HE* 104)

The accusations require Kruschkatz's renewed involvement in Horn's fate and, as before, Kruschkatz acts against Horn so as not to endanger the former's own position (*HE* 104). Again, his assessment of Horn is one of fatalism: "Aber ich unterschrieb auch, weil allein Horns unduldsamer, bornierter Starrsinn mich würdelos machte und ich davon überzeugt war, daß weitere Nachsicht ihm nicht helfen konnte, sondern die Katastrophe lediglich aufschieben würde" (*HE* 105). Kruschkatz, whose views and actions reveal a near apologetic rationalization of socialist politics, is contrasted with Bachofen, an opportunist within the party. It is Bachofen who initiates the persecution of Horn in Bad Guldenberg, contrary to Kruschkatz's will, thereafter openly accusing Kruschkatz of indifference and, ultimately, of responsibility for Horn's suicide (*HE* 238). Bachofen rationalizes Horn's suicide as that of a "Klassenkämpfer," who was prevented by Kruschkatz from seeing the error of his ways, thus precluding repentance (*HE* 238).

Despite Kruschkatz's protestations and his representation of the official rationality, he realizes that others do ascribe guilt to him, for reasons other than those given by Bachofen: "Denn selbst Irene, meine eigene Frau, gehörte zu jenen Leuten in Guldenberg, die mir seinen Selbstmord anlasteten" (*HE* 72). The physician, Dr. Spodeck, who has information about the "böse Geschichte" in Leipzig, diagnoses Kruschkatz's physical problems as being the result of his guilty conscience. Although

Horn's death comes to her as a surprise (*HE* 20), Gertrude Fischlinger, with whom Horn lived and shared a brief period of intimacy, declares "Er war nicht geboren, um auf Erden glücklich zu werden" (*HE* 114).

Horn's alienation and psychological dilemma are the direct result of the conflict between individuality and the ideological doctrine of the over-regulated socio-political system in which he lives. Dissident views are pursued and have negative consequences, as is illustrated by the revocation of Horn's doctorate and his banishment to a provincial town. The persecution of dissident views leads to Horn's isolation from society, or, put another way, to a lack of integration in society. Lack of integration has been identified by Durkheim as contirbuting to egoistic suicide.[16] Transplanted to Bad Guldenberg, Horn tries to carry on his truthful interpretation of history, but when accusations begin anew, the psychological constriction leads to a lethal form of egression.

As his suicidal intention takes shape in his mind, the relational aspect of suicide becomes evident. Horn's suicidal intentions are communicated to other characters and to the reader. Horn visits the pastor and is overheard by Jule as he proclaims his innocence and conveys his desire to disappear. The pastor's subsequent recitation of the *Dies Irae*, the lamentation of the dead (*HE* 115), further informs the reader of Horn's impending death. Horn visits Gertrude a few days before his disappearance, saying, "daß man in seinem Leben nicht immer nur davonlaufen könne" (*HE* 116),

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[16] Durkheim states that "suicide varies inversely with the degree of integration of the social groups of which the individual is a part" (209).

signifying an action different from his departure from Leipzig. To Irene Kruschkatz and Dr. Spodeck, Horn describes himself as a lost soul. "Haben Sie denn nie das Gefühl," Horn asks, "diese Stadt auf dem schnellsten Wege verlassen zu müssen?" (*HE* 212-213). Dr. Spodeck interprets Horn's statements as a communication of suicidal intention and appeals to Horn to make peace with himself (*HE* 214). During a medical visit to Dr. Spodeck, Horn again indicates suicidal ideation when, in speaking about his condition, he says: "Nein. Ich fürchte, die Apparatur ist insgesamt zum Teufel. Sie will nicht mehr" (*HE* 227). Dr. Spodeck uses the religious injunction against suicide in an attempt to dissuade Horn from taking his life: "Versündigen Sie sich nicht an der Schöpfung, Dr. Horn" (*HE* 227). Horn's inevitable death is also presaged by the artist Gohl when he says: "Es geht deinem Horn nicht gut, Thomas, aber wir beide können ihm nicht helfen" (*HE* 221). Thomas forms a significant link between Horn and the reader. He witnesses the deleterious effect of the state on Horn and it is Thomas whom Horn implores to remember in the dream-dialogue.

The Meaning of Suicide

It remains to discuss what instrumental and expressive significance suicide has for this novel. Instrumentally, Horn removes himself physically from a society in which he can no longer be true to his concept of history without sanction. On a personal level, this has led to psychological pain and desperation. Horn is described as leading an existence nearly devoid of normal human contact. Though he reaches

out briefly to Getrude Fischlinger, it is in a superficial, physical way. He enjoys a following at his Thursday evening lectures, but it is stated that few understand the true import of his discourses. His admonition to represent history honestly is largely lost in historical analogy, a fact necessitated by the threat of political sanction. Suicide as depicted in the novel represents also the ultimate rejection by an individual of society.

The expressive significance of Horn's suicide is also to be found on the intra- and extra-novel levels. Within the novel, Horn has substantial impact in death: "Der Tote erregte die Kleinstadt auf eine unangemessene Art. Die Leute gaben ihm, auch als er endlich unter der Erde lag, keine Ruhe. Es schien mir [Kruschkatz], als ob sie von einem bösen Geist getrieben wurden, unablässig über ihn zu reden. Der tote Horn lastete auf ihrer Seele" (*HE* 105). And it is Horn's suicide which marks the permanent departure of the gypsies, a group which exists outside societal constraints. The expressive meaning for characters within the novel is shown to vary according to political ideology. Bachofen, who represents ideological and political rigorism and is a defender of the system, stands apart from other characters in his assessment of Horn's death: "Der Selbstmord sei Horns Schuldbekenntnis gewesen, ein Bekenntnis abartiger und sozialismusfeindlicher Denkungsart. . . (*HE* 238). Bachofen exemplifies the correct socialist view, that as an opponent to socialism, Horn's suicide is little more than an admission of an inappropriate political stance. As has been demonstrated, many impugn Kruschkatz, a representative of the state, for Horn's death, though for different reasons. Since Kruschkatz has contributed to Horn's official denunciation on

two occasions, condemnation must be seen as attaching also to the State. Horn's conflict with the system is related to his conception of history. Manipulation of history is at the heart of Horn's appeal to the young Thomas: ". . . und doch schreiben auch wir die Geschichte. Wir sind es, die dafür einzustehen haben, ob die Wahrheit oder die Lüge berichtet wird" (*HE* 68). Horn likewise discusses with Dr. Spodeck the necessity to contemplate one's history and the consequences of so doing. "An unserer Vergangenheit haben wir alle zu knabbern," Horn says, "Dem einen beschert sie schwere Träume, dem anderen einen frühen Tod" (*HE* 229). Though Horn is the only character within the novel that openly commits suicide, alienation or what might be considered partial egression from society is demonstrated by others. The continuity of political persecution in Bad Guldenberg is illustrated in the self-sacrifice of Gohl's wife, who changes places with her mentally retarded daughter, the near-victim of Nazi selection. Gohl continues to live as a reclusive outsider, fearing that death has forgotten him (*HE* 38). Kruschkatz becomes increasingly disillusioned with the system in which he lives. His words reveal behaviour which is intentionally inimical to his health: "Ich zündete mir eine Zigarette an. Ich wußte, es war Gift für mein Herz, aber es war ein Gift das mir den Schmerz nahm" (*HE* 27). Finally, isolated and in retirement, Kruschkatz tries to chase away his memories, welcoming death: "Wenn ich doch sterben könnte, um allem zu entgehen. Sterben, um nicht zu träumen. . . . Laßt mich traumlos, lichtlos, erinnerungslos. Ich warte auf euren sanfteren süßen Bruder, ich warte, ich warte" (*HE* 260). It is through the character of Thomas that the novel links the expressive meaning within the novel with the meaning presented to the

reading audience. Thomas and the novel's reader are joined in the dialogues which precede each chapter. Unidentified, the addressee of the appeal "erinnere dich" can also be understood as being the reader. Thomas is not actually plagued by Horn, but rather by his memory of Horn: "'-Wenn Sie [Horn] keinen Frieden haben, lassen Sie mir meinen Frieden.' --'Hast du es immer noch nicht begriffen, Junge? Du [Thomas] bist es, der mit den Toten nicht leben kann'" (*HE* 191). Horn, as personified memory, interprets for Thomas the reason for his death: "Du darfst nich vergessen, mein Junge. Wenn du mich vergißt, erst dann sterbe ich wirklich" (*HE* 59), indicating that the reason for his death will have been lost, if it no longer resides in Thomas's mind. This statement discloses the fact that Horn, though physically dead, still takes on life in the memory of Thomas, a representative of a newer generation, existing as potential for effecting change: "Solange es ein menschliches Gedächtnis gibt, wird nichts umsonst gewesen sein, ist nichts vergänglich" (*HE* 145). The importance attributed to history and memory by the protagonist Horn is echoed in Hein's own understanding of history: "Das Begreifen der unmittelbaren wie auch der ferneren Vergangenheit halte ich für absolut notwendig, wenn man die eigene Situation erkennen will. Insofern sind das Dinge, die ich zum Verständnis meiner gegenwärtigen Gesellschaft benötige" (Jachimczak 351). Although the relationship between the fictional Horn and the philosopher on whom his character is based, is distant, Hein admits that the connection "einfach mit der Existenz und dem Tod des Philosophen zu tun hat" (Jachimczak 353). "Wir sind nicht unabhängig, kein Individuum ist von den gesellschaftlichen Entwicklungen unabhängig" (Jachimczak 358), says Christoph

Hein, and it is clear that *Horns Ende* is a novel in which the author asks the reader to examine the continuity between history and the present.

Summary

In three of the four novels here examined the young fulfill a role in the depiction of suicide. Youth naturally symbolizes the future of any nation, and any work which shows young people in a self-destructive light projects the future of a nation in a negative way. In the opinion of Oskar Brüsewitz, a Protestant minister in the GDR who blamed his suicide on conditions in his country, the Socialist Unity Party had, since the Ninth Party Congress, sought to take too much control over the youth of the GDR ("Diktatur" 36). The minister, who identified the cause of his suicide in a note to his daughter, took his life, not just out of desperation, but also as a form of social protest.

In Becker's novel Lina is symbolic of the hope that is engendered by Jakob Heym, the willingness to suspend disbelief for the sake of love and happiness. In the dire circumstances of the ghetto, Lina holds on to the hope symbolized in the fairy tale of the sick princess (*JdL* 163). As the inhabitants are transported away from the ghetto Lina begins to question the truth of Jakob's story. At the same time the narrator, who relates events in the present tense, casting himself back to the end of the war, begins to realize the purpose of Jakob's fiction. "Buchen und Erlen und Birken und Weiden und Kiefer, du lieber Gott, was sehe ich für Bäume" (*JdL* 269), the

narrator says to himself, and shortly thereafter, "mitunter setze ich mich heute noch in einen Zug," (*JdL* 270) and the connection to the present is made. The narrator realizes that Jakob's fiction sustained many inhabitants at least to the point of their deportation. Although Lina's fate is never specifically mentioned, the knowledge of the narrator's survival engenders hope in the reader, and to an extent validates the actions of Jakob, referred to by the narrator as a hero .

Plenzdorf's depiction of the future of youth is more pessimistic than Becker's. Plenzdorf's novel does not show a range of possibilities for youth, but rather a choice between conformity or suicide. Edgar, who never knows real happiness in socialist society, develops from passive compliance within the system to self-isolation from society and eventually to lethal egression. Others are unable to understand Edgar's plight. In an obituary, Edgar's mother describes her son's death as "unfaßbar" (*DnL* 8), an admission which emphasizes the distance between her, someone aspiring to conformity, and Edgar, someone who has been isolated by it. Isolation from his peers is reflected in Charlie's often stated insight "Edgar war ja nicht zu helfen" (*DnL* 73). Self-destruction in youth is particularly disturbing, especially when non-conformity and isolation are brought about by the prevailing socio-political ideology. Edgar's death signals the "Aufkündigung des Bildes vom funktionierenden Kollektiv" (Rohrwasser 220).

In Christoph Hein's novel, like that of Becker, youth is not portrayed in the commission of suicide, rather it bears witness to the transgressions of society. Thomas examines the past and the lingering image of Horn, whose suicide symbolizes the need

to reassess constantly the continuity of history. Thomas lives as the inheritor and interpreter of the past. Inasmuch as the destruction of Horn's career in the 1950's and eventual suicide were a product of a socialist system bent on containment and conformity, the meaning that Horn's suicide will ultimately have depends on the ability of Thomas to process the remembered information. "Thomas exhibits a natural inclination to forget and to suppress" (68), McKnight states. At the beginning of the eighth chapter, Thomas expresses this desire to suppress: "Ich will jetzt schlafen, toter Mann. Schlafen und vergessen" (*HE* 249). Horn's voice, however, adjures him to remember.

This study has referred to the concept of the intellectual with regard to the protagonist Edgar in Plenzdorf's *Die neuen Leiden des jungen W.* The noun "intellectual" is not a precisely definable term. In addition to the definition already included from Robert Brym's *Intellectuals and Politics* (1980), this study cites the definition of intellectual contained in Julien Benda's well-known work on the subject *The Treason of the Intellectuals* (1927). Benda defines intellectuals as "all those whose activity essentially is not the pursuit of practical aims, all those who seek their joy in the practice of an art or a science or metaphysical speculation, in short in the possession of non-material advantages" (43). Keeping in mind the definitions of "intellectual," it is clear that the characters presented in the novels exhibit traits ascribed to intellectuals. Hein's character Horn and Wolf's characters qualify as intellectuals by virtue of their professions (academics and writers). Becker's Jakob Heym and Plenzdorf's Edgar, however, should, by virtue of their ideas, activities, and

disposition to their society, be considered intellectuals as well. Common to all protagonists is the opposition to certain elements of the world in which they live. Bernard E. Brown has stated that "totalitarian regimes fulfill themselves and their logic by suppressing opposition; when they cease to suppress opposition they cease to be fascist or communist" (145). The conflict between individual and state is evident in all novels of the GDR dealt with here. The protagonists represent the opposition to socialism, a position which leads to conflict. Suicide becomes a consequence of this conflict, signifying an act of egression and protest. Suicide as an actual form of expressive protest in GDR society is difficult to quantify since official statistics are difficult to interpret, when available at all, although the example of Oskar Brüsewitz, already given ("Diktatur"), suggests an existing condition in the GDR, because his suicide was admittedly committed in protest against the policies of the GDR towards its youth.

Jakob Heym pursues a course in which he strives for the preservation of his people, though in doing so he places himself and even others in constant peril. Whereas others are concerned with their day-to-day existence, still obedient to the Nazi oppressors, Jakob actively combats despotism, manufacturing hope for those who might otherwise have ceased to believe that survival was possible. It is this ideological opposition that sets Jakob Heym apart from others, even those such as Dr. Kirschbaum, who was critical of Jakob's fictional news reports, though Kirschbaum does eventually commit suicide in a way that can be understood as having expressive meaning for others. Jakob Heym's opposition to the Nazi regime is, as has been

shown, Becker's analogy to the socialism he [Becker] experienced. Like all totalitarian systems, socialism in the GDR was intolerant of open opposition, fearing that opposition could undermine and eventually destroy it. Control in the form of censorship thus led to veiled criticism of the kind seen in Becker's novel.

Plenzdorf's Edgar is engaged in an ideological struggle with the socialist system. Edgar's objection to socialism arises not because of his incompetence, but because of the system's rigidity and inability to accommodate Edgar's desires. Edgar's perspective, which is modified after death and is politically more in conformity with socialist orientation, is self-critical, but, as Brenner points out, the novel was understood as a call to re-examine the responsibility of society toward the individual, especially the youth (41-42). And indeed, Plenzdorf's novel adds to the intellectual discourse about political and generational rigidity by influencing Volker Braun's story *Unvollendete Geschichte* (1975) in which Karin, the main character, discovers her brother's copy of *Die neuen Leiden des jungen W.* (Brandes and Fehn 608).

Citing a 1982 interview in which Christa Wolf gives her reasons for writing *Kein Ort. Nirgends*, Schulz-Jander notes that Christa Wolf, "abandons the sovereignty of the authorial position to posit her own experience as part of the text" (239). Lifting the veil of the historical distance of the novel, Wolf openly articulates criticism of a system which expatriated Biermann in 1976, raising the question as to why disguised criticism is necessary at all. In this regard, it is worthy of note that the 1980s witnessed change within the GDR, change which allowed discourse such as Dieter Schlenstedt's concept of "socialist critical realism" and the "problematic hero," instead

of the traditional "positive hero," through which a form of self-criticism could develop (Emmerich *Kleine Literaturgeschichte* 420-421).

Intellectual repression in the form of censorship continued in the GDR in the 1980s. As McKnight states, Christoph Hein's *Horns Ende* "languished over a year on the publisher's shelves while the censorship office struggled to keep it off the market" (74). The censors were concerned with the novel's expression of continuity between fascism and socialism. Eventually, however, the book was released without official authorization, referred to in a letter written by Hein in 1993 as, "to the best of my knowledge, the only belletristic book that ever appeared in the GDR without this essentially indispensable authorization" (qtd. in McKnight 77).[17] Similar to Schlenstedt's argument for self-criticism, Jürgen Engler, Hein's friend and the member of a group of younger intellectuals, argued "dialectically that the novel needed to be published in order to provoke argumentative reactions from the Marxist standpoint" (McKnight 75).

Fiction in the GDR was seen as playing a significant role in the furtherance of political ideals and was, for this reason, subject to control (Emmerich *Kleine Geschichte* 17). Consequently, intellectual agitation in the GDR could have a significant impact. However, the inability to appease or circumvent the censors could carry negative consequences for the author.

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[17] McKnight also notes the release, six months earlier, of an illegal edition, apparently by mistake. A number of copies of this earlier edition were bound with the cover jacket of Karl May's *Der Geist des Llano Estacado* (77-78).

The theme of suicide in the novels forms part of the overall criticism of socialism. In each of the four novels suicide is presented as the consequence of a relationship with society which was ultimately inimical to the individual. In all but Plenzdorf's novel, discussion of suicide as the result of societal oppression or rigidity is disguised by historical analogy, a typical device to circumvent GDR censorship. Plenzdorf's novel effectively makes ambiguous the issue of suicide as a negative example, i.e., Edgar as a negative hero. Edgar's non-conformity is, however, simply an expression of the right to self-determination and social inclusion. Any society which denies these fundamental rights of the individual can not be seen in a positive light. Suicide functions as the metaphor for intellectual dissension and an expression of the rejection of socialism's status quo.

What lies ahead for the eastern part of Germany following reunification? An article published in the magazine *Der Spiegel* in 1994 examined new trends in actual suicides. Still exhibiting a higher suicide rate than the western part of Germany,[18] the article observed a change in motives for suicide since 1989. Whereas before 1989 people became desperate as a result of the "allgegenwärtigen Gängelung, Verfolgung und Bespitzelung durch den Überwachungsstaat," people, since the *Wende* have begun killing themselves "vor allem wegen sozialer Ungewißheit" ("Sündenböcke" 58). This is a manifestation which seems to confirm predictions and observations in

[18] The article reports that in 1992 the west showed a suicide rate of 15.6/100 thousand, compared to a rate of 21.4/100 thousand in the east ("Sündenböcke" 58).

suicidological research.[19] These motives for suicide are certain to find reverberation in the literature of the east.

[19] Hans Wedler observes the development of an anomic situation for large parts of the population arising as a result of the destabilization of the socialistic regime (82).

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Chapter III

Suicide in the Novel of the Federal Republic of Germany

Political Situation

Three of the novels discussed in this chapter were published during the fledgling years of the Federal Republic of Germany, when memories of National Socialism were fresh and the experiment of democracy and capitalism in the reordered German constellation still new: Walter Jens's *Nein. Die Welt der Angeklagten* (1950), Wolfgang Koeppen's *Treibhaus* (1953), and Siegfried Sommer's *Und keiner weint mir nach* (1953). Although constitutional democracy was not new to Germany, conditions for the new Federal Republic were unique. Germany was now a divided and occupied country, the result of two World Wars within the first half of the twentieth century, in which German forces had been defeated. Not only was this a political and cultural nadir for Germany in the eyes of the rest of the world, but Germans themselves experienced an extreme low point in their collective and individual self-esteem. In literature, expressions such as *Stunde Null, Kahlschlag*, and *Tabula rasa* gained currency, particularly among associations such as the "Gruppe 47," reflecting the perception of an historical caesura and the desire for a new beginning (Wehdeking *Anfänge* 11). Despite the disputed truth of the above metaphors, the terms are still used in the critical discourse about this period. Assimilation of the past is another feature of literature since 1945 as authors endeavour to understand the genesis and

consequences of Nazism, and although *Vergangenheitsbewältigung* is not completely coextensive with the issues of guilt and atonement (Boeschenstein 138), it is clear that in literature guilt and atonement often become questions central to a discussion of the past. The first three novels examine suicide and German society in three very distinct ways. Jens chooses to create a fictional society, politically distanced from cotemporaneous Germany through the guise of an Orwellian totalitarianism. "Dieses Buch," claims Jens's introductory caveat to the novel, "richtet sich weder gegen eine bestimmte Person noch gegen eine bestimmte Macht. Das heißt nicht, daß es nicht wahr sei" (Jens, *Nein. Die Welt der Angeklagten* 6; henceforth *WdA*). Jens, it seems, wishes not to examine the past in its historical specificity, but rather to allow the reader more freedom to consider the issues of totalitarianism as it relates to the past and to a hypothetical future. Koeppen takes a different tack. He too disclaims too great a connection between his fictional work and actual political events, stating that the novel functions as a "Katalysator für die Imagination des Verfassers" and that ultimately, "der Roman hat seine eigene poetische Wahrheit" (Koeppen, *Das Treibhaus*; henceforth *DT*) Despite Koeppen's disavowal of any connection to real events or people, reception of the novel emphasises a political interpretation (U. Greiner 45-64). Juxtaposed to these first two eminently political novels is Sommer's *Und keiner weint mir nach.* Published in the same year as Koeppen's, Sommer's novel is, in many ways, antiphonal to the other two, different yet harmonious in many ways. Demanding inclusion in the study by virtue of its high degree of suicidal ideation, Sommer has written a novel which offers a more parochial view of German society,

seemingly removed from the political events of the day. In this novel, the relationship between youth and adults in society is analogous to the conflict between the individual and the state.

The most recently published of the four books to be dealt with in this chapter, Gert Heidenreich's *Der Ausstieg* (1981), revisits the theme of assimilation of Germany's political past, incorporating the perspective of hindsight. Written more than thirty years after the war, Heidenreich's novel incorporates more recent events taken from the political and cultural map of Germany, namely the terrorism of the 1970s, and does so with a view to demonstrate the continuity of past and present.

Significant about all four of these works, and of greatest importance to the present study, is the use of the theme of suicide. In all of the works suicide becomes an element of central importance as the protagonists' development toward the ultimate act is described, so that the critical reader may gather textual indications in conducting a psycho-literary autopsy of each character. Suicide is not just an occurrence in the novels but in three of them is demonstrated to be the result of the effect of the political situation on each protagonist. The political situation becomes the precipitating cause when taken in combination with the unique constitution of each protagonist. Whether academic, politician, or journalist, each protagonist is described as being in opposition to existing political conditions. Opposition and moral sensitivity lead to the confrontation between individual and system. The resulting inability of the individual to prevail with his moral integrity intact, contributes to disintegration and hopelessness and, eventually, suicide.

In the context of the novels, the suicides are real and believable, but in a wider context they become metaphorical, the result of conscientious objection taken to the extreme. Suicide is not an abstract concept, but is made German, and more specifically West German. By connecting suicide to the conditions of the Federal Republic, the works distinguish suicide from its occurrence in the German Democratic Republic.

Walter Jens's *Nein. Die Welt der Angeklagten* (1950)

Walter Jens's *Nein. Die Welt der Angeklagten* is often compared to other works such as Aldous Huxley's *Brave New World* (1932), Arthur Koestler's *Darkness at Noon* (1940), and George Orwell's *Nineteen Eighty-Four* (1948) (Lauffs; Berls; Rosenfeld),[1] and his style has often been compared to that of Kafka, an influence which Jens freely admits (*WdA* 298-299). Conceived as a "confrontation with the world of Nazism" (Rosenfeld 200), the novel was extremely popular with the post-war reading audience. Reissued in paperback in 1954, all German copies were sold out by 1956, and reception outside the country was very favourable, particularly in France (Rosenfeld 200). In 1968, a new hardbound edition was published by Piper Verlag (reissued in 1977 in paperback), in which is included an afterword by Walter Jens. "Das Problem des letzten Menschen," Jens writes, "bleibt im Sinne einer denkbaren Gesamt-Uniformierung nicht nur so aktuell wie vor zwanzig Jahren, sondern es hat an Brisanz noch gewonnen" (*WdA* 299). Despite Jens's assertion of the novel's continued

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[1] Jens was apparently unfamiliar with Orwell's work prior to writing *Nein. Die Welt der Angeklagten* (*WdA* 297).

relevance, it has been claimed that the novel is largely forgotten (Berls 22). The novel shows a three-tiered totalitarian society which controls its people through manipulation and deceit, pitting one person against the other in an endless system of paranoia driven by accusation and guilt. Central to the novel is the protagonist Walter Sturm, a former academic, who becomes engaged in a judicial proceeding reminiscent of Kafka's *Der Prozess* (Berls 30).

Walter Sturm: "Der Letzte"

> Ich nannte Sie den Letzten, weil eine längst versunkene Zeit im Augenblick Ihres Todes endgültig Vergangenheit wird. . . . Alle kann man bekehren, Sie aber nicht, mein Freund. . . . Wenn Sie nicht mehr sind, brauchen wir niemanden mehr zu bekehren. (*WdA* 190)

These words of explanation from the judge, who holds the highest position in the fictional society, to Sturm indicate that the state regards Sturm's views as contrary to its own purposes and goals. Although Sturm does not openly agitate for change in the society, certain aspects of his life, for example his personal relationship with Gisela Waltz, deviate from the accepted direction of the totalitarian state. "Die Verkümmerung der zwischenmenschlichen Beziehungen ist natürlich eine weitere Konsequenz dieser Gesellschaftsordnung," writes Berls (24), evidenced by the cold, anonymous relationships of the guards (Berls 24; *WdA* 85). Sturm's relationship with

Gisela Waltz, though subject to many restrictions, is still based on love, something which Sturm later identifies as a life-sustaining quality (*WdA* 273).

The judge explains that "sie" (the people) are no longer happy, attributing their unhappiness to Sturm. "Solange sie arbeiten und ihre Pflicht tun, sind sie glücklich," says the judge, "Du bist schuld daran, daß sie nicht so zufrieden waren, wie wir es gerne wollten" (*WdA* 197). It is not Sturm's actions that make him guilty, but his ideas. Walter Sturm, a former academic, is targeted by the state as a political undesirable. His three-day confrontation with the system, as described in the novel, culminates in his suicide, which is the result not of psychological sickness, for there is no indication that Sturm had been anything but a productive member of society, but of external societal forces. His suicide, though closely connected to the three days of trials described in the novel, is actually the result of more than twenty years of life in an oppressive system. The fact that Sturm was an academic does not mean that he was, by definition, opposed to totalitarianism. "Every political system seeks to justify itself in moral and legal terms, "writes Bernard Brown, ". . . there are always intellectuals to participate in the task of justification or legitimization" (1), citing Carl Schmitt as someone who offered a favourable interpretation of Nazism. Not just an academic, Sturm was also an individualist and an independent thinker, someone threatening to the interests of the state. Ironically, it is Sturm's insights into totalitarianism as embodied in his book on Nero which result both in his selection as prospective final all-knowing judge (Berls 25; Rosenfeld 199) and condemn him in the eyes of the totalitarian state. Following the war, he becomes a victim of the eradication

of cultural institutions through the "Kunstgesetz" (*WdA* 38). Terminated as lecturer of literary history and unable to publish, Sturm's hope for intellectual expression has been thwarted under the stranglehold of censorship (*WdA* 28, 79). This frustration of psychological needs contributes to Sturm's eventual suicide.

Anti-Utopia and the Intellectual

In a democracy, the intellectual performs the dual tasks of opposition and criticism, keeping "those in power on their toes, ever alert to malfunctioning of the mechanism or shortcomings of policy" (Brown 3). Brown further states that the strength of intellectuals in a democracy, can, in the extreme, develop to the degree that dissent fostered by intellectuals leads to "alternative political systems in which dissent is suppressed" (3). Jens's novel does not expound on the way in which a totalitarian state was produced following the last war, but it is fair to assume that the state was conceived of by intellectuals as a reaction to the system which preceded. The consequence of the war is totalitarianism, a state in which dissent is not tolerated. Characteristic of fascism and communism, *Die Welt der Angeklagten* lacks what Brown refers to as an organised and autonomous opposition (145). "Only when opposition is recognized as legal," Brown argues, "is it possible for intellectuals to criticize, probe, and question" (145). In Jens's novel, Walter Sturm has been singled out as the intellectual most capable of dissident thought, and through his example, the novel demonstrates the destructive effects of totalitarianism. Sturm's three-day judicial

ordeal encapsulates the externally-caused psychic suffering of an entire society, a system of accusation and trial characterized by its absence of all fairness and rights. People, reduced to numbers and categories, are tortured with the goal of physical and emotional annihilation. Able to achieve partial assimilation for twenty-two years, Sturm's direct confrontation with the system finally intensifies his sense of hopelessness-helplessness and his feelings of loneliness and estrangement. Sturm experiences the world "wie im Traum" (*WdA* 216). "Alles ist fremd," he says, and, in a state where emigration is impossible, he feels "als sei [er] jahrelang fort gewesen" (*WdA* 238). The ability of the state to produce a sense of estrangement in its people allows it to control them. So great is not only the control, but also the perception of control, that Sturm believes from the beginning that he has no choice but "den Weg zu gehen, den man [ihm] bestimmt hat" (*WdA* 28).

Hopelessness-helplessness, the situational aspect described by Shneidman, is evident throughout the novel as Sturm progresses from one social level to another, indicated in passages such as, "Es gibt keinen Ausweg mehr" (*WdA* 28, 177), "Nein, eine Flucht gab es nicht mehr" (*WdA* 181), and "Teuflisches Spiel! Teuflisch und unentwirrbar und kindisch zugleich und nirgends ein Ausweg" (*WdA* 193). All such utterances are relational "clues to the impending lethal event" (Shneidman *Definition* 143), communicating Sturm's evolving contemplation of egression. Feeling helpless within the system, Sturm's contemplation of escape, impossible in a single-state world, contributes to a sense of constriction. Constriction is not the result of Sturm's

limitations of reasoning and internal logic; rather, constriction is here the product of an external force, the state. Once caught in the process of accusation and trial, Sturm's options are eventually reduced to two: conformity or death. Sturm's choice of death, and thus suicide, stems from his feelings of guilt, an aspect which will be dealt with in more detail later.

The state, characterised as the "allgewaltige Macht," dispenses power with "die willfährigen Werkzeuge der Obrigkeit" (*WdA* 7). This monolithic political entity effects total subjugation of its people, and along with this, their deindividualisation and dehumanisation.

"Das Leiden eines Menschen, verantwortungsvoll beschrieben," writes Jens, "kann die Faktoren aufzeigen, die solches Leiden bewirken, während eine Rundumbeschreibung oft nur die Fakten schildert, aber nicht die Faktoren vermittelt" (Qtd. in Pankow 317). Although Jens describes the suffering of an entire state following a war of cataclysmic proportions, the life of Walter Sturm serves as the example of the ultimate suffering and personal sacrifice, thereby illuminating the inimicality of a totalitarian political system.

The monolithic state which arose following the war is a society "ohne Ausland," where "alle Menschen der Erde der einzigen Macht untertan sind" (*WdA* 29). The state has systematically done away with cultural institutions important to the integration and expression of people:

> Fünf Jahre nach dem letzten Kriege, den eine einzige, nun allgewaltige Macht überlebt hatte, zerstörten sie die Kirchen. Sieben Jahre nach dem

> Kriege begannen sie die ersten Universitäten zu schließen. Neun Jahre nach dem Kriege erließen sie das Gesetz über Kunst, das die Dichter, Maler und Musiker zum Schweigen verdammte. (*WdA* 7)

Other evidence of systematic dehumanization is the existence of a three-tier class structure which divides people into accused, witnesses, and judges. Death and suicide become a result of trials against the people and part of the state's grand design to control the populace and eliminate political undesirables.

The polarization of power in the system is expressed in the pronouns "wir" versus "sie." Although at the beginning of the three days the uninitiated Sturm has no direct knowledge of the brutality of the system, the receiving of a "Vorladung" evokes feelings of foreboding and fatalism. "Sie haben mich schon abgeschrieben" (*WdA* 9), Sturm says, and shortly afterwards, "Es war mir, als habe man mich bereits verurteilt" (*WdA* 13).

The Motivation of Guilt

Guilt is the motivating emotion for Sturm's suicide in the novel, but it is not guilt as defined by the totalitarian system in which he lives. As with any system, the state creates legal and moral codes which themselves give definition to what is termed an offense. Because the system is totalitarian, these offenses have evolved not out of a sense of consensus and democracy, but out of a response, presumably necessitated by a World War. Evident is the fact that Sturm's sense of guilt does not conform to

that of the system around him. As Sturm becomes indoctrinated into the logic of the state, he gains an understanding of the role guilt plays in controlling the masses. Guilt drives the system and is synonymous with the word "accused": "Die Angeklagten sind die Schuldigen" (*WdA* 51). In this totalitarian society accusations are made and guilt is fostered according to the system's own internal logic. Citizens are condemned for behaviour which shows even the least hint of individuality (*WdA* 108-110), this being the failure of one's duty to the collective, sometimes with the startling consequence that individuals turn themselves in without reason. Guilt, as explained to Walter Sturm by the highest judge, is to be equated with unhappiness, another word subject to redefinition in the new state. As long as people work and perform their duty, they will, according to the state's logic, be fulfilled and happy. In this loveless and godless society Sturm is identified as someone who has been responsible for people's unhappiness: "Und denke daran," says the high judge, "wie schön es sein wird, wenn die Menschen jetzt nicht mehr durch dich [Sturm] und deinesgleichen unglücklich werden. Du bist schuld daran, daß sie nicht so zufrieden waren, wie wir es gerne wollten" (*WdA* 197). The judge attributes responsibility for many deaths to Sturm, whom he describes as having acted disloyally to the state. By assigning complicity to Sturm, the judge intends to use feelings of guilt as a way of making Sturm compliant. Guilt, as defined by the judge, is however, not what contributes to Sturm's suicide. In fact, the judge himself admits culpability in the death of citizens: "Ich habe die anderen töten lassen. Jeden auf seine Art . . ." (*WdA* 269). It is Sturm's own sense of moral guilt and responsibility, associated with the perception of being an

accomplice of the state albeit unwittingly, that eventually proves too much to bear for Walter Sturm. Gisela Waltz, Sturm's lover, commits suicide as a result of the state's entrapment of Sturm and her, and because suicide offers her the only means of avoiding eventual execution by the state. Suicide for her thus becomes an act of liberation. Sturm is manipulated into betraying the trust in his friends in order to promote his own safety within the state. To the extent that Sturm allows himself to be entrapped by the system, he is responsible for Waltz's suicide.

Sturm has been chosen by the system to succeed as highest judge, but as he makes his way to the top of the hierarchy, he is allowed greater knowledge of the society's class system and its mechanisms and he is set up for greater suspicion and incrimination among his peers. As Sturm gains more awareness of the system and is isolated from his friends, the most important of whom is Gisela Waltz, he assumes greater culpability within the system and, attendant upon this, greater feelings of guilt.

Once Sturm has taken the decision to die, he is relieved of guilt. His death thus takes on the meaning of atonement: "Er fühlte jetzt keine Schuld mehr. Er würde die anderen nicht allein gehen lassen und lachen, weil sie so dumm gewesen waren, sich für ihn zu opfern. Nein, er würde sich zu den anderen stellen" (*WdA* 291).

Passive Suicide

When examining the act of suicide in Jens's novel, it becomes evident that the definition of suicide has to be revisited. What transpires at the end of the novel must be categorized as passive suicide, for the act does not fit the popular conception of suicide, that being the commission of an act which brings swift and certain death to the self. In fact, the act that terminates the life of Walter Sturm is not a direct one, that is to say, Walter Sturm does not physically kill himself. In the context of the novel, however, it is his deliberate decision that secures his death and it is his act of omission, the refusal to assume the position of highest judge, that brings about his murder.

One of the aspects important in establishing suicide is evidence of lethal intention. Part of Sturm's impending decision for suicide is evident in the early association of himself with death. Death ideation evolves out of his sense of estrangement in the new society. Sturm describes his books as, "nur Seitenzahlen und gedruckte Buchstaben ohne Sinn, wenn man sterben muß" (*WdA* 29). Forced to endure a life devoid of meaning and its sustaining activities, he refers to himself, saying "Der Mensch, den man verurteilen will, lebt gar nicht mehr" (*WdA* 29). For Sturm life without choice or individuality and love is "nicht viel" (*WdA* 272;273).

Characteristic of suicide is the protagonist's ambivalence as he contemplates death:

> Durch den flutenden Abend glitt ein Mensch [Sturm]. Er war der Letzte. Alle anderen hatten sie getötet. Der letzte Mensch war Richter geworden, und er sollte Großrichter werden. Weil er ein Mensch war, wollte er noch leben. Aber er konnte nur leben, wenn er sich selbst verriet. Er würde sterben müssen, wenn er sich treu blieb. Er wollte aber noch leben. Er wollte aber auch den Mann nicht foltern, der nachdenkt, und den Mann, der seine Frau liebt, wollte er auch nicht foltern. Er wollte den Mann nicht foltern, der Bücher las, und er wollte die nicht töten, die wußten, was ein Mensch war. Aber er wollte noch nicht sterben. (*WdA* 281)

The rationale for Sturm's death is clearly described as one of conscience. Being true to himself necessitated death, despite his fundamental human desire to live. "Eine große Ruhe war plötzlich über ihn gekommen," it is said, "die ihn in den nächsten Stunden nicht mehr verließ. Er würde nun sterben, und er erschrak nicht, als er dachte: 'Ich werde nun sterben'" (*WdA* 288). Sturm clearly resolved to die in order to preserve his sense of self. In this society, death will be certain, as this is his only alternative. Having chosen death, Sturm's suicide, though never directly identified as such, comes semantically closest to the German word *Freitod*, for Sturm, despite having severely restricted options, freely chooses death as an alternative to psychic suffering. Sturm's death is suicide because he has wilfully chosen it. The death, which is committed at the hands of others, retains the positive aspects of self-sacrifice and martyrdom, yet sheds ignominy and self-defeat, implicit in direct suicide.

The Meaning of Suicide: A Message of Humanity

As has been shown, suicide in Jens's novel contributes to the rejection of totalitarianism. From the perspective of the protagonist Sturm, life's meaning has been destroyed. He is unable to exert himself critically as an intellectual, and suicide provides the physical and psychic egression from what have become intolerable circumstances. In addition to the unfulfilment of psychological needs, suicide provides Sturm with freedom from the guilt associated with being a participant in a system which exploits all people. Within the world of the novel, however, Sturm's choice for death has an influence on no one but himself. Nowhere is it indicated that Sturm's decision changes the circumstances or the thinking of any other character. His defiance of the state is not meant to inspire resistance or incite insurrection among the citizenry. Sturm is resigned to believe the judge's assertion that the state's machinery is capable of maintaining itself.

The ability of the system to maintain itself calls attention to what Berls describes as "eine Schwäche der Jens'schen Konstruktion" (32). Because the issue of succession to the position of highest judge is never a problem, the reader is left to contemplate the illogical necessity to recruit Sturm as the last all-knowing judge. Adding to this illogicality is the choice of Sturm, who, it seems, has been chosen to succeed the highest judge, based on his book on Nero, in which is evident his insight into totalitarianism (*WdA* 276). Sturm's book has been banned and Sturm has thus far been depicted as inimical to the interests of the state. It is inconsistent that his

insight would be needed, especially in a system that is self-sustaining. The only logical conclusion is that the choice of Sturm as successor represents the brutality and the absurdity of the system in the extreme, and that his entrapment symbolises the power and sadism of this totalitarian state.

Death means atonement for the feelings of guilt experienced by Sturm toward the deaths of the others. In death Sturm has a sense of union with those of similar conviction and belief, and he states clearly his choice for those who objected to the system. The expressive value of Sturm's death reaches beyond the individual psyche of the protagonist. Jens's novel is an admonition to its readers not to become complacent, not to allow the world to evolve into the negative place described in the novel: "Sonne und Mond blickten auf einen nicht sehr großen Planeten. Gestalten lebten auf ihm. Früher nannte man sie: die Menschen" (*WdA* 295). In his discussion of the novel, Herbert Kraft sees both positive and negative messages. Although the work is politically abstracted, the readership is able to relate to the many situations from Germany's experienced reality (Kraft 26). According to Kraft, the awareness of the difference between the fictional projected reality of the novel and actual events in post-war Germany engenders hope:

> Und diese Differenz konstituiert die optimistische Vorgabe: daß die Zeit von 1950--trotz allen Schwierigkeiten und Unzulänglichkeiten--die Chance zum Andersmachen bietet, so daß jetzt eine Zukunft als möglich erscheint, die in der folgerichtigen Entwicklung des politischen Systems der zwölf Jahre wäre ausgeschlossen worden. (Kraft 27)

On the other hand, Kraft also interprets the novel as "pessimistische Warnung, weil die Gegenwart keine Sicherheit bietet vor einer Wiederholung des Vergangenen" (Kraft 29). A novel depicting the fall of humanity during Germany's post-war democracy sheds doubt on the results of capitalism (Kraft 29). Sturm's death represents a moral victory over the totalitarian system. The protagonist's self-sacrifice remains on the personal level, however, as it contributes nothing to the betterment of the totalitarian society. As the reader discovers from the high judge in the novel, Sturm has the option of assuming the highest position in the society, but rejection of this has no effect on the system's continued existence: "Wenn du mein Anerbieten ablehnst, so wird nach meinem Tod kein einziger mehr auf der Welt sein, der die Maschine kennt. Sie wird von selbst laufen" (*WdA* 276). In view of this it seems inconsistent, even gratuitous, that the society would trouble itself with the production of someone "der das Ganze zwar nicht mehr leiten oder gar verändern kann, der es aber noch durchschaut" (*WdA* 276).

Part of the expressive value of suicide and the novel in general revolves around the idea of humanity or *Menschlichkeit*. As has been discussed, Sturm chooses death out of a feeling of allegiance to those of similar conviction, of whom he is "der Letzte." Although the monolithic structure has controlled every aspect of Sturm's life for the more than twenty years following the war, Sturm has not been ideologically committed to the system. The process initiated by the receiving of the *Vorladung* has brought Sturm in direct confrontation with totalitarianism and educated him as to its tenets and values. Sturm's direct confrontation with the process of accusation destroys any

remaining sense of individuality left to him and the three-day process proves to be a decision-provoking mechanism in his life, as well. As Sturm sees with his own eyes the horrific methods employed by the state and witnesses the state's manipulation of himself and his friends, he undergoes a transformation. As he progresses to the highest station in the system, corresponding outwardly to the lowest moral position, he begins a journey of moral renewal. His rejection of the highest position in the regressive society becomes an emphatic and unambiguous renunciation of the system. Sturm's self-chosen death is also the result of commitment to certain values, such as individuality and humanity, non-existent in the totalitarian state.

It is not surprising that humaneness should be a theme in Jens's work. About literature, Jens writes: ". . . ihre Aufgabe ist es, in Lessings Sinn, das Flämmchen der Humanität am Glimmen zu erhalten . . . gerade in Zeiten allgemeiner Resignation" (Jens, *Spiegel* 924). Jens looks to Erasmus von Rotterdam and Lessing as purveyors of humanity, summarizing thus: ". . . ohne Literatur keine Bildung hin zur Sozietät der Vernunft, ohne Bildung kein Frieden, ohne Frieden -- und verbürgte Gewaltlosigkeit-- kein Menschsein" (Jens, *Spiegel* 925). The novel *Nein. Die Welt der Angeklagten* demonstrates the suffering of a people in a totalitarian state through the example of an individual. Suicide represents the extent to which the protagonist suffers and the ultimate sacrifice of any human being, but, in the context of this novel, also exemplifies the protagonist's choice for personal moral renewal.

Wolfgang Koeppen's *Das Treibhaus* (1953)

Soon after Jens's (1950) appeared another political novel containing suicide as a central theme: Wolfgang Koeppen's *Das Treibhaus* (henceforth *DT*). According to Dietrich Erlach, the initial success in sales of this novel "beruhte auf dem . . . Mißverständnis vom Schlüsselroman, der einen politischen und gesellschaftlichen Skandal zu versprechen schien" (199-200), and critical reception of the novel was much less positive than for the novel *Tauben im Gras* (1951), Koeppen's first postwar novel (Erlach 199). Wolfgang Koeppen's novel *Das Treibhaus* differs considerably from Jens's in its depiction and criticism of politics in the Federal Republic of Germany, taking aim at a government only partially hidden behind the abstraction of a fictional society.

"Der Abgeordnete war gänzlich unnütz, er war sich selbst eine Last, und ein Sprung von dieser Brücke machte ihn frei" (*DT* 390). These lines punctuate the life of one Heinrich Keetenheuve, in Koeppen's novel a member of the opposition in the government of the Federal Republic of Germany of 1953. Prior to his suicide, Keetenheuve searches for reasons for his disillusionment with life:

> Er hatte sich heute treiben lassen. Wie ein altes Boot, das seinen Halt verloren hat, war er auf des Tages unsteten Strömungen dahingeglitten. . . . Was war sein Halt gewesen, den er verloren hatte? . . . der Anker seines Bootes auf der, wie sich nun zeigte, öde gewordenen See des Lebens, und der Anker war hinabgesunken, der hatte sich vom Boot

> getrennt, die Kette war gerissen, der Anker blieb für immer unten, blieb in der grausigen, der unbekannten, der entsetzlichen dunklen Tiefe. (*DT* 309-310)

Once an energetic and inspired visionary in the young West German state, the protagonist has, by the spring of 1953, become thoroughly isolated from those around him and from his own sense of purpose. Feelings of personal and political inadequacy are the consequences of what he perceives to be the failure of the FRG to continue a mandate of high morals and ethics, rearmament being a central issue.

In contrast to Jens's novel, in which the author feels compelled to repudiate formally any likeness of his anti-utopian state to an existing political power (*WdA* 6), Koeppen takes a more direct approach to political criticism, situating his novel in the city of Bonn in 1953. Koeppen distances his work somewhat from actual political circumstances, however, describing the political situation as a "Katalysator für die Imagination des Verfassers" and stating that the novel has "seine eigene poetische Wahrheit" (*DT* 222). Such a disclaiming statement can, however, be interpreted as an ironical admission of similarity between novel and reality, for "catalyzer" surely indicates a connection between the political reality of the times and Koeppen's fictional work.

Outsiderdom

Adolf Höfer has remarked that the figure of the outsider plays one of the most important roles in the literature of the twentieth century (153). Using Koeppens *Das Treibhaus* as an example, Höfer illustrates how the outsider is used to depict a "verkehrtes Bild der Wirklichkeit, ein Zerrbild" (157), against which society's norms and beliefs can be balanced and measured. "In moderner Dichtung," Höfer continues, "[nimmt] der Außenseiter häufig die zentrale Position der Hauptgestalt [ein], während die sogenannten Normalen als Nebenpersonen an die Peripherie rücken oder auch einfach nur Masse darstellen" (157). According to his thesis the main function of the outsider is primarily moral in nature:

> Die Figur des Außenseiters trägt dazu bei, wichtige Erkenntnisse über Sinn, Unsinn und möglicherweise Wahnsinn von Normen, Leitbildern und dergleichen zu vermitteln. Letztlich hilft die Außenseiterfigur die Frage nach der Verbindlichkeit von Werten und Normen in einer heilsamen Schwebe zu halten und zu verhindern, daß diese sich verhärten und zu menschenfeindlichen Zwängen entarten. (Höfer 158)

To an extent, Höfer confirms Koeppen's assertion that the novel does not reflect reality, but is merely an extrapolation of possibilities, a "what if"-situation, made to provoke the reader into a consideration of his own beliefs and relationship to the Federal Republic.

Keetenheuve fled Nazism during the war, returning after eleven years (*DT* 227). His "Mitarbeit am Wiederaufbau, sein Eifer, der Nation neue Grundlagen des politischen Lebens und die Freiheit der Demokratie zu schaffen, hatten es mit sich gebracht, daß er in den Bundestag gewählt wurde" (*DT* 232). At first, optimistic about the rebuilding of his country, Keetenheuve remembers the initial years after the war as a time "*als Kommunisten und Bürger noch miteinander sprachen*" (*DT* 245; italics in original), a period when reunification still seemed a possibility. Looking back on events after the war, the narrator reveals Keetenheuve's initial feelings of loyalty and hope: "Er hatte nie aufgehört, sich als Deutscher zu fühlen; aber in jenem ersten Nachkriegssommer war es für einen, der elf Jahre weg gewesen war, nicht leicht, sich zu orientieren. . . . und er glaubte damals, daß sich in der Zeit etwas erfüllen würde" (*DT* 227). Keetenheuve's initial optimism, felt in the period immediately following the war, gives way to pessimism and disapproval.[2] The utopic vision of people like Keetenheuve was tolerated and encouraged in the early period of rebuilding in the Federal Republic, but as the phase of consolidation set in, power was gained by realists and experts (Höfer 163).

"Le problème central de *Das Treibhaus*," states Mauranges, "est justement cette question du choix, selon Koeppen, aventureux, de la remilitarisation de l'Allemagne" (64). "Keetenheuve war für reinen Pazifismus, für ein endgültiges Die-Waffen-

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[2] East and West were becoming increasingly divided. In 1952 there were political disputes in the FRG about its integration within the western European community and the implications for re-unification. In the same year the GDR was divided into fourteen districts and a "kasernierte Volkspolizei" was created (Hellwig 441-442).

Nieder!" (*DT* 291), and recognition of Germany's deviation from this moral course causes him anxiety, because, in his opinion, the "Verzicht auf Wehr und Gewalt niemals zu solchem Übel führen konnte, wie ihre Anwendung" (*DT* 291).

Keetenheuve's political struggle is necessarily connected to his identity as a German in the newly constituted country. Instead of remaining in Germany during the war, in order to launch a fight from within, Keetenheuve went to England, a fact which haunts him later as rumour and innuendo, albeit untrue, portray him as a traitor (*DT* 275).[3]

As someone intimately involved in and responsible for change and direction in the Federal Republic of Germany, Keetenheuve experiences a growing sense of guilt at what he perceives to be the intractability of Germany and its people, coming to the conclusion that, "die Menschen waren natürlich dieselben geblieben, sie dachten gar nicht daran, anders zu werden" (*DT* 232). Although plagued by his inability to effect change Keetenheuve nevertheless continues to seek re-election, "weil er sich für einen der wenigen hielt, die ihr Mandat noch als eine Anwaltschaft gegen die Macht auffaßten" (*DT* 240). A polarization is evident in the distribution of political power. Keetenheuve, champion of the ordinary citizen, despises the "Treibhausklima" (*DT* 251) and luxuriousness of Bonn and remains unseduced by its temptations.

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[3] In discussing the stigma of emigration during the war, the Mitscherlichs in their work *The Inability to Mourn* (original: *Die Unfähigkeit zu trauern*, 1967) cite the Bundestag elections of 1965 during which allegations about Willy Brandt's participation in the Norwegian army during the 1930s surfaced. So powerful was the general acceptance of the allegations that despite Brandt's popularity, his own party felt unable to come to his defence (51).

Guilt becomes a substantial source of motivation in the protagonist's development towards suicide in Koeppen's novel. The legacy of militarism and National Socialism weighs heavily on Keetenheuve's conscience. The German people, as described by the narrator reflecting Keetenheuve's views, are perceived as silently revering the dictatorship of the past: "Das Ansehen der Demokratie war gering. Sie begeisterte nicht. Und das Ansehen der Diktatur? Das Volk schwieg. Schwieg es in weiterwirkender Furcht? Schwieg es in anhänglicher Liebe?" (*DT* 249). Keetenheuve experiences guilt because of the attitudes of his people and guilt for his inability to effect change. The use of an authorial narrator, although clearly relating Keetenheuve's beliefs, does, by virtue of his detached position, create distance from the voice of the protagonist, thereby creating reflective distance in the reader.

As Keetenheuve perceives that his political activity is ineffectual, he begins to lose his justification for being. As J.-P. Mauranges points out, Keetenheuve's frustration has to do with the very nature of the democratic system itself: "l'opposition parlementaire est quasi impuissante à faire prévaloir ses options, aussi longtemps qu'elle est dans l'"Opposition"" (62).[4] Keetenheuve experiences estrangement in his own country, feeling as though he is in "dem Käfig des Vaterlandes" (*DT* 278). Although he loves his country, he is at odds with Germany's political and social course. He no longer recognizes its people, asking "Wer war das Volk?" (*DT* 249), "Was berührte dieses Volk?", and "Sehnten sie sich nach der Peitsche, um 'Hurra' schreien

[4] Mauranges reminds one that this perceived ineffectuality of the opposition in government would seem particularly frustrating in a government with a small mandate. Adenauer was elected with the slim majority of 202 to 200 (63).

zu können?" (*DT* 381-382). Keetenheuve's political alienation extends even to its language of discourse. No longer is he able to understand "Ausschußdeutsch" (*DT* 311). Eventually Keetenheuve becomes dissociated from the people whom he represents. In a movie theatre, this estrangement prompts his need to escape: "Warum lachten sie? Er verstand es nicht. Es erschreckte ihn. Er war ausgeschlossen. . . . War Keetenheuve ein Ausländer? . . . Vielleicht war er ein Ausländer des Gefühls . . . Er verließ eilig das Kino. Es war eine Flucht" (*DT* 332).

The novel's political intention was the subject of much speculation in its early reception, then described as "eminent politisch" (Korn 45) and a novel which "nicht mehr und nicht weniger als das große politische Trauer- und Satyrspiel der Entscheidung über die Wiederbewaffnung zum Inhalt hat" (Korn 45). Rearmament was not seen as the only subject of criticism in Koeppen's novel, however. "Es gibt nicht nur die generelle Kritik an der Wiederaufrüstung," writes Erhard Schütz,

> es gibt auch die Beschreibung der Kanzlerdemokratie, den Zwiespalt der Sozialdemokratie, die Entmachtung des Parlaments durch die Ausschüsse, die Unterhöhlung des Öffentlichkeitsprinzips durch Geheimdiplomatie, die Verstaatlichung des Parlaments in seinen Angehörigen, die personale Kontinuität schließlich von Verwaltung und Regierung mit dem "Dritten Reich", die zunehmende Traktierung von Politik als Reklame usw. (75)

This highly political novel demonstrates the alienation experienced by the protagonist, a once idealistic member of the opposition party. Just as Walter Sturm was singled out

as "der Letzte," someone of moral conscience, an individualist inimical to the interests of the state, so too is Heinrich Keetenheuve, described as "das Korn Salz gewesen, der Bazillus der Unruhe in ihrem milden trägen Parteibrei, ein Gewissensmensch und somit ein Ärgernis" (*DT* 223).

After returning from the war, Keetenheuve marries Elke, a young girl whose Nazi parents have committed suicide, a situation which introduces a political component into Keetenheuve's love relationship. When Koeppen tells Elke of his reasons for leaving Germany, she is unable to comprehend his attitude, which she summarily explains as "eben moralisch" (*DT* 232). Keetenheuve's commitment remains to his political work and his young wife grows to hate the many books, papers, and journals with which she has to compete and about which she has no understanding (*DT* 232). Her sense of exclusion and Keetenheuve's many absences eventually lead to her recourse to alcohol and to lesbian relationships. Höfer observes that Keetenheuve is unable to relate to the other government representatives around him who have "ordentliche Familienverhältnisse" (160), based largely on pretence and constituting a form of loveless marriage that Keetenheuve rejects (Höfer 161). Despite his critical attitude towards others, Keetenheuve is himself unable to achieve a marriage based on love.

From the outset of the novel, Keetenheuve's wife Elke is already deceased, but she remains a significant part of his consciousness. He envisions her taunting him from the grave. "Da hast du deine Politik und deine Händel, und von mir bist du befreit!" (*DT* 283), he imagines her saying. As much as he tries to relegate her "zu den

Akten" (*DT* 283), her memory persists in sleep, dream, and death (*DT* 283): "Sie sollte in seinem Gedächtnis leben . . . er wollte Elke beichten, daß er sie liebe, daß sie ihm fehle" (*DT* 284). Keetenheuve develops a peculiarly selfish relationship to Elke's memory after her death, writing her letters which are "an die Nachwelt gerichtet" (*DT* 284). The authorial narrator describes Elke's function as "das Medium, das ihn sprechen ließ und das ihm Kontakt gab" (*DT* 284), a kind of contact which extends beyond love to life and death. Having driven Elke to desperation, Keetenheuve self-indulgently uses even her memory to his own purposes. Elke's memory produces feelings of guilt and psychological pain in Keetenheuve, and in his constantly imagined reviviscence of her, Keetenheuve is linked to the realm of death.

An aspect of Keetenheuve's being which distinguishes him from the rest of the government officials in the novel is his predilection for culture. "Für Schöngeister rezeptiver, produktiver oder halbproduktiver Art," says Adolf Höfer of the political attitude in the novel, "scheint da kein Platz zu sein im rauhen Klima der Politik" (162). Höfer asserts that even Keetenheuve regards his literary tendencies as frivolous activity, unsuitable for the cut-throat environment of politics (162). Keetenheuve's occupation with the poetry of Baudelaire, Cummings, Verlaine, and others, and the many references to medieval German sagas, underline his dreamy idealism, an orientation starkly contrasted to the *Realpolitik* of his colleagues.

The Meaning of Suicide

The text contains many clues to Keetenheuve's approaching act of suicide in the symbols of death and sickness. Keetenheuve is possessed by "Mordgedanken" (*DT* 223) both in relation to Elke's lesbian lover, whom he contemplates murdering, and towards his deceased wife for whose death he feels responsible. "Todtraurigsein" and "Todsündegefühl," not unwelcome feelings to Keetenheuve, are sometimes associated with sex (*DT* 231), signifying a uniting of Keetenheuve and his dead wife. Death is also linked to Keetenheuve's political existence. He describes his opposition to rearmament as a fight "gegen den Tod" (*DT* 363), symbolising the destructive force of war, something which Keetenheuve, as pacifist, vehemently opposes. Keetenheuve eventually loses in his personal battle with death. When Keetenheuve declines the offer of an externally imposed banishment at a diplomatic post in Guatemala, one to which he gives fleeting consideration, he describes his eventual rejection of the idea as "Verzicht auf den Tod" (*DT* 356), the prelude to a political death.

The theme of sickness adds to the general theme of Keetenheuve's perceived demise and self-destruction. "Kranke[s] Volk" (*DT* 283), "Krankheit" (*DT* 333; 367), "ein Krebs des deutschen Volkes" (*DT* 290), "die zwei kranken Zonen" (*DT* 369) are all terms which reflect Keetenheuve's subjective view of the German condition and himself.

In discussing the meaning of Keetenheuve's suicide, mention should be made of another instance of suicide in the novel. Elke's parents also commit suicide out of

a sense of commitment to their ideals. In their case, suicide signifies both honourable death in defeat and an expression of allegiance to Nazism. In taking the "Todeskapsel des Für-alle-Fälle" (228), they act in a similar way to defeat as does Keetenheuve. This likeness must be seen as negative in both cases. Elke's parents are unwilling to bear responsibility for their part in the misdoings of a dictatorship, and Keetenheuve is unwilling to persevere in the belief that he can be of value to his country.

The instrumental value of Keetenheuve's suicide is purely subjective, committed to end the emotional suffering caused by his emotional alienation from his country. Political and personal failure have left him without justification for living. Unable to live with the guilt of his wife's death and his perceived failure to affect the moral direction of Germany, the protagonist takes his life.

In the gulf between the protagonist's instrumental reason for taking his life and the novel's expressive meaning of suicide lies a substantial part of the novel's message. An important aspect in Koeppen's work turns on the question of whether the leap from the bridge does indeed provide Keetenheuve with freedom. In death, Keetenheuve does not solve the problems he sees in German society; he merely achieves personal escape from the responsibility of having to deal with them. The final statement "ein Sprung von dieser Brücke machte *ihn* frei" (*DT* 390; emphasis mine), reflects words spoken by Gertrud Stauffacher in Schiller's *Wilhelm Tell* (1.2.149), as she considers suicide as the last option open to her in order to escape her difficulties. Although evidence has not been found to suggest that Koeppen consciously refers to Schiller's work, the similarity seems more than coincidental. As contained in Koeppen's novel,

the statement, as mediated through the narrator, implies some distance from the protagonist, and can be construed as ironical. As viewed by the narrator, suicide has relieved one disillusioned politician of his duty to Germany. A strong implication of Keetenheuve's suicide, especially when connected with the previous part of the sentence "der Abgeordnete war gänzlich unnütz" (*DT* 390), is that Keetenheuve's death has also been futile and a negative example. Horst Rüdiger stated in a 1953 review of the book, "Im *Treibhaus* besteht die Möglichkeit zu Freiheit nur noch in der Negation des Daseins selbst," noting, as well, that to situate suicide solely within a political context may have alienated the reader, thus necessitating the extra motivation of failure in love (57).

Although sympathy for Keetenheuve has been created in the novel, the narrator's attitude toward Keetenheuve's suicide is clearly condemnatory. Referring to Keetenheuve, Höfer asserts that Koeppen treats his "Geschöpf nicht nur mit Sympathie, sondern auch mit einem gehörigen und ungewöhnlichen Maß an Skepsis" (158). There is much in the text to indicate that Keetenheuve's view is an extremely limited one. A symptom of his inability to compromise is exhibited in his relationship to Elke, but the cause of Keetenheuve's one-sidedness may be found in his own admirable yet inflexible political attitudes. His radical moral stance and his ineffectuality vis-à-vis the outward political situation contribute to constricted thinking about his options in life.

That Keetenheuve would commit suicide is not unimaginable in view of his circumstances. His perception that the personal and professional parts of his life were

in ruins must be accepted by the reader as at least subjectively valid reasons for desperation. Beyond the purely subjective, however, Keetenheuve's recourse to suicide receives neither endorsement nor censure from the narrator. While maintaining skeptical distance from the protagonist, the narrator reserves much negative criticism for the politcal situation in post-war Bonn. This narratorial attitude can not escape the reader and must strengthen the reader's empathy for Keetenheuve's situation.

Notwithstanding the circumstances described and the narrator's attitude, suicide is always an extreme measure, and, at the very least, enjoins the reader to contemplate more fully the protagonist's motivations.

Siegfried Sommer: *Und keiner weint mir nach* (1953)

Only two years after the Western allies formally ended the state of war with Germany and in the same year that the GDR witnessed a people's revolt crushed by Soviet military (Hellwig 439-440), Siegfried Sommer published a parochial, light, and seemingly unpolitical novel about life in a lower-class neighbourhood of Munich in the late 1920s: *Und keiner weint mir nach* (henceforth *UKW*). The literary parochialism of this novel would perhaps merit little attention were it not for the pervasive theme of suicide and the knowledge that the 1950s were a period of political and cultural reassessment, elements which tarnish the novel's veneer of being an *Unterhaltungsroman.* In fact, Sommer's oblique references to the Nazi period and the war, reveal the narrator's consciousness of events. Although the narrator draws the

reader's attention to the political chasm of the war, it does so in a deceptively trivialized way. It is probably for this reason that the novel has been largely overlooked by critics.

"Mietshaus 46 in der Mondstraße": Suicide's Social Milieu

"Dies waren die Inwohner eines Hauses in der Mondstraße in einer Stadt, die groß war und doch auf dem riesigsten Globus höchstens wie eine Warze ausgesehen hätte," (*UKW* 52) states the narrator after having introduced the characters of the novel. Describing Munich as a "wart," the narrator's disposition toward the setting of the novel is sarcastic and negative, a tone which carries through the novel, evoking an incongruous combination of humour, irony, and profound sadness. Reflected in expressions of dialect, such as "Pfüad di" (*UKW* 56), and "'s Gas is kumma, vierzehn fuchzig" (*UKW* 56), the novel's setting is confined to a neighbourhood in Munich, lending to the novel a tone of realism and intimacy with the characters and events described. The narrator also assumes an irreverent and ironical attitude, often blending tragic events with humour: "Wenn man errechnete, daß zweiundsiebzig Figuren in der alten Rentenburg hausten und daß jede im Durchschnitt sechzig Jahre alt wurde, so mußte mindestens in jedem Jahr eine abkratzen" (*UKW* 12).

Events of the novel are not described contemporaneously as they unfold, but rather from the perspective of temporal distance, revealed in statements such as, "Auf alten Fotografien sind solche Hosen noch manchmal abgebildet" (*UKW* 5). Although

the story is set primarily in a time before the war, it eventually extends beyond this to a time after the Nazi regime in Germany. The narrator's perspective, therefore, has the benefit of hindsight, e.g. "Später, als der Leonhard fast achtzehn Jahre war . . ." (*UKW* 142), but apart from occasional instances of foreshadowing, the narrator seems not to possess the expected maturity and understanding attendant with hindsight. The preservation of the childlike naïvety and awkwardness of an intimate observer of events is effective in relaying the protagonist's development through adolescence, bringing the reader closer to the protagonist's experiences and suicidal ideation.

Political Influence

As mentioned, the Second World War is conspicuously understated in the novel, however, reference to the war is made. The emigrant Viviani makes speeches to whoever will listen. In one instance Viviani sarcastically applies the metaphor of German shoe size and quality to Germany's military success against other countries, then admonishing his listeners to be ready for the next campaign: "Deutsche, laßt euch die Stiefel besohlen und dreifach nageln. . . . damit sie für die nächsten fünfzig Jahre reichen, wenn das Kind hineinwächst" (*UKW* 84). In this passage and the novel's next few pages in which Viviani continues to ridicule the Germans, the legacy of aggression and war is described as a German trait. The focus expands out of the narrow confines of the Munich neighbourhood and German militancy is described in generalised terms.

The seriousness of such aspersions is undermined both by the fact that Viviani has himself chosen to reside in Germany and by Viviani's character, which is decidedly shallow and biased (compare with his oration about women 188-195). Viviani's speeches do provoke the reader to evaluate his or her own opinions about these issues, however. Further to this, some characters in the novel are described vaguely as having fallen "in einem Krieg" (*UKW* 361) and events are described with characteristically dark humour, which constitutes a trivialisation of death itself:

> Biwi Leer, der als Friseur natürlich zu den Sanitätern eingerückt war, freute sich sehr, als er hörte, daß er durch den Krieg in ein anderes Land kommen sollte. Das wollte er schon immer. Er kam tatsächlich nach Afrika. Dort wurde er schnell zum Unteroffizier befördert und starb dann rasch an Typhus. (*UKW* 363)

The narrator's trivialisation of death is ultimately a reflection of the meaninglessness and expendability of life, which culminates in the suicide of the protagonist Leonhard Knie.

The Betrayal of Leonhard Knie

"Die Wurzel alles menschlichen Unglücks ist halt das Geschlecht" (*UKW* 371), states the narrator with respect to the character Marilli Kosemund, a young girl in the neighbourhood. The issue of sex becomes the focus of unhappiness for many characters in the novel. It proves to be at least part of the source of unhappiness for the

protagonist Leonhard Knie, and not simply because of his relationship to Marilli Kosemund. The connection between suicide and the sexuality of youth is discussed in scientific literature on suicide. Mergen states:

> . . . gerade in der Pubertät ist der Jugendliche sehr vulnerabel. Konventionelle Vorurteile, von Erziehern, Eltern oder anderen Personen konkretisiert, können psychische Traumata setzen, welche dann zu Schuldkomplexen, hypochondrisch gefärbten Depressionen mit Selbstanschuldigungen und Suizidgefahr führen. (191)

Sommer's novel presents a picture of the sexual hypocrisy and repression of the older generation, which contributes to the suicide of the protagonist Leonhard Knie. Leonhard Knie becomes a casualty of his social milieu, but his suicide does not create an atmosphere of understanding and enlightenment as does Horn's suicide in Hein's *Horns Ende*, rather the death of eighteen-year-old Leonhard Knie is virtually disregarded by the people of his community.

Even Leonhard's conception is inauspicious. The product of a garden shed romance, the ignominy associated with Leonhard's beginnings is a cross which he is forced to bear before the entire community. "Von der Herkunft Leonhards erzählten sich die Leute das . . ." (*UKW* 36), is a statement which indicates that the version of Leonhard's disreputable background related to the reader by the narrator is common knowledge in the community. Burdened with a shame which has become transgenerational, Leonhard is destined to experience unhappiness. The protagonist also experiences abandonment at a very early age. His father, Jakob Langjohann,

refuses to assume responsibility for him, escaping to Hamburg, and when Leonhard is four years old, his mother abandons him to join Langjohann, leaving Leonhard with his grandmother (*UKW* 37). The correlation between suicidal ideation in youths and the disintegration of the family is well known (Ringel "Über Selbstmordversuch" 168-169; Evans and Farberow 235-236). Children who feel unwanted or experience the loss of a significant relationship, Grollman also asserts, may be driven to suicide (41). Thoughts of Leonhard's mother are associated with suicidal ideation (*UKW* 307-308), and Leonhard himself makes the connection between the issue of abandonment and his emotional distress. Describing Leonhard's feelings, the narrator reveals the following: "Das Mitleid über sich selbst machte ihn innerlich ganz wund. Er [Leonhard] schaute dann in seinen Spiegel und weinte. Keine hatte ihn gewollt" (*UKW* 344). "Hast keine gute Mutter, armer Teufel," Leonhard says to himself, "keine Mutter und niemand" (*UKW* 344). Leonhard desires to love someone and to be loved in return, but "niemand wollte seine Opfer" (*UKW* 345).

Not only does Leonhard experience his own sexual dysfunction, but he and others bear witness to instances of sexual misconduct in the community. Sidonie Innig, who lives alone and somewhat eccentrically as the result of a broken relationship (*UKW* 13-15), the widower Blätsch, who commits suicide as a result of public speculation about inappropriate sexual behaviour (*UKW* 126), and the discovery of the tavernkeeper Schindler's wife engaged in sexual relations with a beer delivery man (*UKW* 166), provide examples of what Leo, in his naïve way, correctly perceives

to be the dysfunction of the society in which he lives. "Wo die Kinder herkamen," thinks Leo to himself, "das wußte er schon lange, aber da gab's noch einen ganzen Haufen anderer Sachen, die er sich nicht erklären konnte. Und wann hat schon einmal ein Vierzehnjähriger einen Erwachsenen danach gefragt?" (*UKW* 167). School and religious instruction do not enlighten Leo and his adolescent schoolmates about sexuality. Young women who become pregnant try to terminate pregnancy by drinking mulled wine, taking foot baths, and by leaping from chairs (*UKW* 236). The novel presents Leo's own exploration of sex in often embarrassing and humourous situations. He witnesses the illicit rendezvous of a married woman and her lover, later finding condoms in the woman's purse (*UKW* 112); he observes his boss Bertele having sex with a hired woman in the store (*UKW* 220) and he hears the chauvinistic speeches of Luigi Viviani about differences between men and women (*UKW* 188). When caught in a compromising position with Lotte Hallser, a schoolmate, Gerber, his teacher, sarcastically asks, "Willst vielleicht eine Familie gründen!?" (*UKW* 143).

Leonhard, whose natural curiosity and experiences do not end in happy enlightenment, is singled out because of the negative impact of his experiences. His distinctness from others is defined by Leonhard himself in examples of inner monologue. He thinks of himself as more of an intellect than others, perceiving his problem to be his inability to come to grips with his limitations. In many respects, Sommer's novel presents the same kind of social conflict evident in Plenzdorf's *Die neuen Leiden des jungen W.* Leonhard's very ability leads to his disorientation in a

society bent on conformity and usefulness. Leonhard and his schoolmates are assigned the task of writing an essay about how they can make themselves useful (*UKW* 66). Leonhard questions his experiences much more than do his peers, but, unsupported by the older generation, is forced to rationalize life by himself. Like Edgar, Leonhard seeks both escape and answers in what he comes to think of as "die verfluchte Leserei" (*UKW* 305), becoming absorbed in Hesse's Bildungsroman *Demian* (1919) and Oscar Wilde's *The Picture of Dorian Gray* (1890). Eventually Leonhard's reading takes a self-destructive turn when he begins to read about meditation, then putting into practise the power of suggestion in order to avoid feeling physical pain (*UKW* 318). This step is one of the many relational indicators to the reader that Leonhard is becoming self-destructive.

Leonhard's path toward suicide is littered with relational evidence of the decision which is taking shape in his mind. Such clues are of different types: words, thoughts, and actions of the protagonist, as well as narratorial comment to the reader. Although other characters in the novel have some indication of Leonhard's suicidal ideation, the reader has the benefit of all relational clues, some of which are more indirect, as when Leonhard contemplates "ferne[s] Ertrinken" (*UKW* 98). Much behaviour clearly signals suicide: Leonhard's recourse to alcohol (*UKW* 223), his writing of the poem "Der Abschied" (*UKW* 280),[5] the association of suicide with his

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[5] Eintönig, sinnlos rinnt die zähe Zeit
und frierend sehe ich das Ende,
denn alles wird so schnell Vergangenheit,
noch spür ich streichelnd deine blassen Hände.
(*UKW* 280)

mother (*UKW* 308), his desire to learn a song which has provoked suicide in others ("Trauriger Sonntag," *UKW* 308), and his experimentation with gas (*UKW* 330). Much evidence comes in the form of statements made by Leonhard himself, despite their occasional ambiguity. Comments uttered to other characters, such as, "Jetzt is vorbei" (*UKW* 144), "Ah, i glaub manchmal selber, mich hat's" (*UKW* 151), and the "strange" (comment by narrator) farewell to his friend Bubi Rupp: "Ich wünsch dir alles Gute für dein Leben" (*UKW* 31). These are all indicative of Leonhard's state of mind and the intentionality of suicide.

Leonhard eventually experiences sex, only to discover that what has been the focus of so much attention is, for him, profoundly disappointing. "Das also? Das war überhaupt nichts," Leonhard says to himself, "O du liebe Güte, da machten sie nun so ein Getöse darum! Wegen so einem Nichts brauchte man nicht unbedingt weiterzuleben" (*UKW* 342). Sex becomes infused with and connected to the choice between life and death. Superficially, the comment evokes a humourous response; however, particularly in retrospect, Leonhard's comment signifies the protagonist's very real existential struggle.

Leonhard Knie even feels directed by astrology, and the symbol of the scorpion, as will be seen in Gert Heidenreich's *Der Ausstieg*, plays a role in the depiction of suicide in this novel. An interpretation of the constellation of stars for the astrological sign of Scorpio indicates that Leonhard is destined to meet with a violent end:

> Steht aber der Neptun direkt über dem Uranus, so kann sich daraus nach viel vorangegangenem seelischem Leid ein Ende durch die eigene Hand ergeben. Uranus, der Planet der Philosophen und der Denkenden, ist auch der Stern der Selbstmörder. (*UKW* 348-349)

Leonhard perceives himself to fall into the category of philosophers and thinkers and interprets his suicide as a matter of destiny.

And so the protagonist premeditatively takes his own life. The intentionality or method of suicide is never in doubt and the citation of the numerous instances of ideation merely confirm the outcome. Not so evident is the meaning that the suicide has for the novel as a whole. This question will be discussed in the next section.

The Meaning of Suicide

The suicide of Leonhard Knie conforms to much of the actual scientific knowledge about suicide in adolescents and constitutes a rational and plausible suicide. He experiences the abandonment of his parents and the disapproval of a community which was neither willing nor able to guide its youth in positive ways. The issue of sexuality becomes the focal point for the conflict between generations. Leonhard engages in typical adolescent self-focussed pity, but because of society's lack of understanding and his own legacy of neglect, becomes isolated, feeling that he is "ein Mensch zuviel auf der Welt" (*UKW* 345), saying "keiner weint mir nach" (*UKW* 350), an opinion echoed by the narrator (*UKW* 334).

The death of Leonhard Knie's grandmother causes some in the community to reflect on the suicide of Leonhard, which, by that point, lies twenty years in the past. "Dem ist allerhand erspart geblieben," says one, and "das war der Schlaueste von allen," says another. In effect, the speakers are pondering and validating Leonhard's act of suicide, referring to it as a sensible way of avoiding the events that were to follow. These events, though not expressly stated, refer to the Nazi period and the Second World War. The narrator states that, "da ein Krieg gewesen war, hatten sich viele Menschen wieder auf den Herrgott und das jenseitige Leben besonnen . . ." (*UKW* 367), a satirical statement that alludes to the impact of war.

Instrumentally, Leonhard Knie commits suicide in order to leave his pain behind: "Wenn er jetzt starb, dachte er, würden seine Sehnsucht und sein Schmerz, sein Kummer und sein Unglück auf der Welt zurückbleiben" (*UKW* 351). Leonhard associates the source and location of suffering so closely with the world that he envisions it as a force which will remain in the world and be assumed by someone after his death (*UKW* 351). Were it not so, he reasons, then suffering would have disappeared from the world. There is no evidence that Leonhard intended to communicate any meaning to other characters in the novel through his suicide. For him suicide can be said to be purely instrumental.

The inclusion of suicide in this novel has obvious expressive meaning, however, for the reader. Leonhard is portrayed as fundamentally good. Although he stole money from his grandmother, he knew it was wrong and displayed a guilty conscience, evident in the fact that he kept a debt book (*UKW* 354). Leonhard's maladaptation to

society is represented to be the result of societal failure. Even the parental abandonment he experiences has become a function of a repression which is endemic in society. For the majority of the young people portrayed in the novel, inurement or insensitivity to the failings of society lead to the acceptance and perpetuation of the status quo. Although it is stated, "die alte Zeit war vorbei" (*UKW* 356), it is apparent that even the Second World War has done very little to change the circumstances in this community. Although the suicide of eighteen-year-old Leonhard does not result from the protagonist's emotional struggle with the real or perceived continuity of fascism, as is the case in the other novels of this chapter, the novel illustrates on a more basic level the continuity of beliefs in society which Leonhard actually experiences and which compel him to commit suicide. Power, as used by adults in the novel, while imitated and accepted by the majority of the younger generation, leads to self-destruction in the more intellectual and sensitive of them.

The humour, associated with virtually every unhappy event in the novel reveals the narrator's hardened acceptance of the situation, despite the occasional validation of Leonhard's feelings: "Was der junge Mann in dieser Zeit dachte, war nicht gefiltert und etwas unklar, aber es war etwas dran" (*UKW* 288). The narrator often provokes the reader to contemplate Leonhard's fate through the words or actions of other characters in the novel. In one such instance, when Leonhard borrows books on Indian meditation and karma, the librarian shakes her head and utters the word "schade." The narrator, commenting on the librarian's utterance, states, "Wer weiß, was sie damit meinte" (*UKW* 298). Although blatant direction by the narrator suggests an

unsophisticated reading audience, the novel should not automatically be relegated to the category of trivial literature. This novel lacks the happy ending characteristic of trivial literature ("Trivialliteratur" 970) and adjures the reader to contemplate self-destruction which is not a trivial subject. The combination of humour and tragedy allows the novel to avoid an overly melancholic inaccessibility, while confronting the reader with the story of the destruction of a young person's potential.

Gert Heidenreich's *Der Ausstieg* (1982)

The last novel to be discussed in this chapter shows a protagonist, Heinrich Bode, who is also in conflict with the political condition of his country, the Federal Republic of Germany. This novel was written in 1982, thirty years after the first three novels discussed in this chapter. It incorporates actual political events of the period between the 1950s and 1980s, specifically the terrorism of the Rote Armee Fraktion during the 1970s.

The protagonist's path toward suicide and its causal relationship to the Federal Republic is delineated through actual historical events, both recent and more distant. The theme of suicide is also illuminated through imagery, symbolism, and analogy. Instances such as the prophetic story of the scorpion, the symbol of the pelican, the Englishman's near-drowning, as well as, the father-son relationship all contribute to an understanding of suicide within the novel.

Motivation: Politics Past and Present

The dominant struggle is defined in the relationship between the protagonist and society. In examining this struggle it is important to understand that the Federal Republic represents not simply an arbitrary political boundary in the novel, but also a part of the protagonist's identity, and as such, is inextricably connected to the character's existence. The beginning of the novel strikes an ominous note, for it speaks of Bode's impending death in a paradoxically positive way. When the narrator pronounces that "Bode hat's gut" (*DA* 7), "Bode hat's doppelt gut" (DA 7), and "Tausendundeinmal gut hat es Bode" (*DA* 8), the sardonic tone which associates death and fortuitousness belies a truly melancholic meaning. Bode's own words "Hier wäre der Tod vielleicht erträglich, dort rauszusehen dabei, das würde mich ruhig machen" (*DA* 7), indicate a certain exertion of control and will over the location of death, if not yet the method. "Hier" refers to France, the country to which Bode flees. The tolerableness of death in France as opposed to Germany rests on the guilt-ridden conscience of a German protagonist whose self-sacrifice in France represents atonement to a country mistreated by Germany. In reality, the politics of France since the war had been no less encumbered with political strife than Germany's. After the war, France was forced to deal with colonial independence movements within its empire. In 1946 France became engaged in an eight-year war to preserve its influence

in Indochina, and in 1954 France began to send hundreds of thousands of soldiers to deal with the revolt of Algerian nationalists to defend the fiction that Algeria was an integral part of France. In 1968, student and labour unrest brought France to a virtual halt ("France" 520-523). Bode's perception that France was the land of cleansing was illusory and emphasizes the unbalanced beliefs that he holds throughout the novel.

Through the benefit of flashbacks, information about Bode's life is gradually revealed. One piece of information gleaned is that his contemplation of death has not been sudden or impulsive, but that it has been developing for more than four years.

Since the natural inclination for human beings is to welcome life, Bode's obvious predilection for death immediately raises the question as to the reasons for this ideation. The novel describes, through the juxtaposition of flashbacks and present time, the reasons for Bode's separation from his country and his ultimate egression from life. Like the character Keetenheuve in Koeppen's novel, Bode's youthful hopefulness for his country meets with disillusionment (*DA* 18-19). Bode desires, as others have done, to find a new beginning outside the country (*DA* 23). But what is it about Germany that disappoints Bode? "Es ist nur der Zustand der Republik," says Bode to himself, "Was für ein Zustand? fragt der im Spiegel. Der Rechtsstaat wird demontiert" (*DA* 66). Bode perceives a resurgent presence of right extremism in the Federal Republic, illustrated in the novel through examples such as the uncovering of a judge's extremist connections (*DA* 33), the German involvement in the provision of weapons to extreme right-wing groups (*DA* 25), Bode's witnessing of the thuggish

tactics of the German president's guards (*DA* 36), and the evidence of young right-wing militants (*DA* 77; 79). Bode wishes to escape a Germany in which he sees history repeating itself.

The shifts between recollection and present experience are achieved with such subtlety that the past often fuses with the present, a technique which also contemporizes more distant history, such as the allusions to the time of National Socialism.

The end of the novel reveals the protagonist's suicide, to which clues exist throughout the novel. To be answered is the question of what it was that drove Heinrich Bode to a desperation so overwhelming that suicide seemed the only way out. The answer to the question resides in the unique combination of characteristics possessed by both individual and society. Recognizing that different characters react differently to their political environment, it is not necessary to recognize individuality in assessing Bode's motivation for suicide. As Shneidman states in his discussion of the idiosyncratic nature of suicide: ". . . suicide is best understood not so much as an unreasonable act--every suicide seems logical to the individual who commits it . . . A suicide is committed because of thwarted or unfulfilled needs" (*Definition* 126). Having said this, Heidenreich does provide many postdictive indicators which show the protagonist's own reasons for suicide.

Bode's inner turmoil arises out of his relationship with his country, an understanding of which can be gained through the information given about the perceived political condition of the Federal Republic of Germany.

Bode's character becomes defined in its contrast with that of his friend Marzin, a person of similar age, who thrives within the Federal Republic, profiting from the unique opportunities presented by the political situation (*DA* 16). For the opportunist Marzin, the Federal Republic is "das freieste Land, das je auf deutschem Boden existiert hat" (*DA* 11). Bode, as has been mentioned, is deeply disturbed by what he perceives to be happening in the politics of the Federal Republic of Germany. Although both views of postwar Germany have validity, the narrator, and perhaps the author, seem to create sympathy for Bode's position. Although Marzin promotes the peace movement in his visit to Bode in France, his intentions and methods are ridiculed by Dr. Bazille, a local resident. Marzin's French is described as "einwandfreie[s] Schulfranzösisch" (*DA* 116), but his attempts at worldliness fall flat as he discusses his opinions about the peace movement with the rhetoric of a general. In short, Marzin is totally incapable of relating to the French, even though the mechanics of his language are perfect.

Like the protagonists in the first two novels in this chapter, Bode is portrayed as a person of conscience, set apart and condemned by the dominant forces in society for his views. "Alle, die Bode sind, müssen weg, damit der letzte getilgt wird" (*DA* 8), states the narrator, whose perspective seems closely aligned with that of Bode. The use of the words "the last one" to describe people of high moral conscience who threaten the continued existence of the powers that be, bears resemblance to the concept of "der Letzte" in Walter Jens' *Nein. Die Welt der Angeklagten.* That Bode poses a threat to the establishment, is not simply a product of his imagination. When Bode researches

and exposes the right-wing extremism of a high court judge, his journalistic ethic conflicts with the political views of his employers and his employment is terminated (*DA* 33). The feelings of resignation and impotence he experiences are the result of real politically motivated action taken in opposition to him.

Concomitant with the idea of eliminating certain elements in society, Heidenreich's novel also advances the notion of "stumm machen" or silencing. As an individual Bode has become the target of this repressive silencing. Silence is not, however, imposed upon Bode alone; rather, the protagonist generalises the condition as being distinctively German when he characterises the Federal Republic as a "stumme[s] Land, le pays muet" (*DA* 9). "[S]tummes Land" (*DA* 40), "in diesen Mauern Verstummung" (*DA* 41), "Bode schweigt" (*DA* 79,86), "Zeichen der Verstummung des Landes" (*DA* 110)--these phrases are all indicators of the presence of this theme in describing the Federal Republic and its effect on Bode. Indeed, Bode himself, powerless to effect positive change through his journalism, internalises this "Stummachen" to the extent that he begins to impose it on himself.

"Genug Verwirrung im Lande. Er wollte Unterschiede. Die wollten sich nicht einstellen" (*DA* 8), the novel says of Bode. Although the "differences" sought are not specified, part of Bode's frustration, it can be surmised, comes from his criticism of the German political system, which, according to him, perpetuates the status quo: "dieses Land ist mir zu klug; die Rechten wählen den Kanzler der Linken, damit die Linken

rechte Politik machen können" (*DA* 8). This criticism is similar to that of Keetenheuve in *Treibhaus* and aims at what is discerned as the ineffectuality of the political system.

In his frustration Bode chooses emigration. His belief "vergessen zu können, zurücklassen zu können mit dem Schritt über die Grenze" (*DA* 50), proves wrong, however. Even in France, his own perception of his German identity plagues him: ". . . jetzt hatte er das Gefühl, einen deutschen Geruch am Körper zu tragen: den Geruch einer Vergangenheit im Schlachthaus" (*DA* 26). He bears the scars of guilt despite the realisation that "Die Vergangenheit, die sie alle meinten, war niemals die seine gewesen" (*DA* 26). Defying the expectations and the image that the local French population has of Germans, Bode does not seek to profit from the *auberge* by the sea, which he has purchased. As Dr. Bazille says of Bode, "Sie ruinieren das Bild vom Deutschen" (*DA* 57). Indeed, far from an anticipation of prosperity, Bode seems to have set a limit to his time in France and his life when it is revealed that he only has enough money for three years (*DA* 33). Bode's intention is never to renovate his French inn and open a business, but rather the house is to be his last place of dwelling before committing suicide.

Bode's pain is connected with actual political times and events, both distant and near, the former being the period of National Socialism and the latter the terrorism of the late 1970s.

More recent political events also find continued mention in the novel. In the winter of 1977-78 Bode reads about the spread of injustice and is bothered by the

silence, "die allgemeine Ruhe. Jeden Tag neue Nachrichten über die Verbreitung des Unrechts. Ruhe. Jeden Morgen ein neuer Rückschritt hinter die Stunde Null. Ruhe" (*DA* 24). "Laut bleibt der Herbst '77," states the narrator, describing the waves of political news: "Die Heldentoten und die Opfer zupaß gekommenen Selbstmords und die Kommando-Helden und die offiziellen Reden vom Lynchen . . . . (*DA* 41). Referred to are the incidents of leftist extremism in the FRG,[6] extremism which produced an impression that the participants were betraying the ideals of the movement they sought to champion.

Suicide is again the subject of the story told by Bode of a seventy-three-year-old printer in a large West German city, who, suspected of leftist activity, becomes the victim of police brutality. Mistreated by police and told by one that he did not spend enough time in a concentration camp during the war, the desperate man commits suicide (*DA* 107).

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[6] May 9, 1976, Ulrike Meinhof committed suicide in Stuttgart-Stammheim prison; April 7, 1977, the attorney general Buback was killed by terrorists; April 28, 1977, A. Baader, G. Ensslin, and J.C. Raspe were sentenced to life terms; July 30, 1977, J. Ponto, head of the Dresdner Bank was murdered by terrorists; Sept. 5, 1977, M. Schleyer, was kidnapped by terrorists; Oct. 14, 1977, a Lufthansa jet was hijacked and the pilot killed; Oct. 18, 1977, the jet was stormed by the "GSG 9" (Grenzschutz-Sondereinheit) in Mogadischu; Oct. 18, 1977, A. Baader, G. Ensslin, and J.C. Raspe commited suicide in Stammheim prison; Oct. 19, 1977, M. Schleyer was found murdered in Mulhouse (Hellwig 488-494).

Transgenerational Egression from Political Conditions

Der Ausstieg makes numerous references to the period of National Socialism, but this part of history is best connected to the protagonist by way of Bode's relationship to his father. Bode visits his estranged father in a desire to learn about the beginnings of the Republic and the time before it (*DA* 43). Bode's moral make-up is reinforced through the revelation of his father's own actions and the parallels between father and son. Bode's father, an academic who refused to join the Nazi Party during the war, was, at thirty-five years of age, denounced by his *Ordinarius* and denied a career. As Bode himself does thirty years after the war, so too does Bode's father react to political oppression by physically distancing himself. He moves to the North Sea, where "seine Rede nicht gefragt ist" (*DA* 44). Rather than struggle against the system any longer Bode, too, decides to silence within himself, by virtue of geographical distance from the Federal Republic, the images of his country which continue to plague him (*DA* 50).

The example given by Bode's father of a Nazi professor, who after the war is able to make the transition to another party and obtain a university chair (*DA* 44), exemplifies for Bode and his father the continuity of fascism and injustice. For Bode's father, politics are "ein schmutziges Geschäft" (*DA* 44), and in the novel it is politics that have driven Bode's family apart, causing a breach in the understanding between generations. Bode and his father achieve a reconciliation of sorts, able to ask long suppressed questions, and Bode discovers "Würde" in his father (*DA* 44). Bode's father, eschewing political theories, offers Bode help by way of three stories which his son is

to interpret. The first two stories describe politically motivated incidents of hate and division in Germany during and after the time of National Socialism, connected also to Bode's youth. The third story is about a man named Strothof, a communist who had survived the Nazis and the war, and who believed "daß in der neuen Republik die Freiheit grenzenlos sei" (*DA* 51). Anticipating political tolerance after the war, Strothof, a village teacher, still quietly held communist convictions, though "nach drüben [German Democratic Republic] hätte er nun mal gar keine Neigung gehabt" (*DA* 51). In September of 1956 the Strothofs fall victim to anti-communist actions from local citizens, which they see as evidence of the continuation of political intolerance among the people, but real disappointment is felt by them when the authorities refuse to investigate the Strothofs' complaints (*DA* 52). The Strothofs remain in the village that is described as "nicht schlechter als andere Dörfer" (*DA* 52), but, fearing continued reprisal, announce their rejection of communism, a fact which is announced even in church. A while later Jan Strothof receives a beating at the hands of democrats, interpreted by police as a communist act of revenge. Bode is unable to free himself from the image of Strothof's scar and what it signifies about the new Republic. The final embrace of father and son is described as "stumm" (*DA* 55). Signifying the continuity of history, Bode contemplates "die vierte deutsche Geschichte," which has begun "mit dem Parteitag der Christsozialen in München. Die Bürokraten sind ins Recht gesetzt. Die Spitzel. Die Verleumder" (*DA* 55) and signifies continuity.

Suicide in Symbol and Metaphor

Dr. Bazille, resident of Les Petites Dalles, is a character of near mystical and improbable stature in the novel. He functions almost as a therapist to Bode and as a catalyst in the revelation of Bode's inner turmoil and suicidal ideation. Many of the stories which uncover the theme of suicide are conducted through Bazille.

The nature of Bode's suicide is explained in what is probably the novel's most important and revealing metaphor for it. The story of the scorpion recounts a foretune-telling experience that Bode has had in Africa at an earlier time.

In the story, Bode, "der einzige Weiße" (*DA* 61) is given information about the meaning of each symbol, but must apply what he observes to his own life, a significant fact in the examination of the subjectivity of the protagonist's perspective. A circle is drawn in the sand, an arena, which an elderly man describes to Bode as "deine Freiheit" (*DA* 62). A tin can is produced which represents "das Gefängnis" (*DA* 62), from which a scorpion is released into the traced circle in the sand. The scorpion's release is described as "deine Geburt" (*DA* 62). "Die kleine Furche im Staub," says the narrator, interpreting the scorpion's actions, "wäre kein Hindernis. Aber er überschreitet sie nicht" (*DA* 62). The elder draws a spiral within the arena, designating it Bode's "life." Thereafter, the scorpion's path becomes tighter and the scorpion "spürt die Beschränkung" (*DA* 63). The scorpion, perceiving the encircling trench to be inescapable, stings itself to death in desperation: "Er krümmt seinen Hinterleib mit dem Stachel gegen sich selbst. Er spürt zwischen den Ringen des

Panzers die Stelle auf, wo er verletzbar ist. Er richtet den Giftdorn in den eigenen Körper. Er sticht zu" (*DA* 63). The scorpion's behaviour prior to its self-killing is described as "verzweifelt" and "wild," reflecting aspects of Bode's own condition leading to suicide. Described further by the narrator as standing free, the phrase "nur von einer Linie gefangen" (*DA* 63), underscores the notion that the animal's desperation was only perceived, and the result of suicide unnecessary. Finally, as the scorpion dies, it reaches into the air in search of an enemy which is not there. In the end the scorpion in its limited view has become its own mortal enemy.

In his application of the scorpion's situation to his own, Bode finds a distinction in the fact that he has made it "über die Grenze" (to France), remaining uncertain, however, whether this fact alone "genügt zum Leben" (*DA* 63). If the border between the Federal Republic and France is to be equated with the shallow trench in the oracle, then Bode has indeed made it literally over the border. For Bode the arena is analogous to the physical boundary encircling the Federal Republic. Like other German nationals, he has left the physical confines of his country, yet he is unable to leave behind the emotional ties to Germany, a fact which is exacerbated by news of Germany. In February of 1981 Bode hears reports over the BBC of the denunciation of pacifists by the Social Democrats (*DA* 64) and in French newspapers he reads "besorgte Artikel über die Bundesrepublik" (*DA* 25).

The scorpion's arena, confined by the shallow trench, represents more than just a physical boundary, but Bode, limited by his subjectivity, seems at this point in the novel unable to grasp the additional meaning of the oracle. The line in the sand

represents a greater psychological barrier in the thinking of Bode and others like him, that is, the inability to regard Germany as anything but a place of renewed fascism. Bearing the guilt of his country's Nazi past, Bode is also unable to conceive of any solution but suicide.

The story of Edward, an English tourist, constitutes a real event within the context of the novel, which is meaningful to Bode's life and furthers his contemplation of suicide. Edward, who, as it turns out, is despondent about his marriage, attempts to drown himself in the sea but is rescued by a lifeguard and the ubiquitous Dr. Bazille. Bode's "Ahnung, das Schicksal des Engländers habe möglicherweise eine Bedeutung für ihn selbst" (*DA* 87), is given meaning when Edward explains that "[s]eine Rettung war [s]eine Vernichtung" (*DA* 87). In an explanation of his circumstances, Edward reveals a marriage that has come undone for political reasons, chief among them the arrogance and hypocracy of the upper classes of England. Thinking not of death, but rather of "Heimkehr," Edward had given himself up to the water, his fear of destruction in the water less than his fear of destruction among the ruling classes in his homeland. Later, pondering Edward's situation and his own, Bode writes in his notebook, "überall lauern die Retter. Man muß auf der Hut sein" (*DA* 96), a note which gives relational information of his own suicidal ideation. From Bode's notation it is obvious not only that he desires not to be rescued, but that his constricted view of his circumstances causes him to disregard the political anguish of anyone but himself.

The theme of suicide is developed in another example of storytelling between Dr. Bazille, Bode, and Edward. Edward tells the story of pelicans that congregate at a lake in Australia in order to feed on an abundance of fish. The pelicans thrive for three years, at which time the lake begins to dry up. Despite their hunger they remain there and await death. Once again, the telling of such stories has a suggestible effect on Bode prior to his suicide, while at the same time providing the reader with relational information about Bode's impending act.

The pelican is not the only bird which has symbolic meaning in the novel. The German eagle is imbued with negativity, most clearly illustrated in the dream Bode recounts to Marianne, a friend who shares much of his disillusionment of Germany. Bode, in a semi-conscious state, envisions the approach of a bird: "ein kurz geratenes Wappentier, silbern, eckig und solide. Der D-Mark-Adler war's, jener vom Fünfmarkstück" (*DA* 19). The eagle, the embodiment of the Federal Republic, asks Bode whether he loves his country, to which Bode answers, "Nein, ich liebe es nicht! Schamlosigkeit, Mord, Überheblichkeit! Verbotsland! Kasernenland! Ich möchte gern, ich kann es nicht lieben, es ist nicht danach!" (*DA* 19).

Bode, himself a "gestempelte[r] Adler" (*DA* 9), unable to shed this part of his identity, seeks to purify himself in the "pure" water of the French coast. Purification, however, is not possible, for as the story reveals, the French coast is polluted (*DA* 7).

Sickness and the German Condition

The German condition is characterized as sick. During the visit to his father, Bode, overcome by sickness, sees his own image in the mirror as that of a stranger. Asked by the image in the mirror as to the reasons for his sickness he responds that his sickness is a result of "der Zustand der Republik" (*DA*66). Later, Bode contemplates the reaction of his French neighbours to his suicide. He imagines Dr. Bazille, someone who understands his pain, as explaining Bode's suicide as "die deutsche Krankheit" (*DA* 72). At one point Bode characterizes the observed "Unlust an Freiheit" as a "deutsch-deutsche Epidemie" (*DA* 103). This opinion seems to reflect the opinion of Keetenheuve in Koeppen's *Das Treibhaus*. In each case the protagonist sees continuity between past and present political circumstances and an unwillingness in the German people to correct these perceived wrongs.

German Legacy of Guilt

By virtue of his Germanness, Bode internalises a legacy of guilt, which produces in him a deleterious relationship to his own country. The conflict between him as an individual and the Federal Republic leads to his gradual disintegration from society, self-imposed physical exile, and, finally, his egression from life itself. The novel becomes a kind of reconstruction of the psychic process experienced by Bode as the reasons for his emigration to France are explained and his unabated psychological pain develops to a point where it is no longer tolerable even in exile. Heinrich Bode is

plagued by guilt which results not only from the knowledge of his country's past, but which is founded also on his perception of the continuation into the present of certain elements in German society.

Although the novel is primarily the story of the progression of one individual towards suicide, it generalizes the conflict between individual citizen and German society. The words "Alle, die Bode sind, müssen weg" (*DA* 8), "Kollegen hatten zur Toscana geraten. Zu viele" (*DA* 23), and "ein Mensch wird sein Land nicht los. Ein Land verliert leicht seine Menschen" (*DA* 24), are indications of a wider phenomenon of emigration. In Bode is represented the fundamental conflict of Germans who believe(d) the German politics to be steering a course away from many of the ideals articulated in the early days of the Federal Republic. Disgruntled and disillusioned, many of these people demonstrate political objection in emigration. Emigration, however, neither justifies their opinions nor makes the emigrants less German. A direct comparison is constructed between those who emigrated during the totalitarian regime and those who chose to emigrate during the new Federal Republic. Although characters such as Keetenheuve and Bode eventually even commit suicide because of the injustices they discern in their country, a comparison between Hitler's Nazi Germany and the Federal Republic's democratic government becomes absurd, thereby undermining the rationality of the protagonists' suicides. This is, however, in contrast to Jens's Walter Sturm, who lives in a totalitarian state and experiences conditions analogous to those of Nazi Germany.

The Meaning of Suicide

> Nur wenige Meter taubengraues Geröll zum Schaumrand des Atlantik: der zischt her, leckt am Leben; vom äußersten Rand der Existenz Bodes nimmt er ein wenig mit hinaus, mischt es unter, verdünnt es draußen, kehrt zurück. (*DA* 7)

The protagonist's relationship to the sea, as indicated in the passage above, is marked by conflict and is self-destructive, yet, he makes the conscious choice to move closer to it. Proximity to the sea provides only temporary respite to Heinrich Bode, who eventually succumbs to its lethal potential. Eventually, death by self-imposed drowning, as in Koeppen's *Treibhaus*, is the method chosen for egression from intolerable circumstances. The sea represents both an instrument of destruction and of absolution of guilt.

Suicide by drowning is a form of suicide which is comparatively indirect, even hidden or concealed, and therefore socially more acceptable in its ambiguity. Bode is drawn to the water, and it is that which makes death "erträglich" (*DA* 7), its "Ebbe . . . eine geschenkte Frist" (*DA* 27).

"Die extreme Situation in Deutschland" posits Karl Esselborn, "wird also am Beispiel einer extrem reagierenden Figur dargestellt, die nicht realistisch zu verstehen ist" (Esselborn and Hunfeld 40). Whether or not suicide is or is not reasonable for individuals in circumstances such as Bode's cannot be answered objectively. What is certain is that within the literary treatment of the theme, suicide is presented as

plausible, despite the fact that Bode's own choice represents an extreme reaction to political conditions.

The protagonist Heinrich Bode is not trying to give expressive meaning to his suicide within the novel; however, the novel does make an expressive statement to the reader. Bode's suicide is the result of his psychic suffering which is caused by his perception of political conditions.

It remains then for the reader to assess the veridical value of the protagonist's suicidal solution. One might argue that Bode's assumption of guilt is not reasonable and should properly have been interpreted by him as the sins of another generation. Even Bode's father, who was a contemporary of the fascists, did not assume and internalize the burden to the extent that Bode does. In effect, Bode gives up on his country, despite its prosperity and pacifistic international posture, choosing instead to focus exclusively on the perceived continuity of some political elements in German society

Summary

In all of the novels dealt with in this chapter, suicide becomes the conscious alternative to facing life's vicissitudes. In the novels by Jens, Koeppen, and Heidenreich, the motivation for the characters' suicide is overwhelmingly political in nature. Koeppen and Heidenreich relate actual political events of the day, such as rearmament and the extremism of the political right and left, to the psychic dilemma

of their respective protagonists. Political circumstances in the novels of Jens and Sommer are obfuscated, but reference is made in both cases to war and totalitarianism.

Walter Sturm is the least able to bring about change in the given circumstances, because the fictional totalitarian monolith is depicted as omniscient and inescapable. In this novel alone does suicide come closest to being a positive choice, and it is clear that it is the unalterability of circumstances which excuses suicide. The literary suicide is intended as a deterrent, a warning, or admonition to the reader, not to take peace and democracy for granted. In the novels of Koeppen, Heidenreich, and Sommer, suicide, although viewed sympathetically, is certainly not presented as the only option open to the protagonists. Suicide thus becomes more idiosyncratic in nature and the reader is induced to reflect more on the reasonableness of suicide in individual circumstances.

Although de-emphasised, each novel also presents a failed love relationship, which heightens the psychological anguish experienced by each protagonist. In the cases of Jens's and Koeppen's novels the protagonist is, in part, directly responsible for the death of his female partner, thus making the self-inflicted death of the protagonist a subjectively reasoned form of atonement. The protagonist's responsibility for the death of his partner is the direct result of the influence of the political environment. The death of Gisela Waltz is brought about in a direct way by a totalitarian political system, whereas Elke is destroyed by the moral and political single-mindedness exemplified by Keetenheuve. The political coersion exerted on Keetenheuve is less direct. In Heidenreich's novel, Bode's relationship to Marianne fails because of the

inimical effect the political system seems to have on him. Although Bode and Marianne share similar views about Germany, i.e., she, in response to an act of terroristic violence, says, "Wir müssen aus diesem Land" (*DA* 82), Bode becomes reclusive, making himself a less functional member of society and a less suitable partner for her. In a sense the *Realpolitik* of love mirrors that of politics. In Sommer's novel, Leonhard is incapable of forming any relationship. This inability is presented as society's failure to provide proper enlightenment and proper examples of sexual relationships.

As with all of the novels studied here the theme of suicide alerts the reader to the connection between the suicide of the novel's character(s) and the societal conditions portrayed. Suicide is never produced in a vacuum, but is demonstrated to be the result of conditions existing within Germany. As has been shown, the reasonableness of each protagonist's perception may be called into question, but one may suggest that the novels present views of suicide which are meant to provoke the reader's own sensibilities and assertions.

Chapter IV

Summary: Suicide in the German Novel 1945-1989

In concluding this study it is appropriate to recall the ideas expressed by Klaus Mann in this study's opening quotation. Despite the resolution of Europe's economic plight four years after the end of the Second World War, Mann, in his *The Ordeal of European Intellectuals*, identifies what he calls "the intellectual dilemma of thinking men and women from Great Britain to the countries behind the Iron Curtain" and a "war of ideas" (*Ordeal* 6). Mann questions the ability of European intellectuals to "meet their ordeal" *(Ordeal* 10), and goes on to define the role of the intellectual in today's society, outlining the intellectual crisis characteristic of the present age (*Ordeal* 16), one which, in his opinion, has increased in magnitude since the First World War (*Ordeal* 22). For Mann, European intellectuals are "more keenly aware of the critical world situation" than others because they have experienced it directly (*Ordeal* 22). While this study does not hold, as does Mann, that all Europeans necessarily belong "to the same tragic, but proud and distinguished clan" (*Ordeal* 24), it seems that Mann does identify a crisis which is evident in the literature of Germany between 1945 and 1989. In the battle between the intellectuals of East and West, Mann asserts that one has been compelled to take sides (40). The crisis arising out of the forced necessity to choose sides leads to hopelessness for many intellectuals. Klaus Mann quotes what are ostensibly the words of a young intellectual representative of the prevalent European

intellectual dilemma. "There is no hope," states the young intellectual, "whether we intellectuals are traitors or whether we are victims, in any case we'd better recognize the utter hopelessness of our situation. Why fool ourselves? We're done for! We're licked!" (*Ordeal* 56). These words echo the resignation present in most of the novels in this study to varying degrees and in differentiated ways. The alleged student goes on to define the struggle as one between "two great antispiritual powers--American money and Russian fanaticism," (*Ordeal* 56), ideological tendencies associated with the protagonists' dilemmas in this study. Not only does the student identify the ideological poles which apply deleterious force on intellectuals, but the student also arrives at a proposed solution to the problem. The student advocates a

> . . . movement of despair, the rebellion of the hopeless one. Instead of trying to appease the powers that be, instead of vindicating the machinations of greedy bankers or the outrages of tyrannical bureaucrats, we ought to go on record with our protest, with an unequivocal expression of our bitterness, our horror. Things have reached a point where only the most dramatic, most radical gesture has a chance to be noticed, to awake the conscience of the blinded, hypnotized masses. I'd like to see hundreds, thousands of intellectuals follow the examples of Virginia Woolf, Ernst Toller, Stefan Zweig, Jan Masaryk.
>
> A suicide wave among the world's most distinguished, most celebrated minds would shock the peoples out of their lethargy, would make them

> realize the extreme gravity of the ordeal man has brought upon himself by his folly and selfishness. (*Ordeal* 58, 60)

The university student, who is unnamed, may indeed simply be the fictional conduit for Mann's own views. The same views are echoed in what is thought to be an excerpt from Mann's *The Last Day*.[1] Whether the admonition to follow the example of suicide is an earnest one can not be determined, though Klaus Mann did commit suicide.[2]

What is apparent from this study is that the demonstration of suicide among intellectuals does exist in the German novel between 1945 and 1989, whether one chooses to define the protagonists themselves as intellectuals or to reserve this term for the novels' authors. Suicide as described by the young intellectual in Mann's *The Ordeal of the European Intellectuals* is intended to be a form of protest that will "awake the consciences of the blinded, hypnotized masses" and "shock the peoples out of their lethargy" (60). To presume that the authors of the novels here dealt with envisioned their works as having a Werther-effect would be disingenuous; however, suicide plays a decidedly important role. For each protagonist, suicide definitely constitutes a form of protest against existing political and social conditions. This protest is presented to the reader, with the effect of awakening the reader's conscience.

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[1] See page 1 of this dissertation.

[2] The issue as to whether Klaus Mann committed suicide for the reasons suggested in *The Ordeal of the European Intellectuals* is a matter of interpretation. A factor to be considered in assessing the reasons for suicide relates to evidence of suicide within one's family, evidence of which exists in the case of Klaus Mann (Adler 83).

If writers are to be considered intellectuals, as Klaus Mann certainly seems to suggest,[3] then the inclusion of the theme of suicide in a work of fiction automatically connects the theme to the realm of the intellectual. In addition to this, however, the works examined in this study associate suicide in the novel with protagonists "whose activity essentially is not the pursuit of practical aims" (Benda 43), and can be defined as intellectuals also. One of the most striking similarities among the protagonists is the fact that each character's conscientious opposition to the social or political structure puts him or her in physical danger even before suicide occurs. Plievier's Vilshofen opposed the authority of his Nazi leader and contemplated, not what was most practical in the circumstances, but rather what was most morally correct for his country. The Quangels in Fallada's novel pursued the dissemination of information which was in resistance to the Nazi regime, despite the fact that it placed them in constant peril and eventually led to their execution. The trait of the intellectual protagonist can also be seen in the novels of the GDR. Jakob Heym in Becker's *Jakob der Lügner* would have accomplished no more in terms of his own physical well-being had he not created and maintained the fiction in the ghetto. Instead, he chose to act in what he considered to be the interests of the greater good of his community. Although Plenzdorf's Edgar does not act in order to benefit those around him, he does oppose the political and social establishment, with the result that he becomes isolated. Wolf's Kleist and Günderrode, as literary figures, occupy a realm which is, by the very

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[3] See also Julien Benda, who includes "philosophers, men of religion, men of literature, artists, men of learning" (44).

nature of the characters, more within the realm of ideas. Hein's protagonist Horn is also an academic and is more stereotypically intellectual in his orientation. What is important in the novels of the GDR is the fact that the opposition and, ultimately, suicide displayed by the intellectual figure are mediated through historical distance. In Plenzdorf's novel the historical connection is achieved through Edgar's use of Goethe's *Werther*. In addition to this, the ambiguous nature of the suicide itself renders the criticism innocuous.

The novels of the FRG also exhibit the crisis of the intellectual. Jens's Walter Sturm is the quintessential intellectual, who has been rendered impotent in a totalitarian system. *Nein. Die Welt der Angeklagten,* presents the intellectual struggle in the depiction of a very polarized society. Keetenheuve is set apart from his peers in his affection for the arts, particularly literature, whereas other politicians are concerned with practical politics and the furtherance of their own careers. Keetenheuve is typical of the intellectual who holds a purist view. His dilemma exists in his inability to compromise his moral position. The character of Bode illustrates a much subtler form of intellectual objection. His confrontation with the system is more a product of his perception than his actual environment. Leonhard Knie, though very different in his consciousness of his political surroundings, nevertheless shows characteristics similar to the other protagonists. He verbalises opposition to the adults in his community, analogous to the criticism of political authorities in the other novels. Like the other protagonists, he too shows an intellectual orientation, albeit naïve. Like Keetenheuve, he is interested in poetry, even using it to express his feelings of pain.

Characteristic of suicide in the novels of each time period is its association with Germany's Nazi past. Significantly, however, *Vergangenheitsbewältigung* is treated in quite distinct ways. Not surprisingly, the two earliest novels which fall into the period preceding the formal division of Germany consider very directly the issue of Hitler's National Socialism. Both of the novels, written in close association with the developing GDR, show an anti-Nazi stance typical of socialism, though, as has been shown, neither Plievier nor Fallada was a confirmed communist. In the case of once confirmed Nazis such as Escherich (*JSA*) and Vilshofen (*STA*), suicide or the contemplation of suicide was motivated largely by guilt. In the novels of the GDR, where Nazism is treated directly (*JdL*) or where socialism is likened to fascism (*HE*), suicide is not the result of the guilt assumed because of the war. Suicide is motivated by the desperation created by the confrontation between individual and society, where the individual is rendered helpless. In the novels of the FRG discussed, only in Sommer's novel is suicide not connected directly with the guilt of the war, although Viviani's diatribe against the Germans raises the spectre of German aggression. The comments of two residents of Leonhard's community justify Leonhard's suicide after the fact as a way of escaping the war, which would seem to relate Leonhard's suicide indirectly to guilt. It must be said that Leonhard himself could not have been motivated by this guilt. Jens's protagonist Sturm experiences the guilt of apathy for the twenty-three years following the war. For those years he no longer fulfilled the role of an intellectual; rather, he concerned himself with purely practical needs. Koeppen and Heidenreich pursue the issue of guilt to the greatest extent and in these

novels guilt becomes an overt motivator of suicide. In Heidenreich's novel, the protagonist is even aware of the fact that he feels guilty for something that he had not been responsible for and yet the feelings persist, because he is unable "to take the country out of himself." The fact that writers in the West describe the contemplation of guilt is not surprising, because it was the Federal Republic that assumed the entire guilt of the war. Socialism regarded fascism as the natural consequence of capitalism and thus had a pretext to distance itself from responsibility. Had writers of the GDR portrayed their citizens as burdening themselves with this kind of guilt, the association between fascism and socialism would have been made and their works would not have been accepted by the censors. Christoph Hein's *Horns Ende* was rejected for the connection it was thought to have made between fascism and socialism.

By using Shneidman's common characteristics of suicide, this study has shown that present suicidological theory is borne out in the fictional literature. This fact, though itself not new, reaffirms the belief that art reflects reality and that there is truth to be found in art. In many of the works studied here, the evidence of true suicidal ideation was abundant and suicidal intention beyond question. The inclusion of Shneidman's characteristics was of particular benefit in making a determination of suicide in cases of ambiguity. Plenzdorf's *Die neuen Leiden des jungen W.* is just such a case. Suicide seems more likely in view of the serial nature of his behaviour, his isolation, and the many relational clues in the text. The ability to demonstrate the various manifestations of suicide in human beings facilitated discussion of affective and conative clues, which go to the issue of motivation for suicide.

Part of the rationale for confining the period to be studied to the time before reunification is based on the knowledge that conditions within Germany change significantly, however unquantifiable these changes still are. It is possible that many issues observed in this study will persist, but it is likely that certain facts will change. An example of one change has been observed in the destabilization in the GDR and the ensuing anomic[4] situation (Wedler *Remarks* 82). Wedler states:

> . . . the economic situation has worsened in large parts of East-Germany, combined with growing unemployment. Even when this economic depression will be terminated after a more or less short period, it may result in psychopathological reactions in a population without experiences with liberal western lifestyle, when living under the condition of totalitarianism for about 60 years. (*Remarks* 82)

The political polarization between the east and west can no longer be spoken of or written about in such definite terms. The confrontation between the individual and socialist state evident in the novels of the GDR no longer exists, and with its disappearance the change in literary production and the very role of literature in society. The issue of reunification and ideological division between the two German states, evident in the novels of the FRG by Koeppen and Heidenreich, have been redefined and post-Wall novels are delimited in terms of reintegration and alienation within a unified Germany.

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[4] "Anomic" is a term developed by Durkheim, which refers to "the failure of the person to adjust to social change" (Grollman 31).

If writing about suicide is undertaken for prophylactic reasons, then one might say that literary suicide has an instrumental function for the writer, because it acts cathartically in purging the writer of his suicidal tendencies. In the case of Heinrich von Kleist[5] and Klaus Mann this function proved of limited value. But what of the suicide theme in works of fiction whose author is not suicidal? It would seem reasonable that for all literary works, and indeed all works of art which contain the theme of suicide, there is some lasting expressive meaning, which is realised when the work is interpreted, in this case by the reader. The theme of suicide, which represents a protagonist's confrontation with something, is validated or rejected by the reader. As Höfer has suggested in his opinion about the outsider, an image is presented against which the interpreter measures his own attitudes to a given subject. This discourse or dialogue makes literary suicide different from actual suicide, in that suicide can be contemplated without the need to actually sacrifice life. Instead, one sacrifices the idea of life. Actual suicide can, of course, be expressive (Wood). One need only remind oneself of the suicides at Stammheim described in Heidenreich's novel, and the suicide of the Reverend O. Brüsewitz in protest against the GDR's church policies (Hellwig 488; "Diktatur" 36). The present study shows that the theme of suicide in the novels examined is clearly connected to political and social conditions within Germany. It has also been demonstrated that, although certain aspects of the depiction are common to both the GDR and the FRG, the two states varied in some

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[5] In her dissertation entitled "Die Darstellung des Suizids in der deutschsprachigen Literatur seit Goethe" (1992), Gabriele Adler discusses evidence of Kleist's suicidal tendencies in his letters, his *Prinz Friedrich von Homburg* (1821), and his *Penthesilea* (1807) (97-103).

ways as well, a conclusion that offers insight into the way in which the fundamental question of death is affected by political and social conditions.

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The Level of Organizational Effectiveness of the (IC) Construction Firm: A Multivariate Model-Based Prediction Methodology

by

Adnan A. Adas

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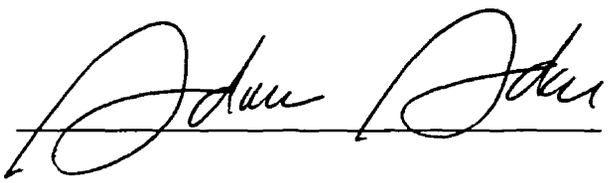
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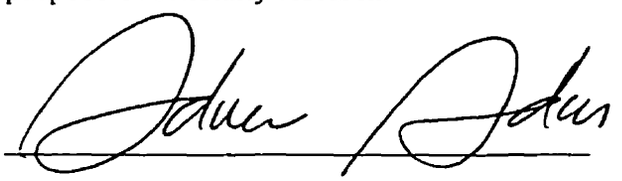
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ABSTRACT

The Level of Organizational Effectiveness of The (ICI) Construction Firm:
A Multivariate Model-Based Prediction Methodology

The assessment of organizational effectiveness represents a crucial step in the improvement process of the firm. Given the lack of consensus in its definitions and the various theoretical models and approaches that can be used to study and model organizational effectiveness, it is important for the validity of assessment that the methodology used to be linked to a suitable theoretical approach. The linkage must provide a theoretical basis for identifying the important organizational characteristics in the domain of effectiveness of the type of firm undergoing the assessment. This would ensure that the developed assessment methodology can be generalized to other similar firms of the same type, rather than being organization or firm-specific.

Most existing methods of assessing organizational effectiveness in the context of the construction firm tend to be organization-specific. Most utilize a project-dependent approach where assessment is typically performed after the completion of projects and effectiveness is assessed by the ability of the construction firm to achieve specific goal or goals that relate to time of execution, costs of completion, quality of finished work and/or a certain level of productivity. Project indicators, when used in the assessment of organizational effectiveness are crude at best. In certain instances, using these as indicators of effectiveness could be misguiding due to overlooking or not considering the particulars of each project performed by the construction firm.

Using the level of productivity by the construction firm as a common criteria of effectiveness suffers from many theoretical and methodological deficiencies. Both project indicators and productivity-based methods use indirect assessment. This yields very little information about the levels of important organizational characteristics that actually influence organizational effectiveness in the construction firm. An approach that incorporates the assessment of the important organizational attributes in the domain of effectiveness, based on and linked to an appropriate theoretical model, would give the construction firm a valuable and practical tool for monitoring its level of effectiveness.

A configurational perspective of organizational analysis and the competing values approach toward studying and modeling effectiveness criteria are identified in this research as most appropriate to be used to develop a valid assessment methodology for the construction firm, as it pursues suitable organizational configurations in its quest for effectiveness. The study of effectiveness' domains and dimensions, in the four ideal configurations of the competing values approach, helped in identifying criteria that are most relevant in examining the organizational effectiveness of the construction firm. These criteria are grouped into four general categories of organizational characteristics: structural context of the firm; organizational flexibility, rules and regulations; person-oriented processes in the firm; and organizational strategy means and ends used by the firm. Based on these categories, fourteen organizational variables are identified to form a basis on which a project-independent method of assessing effectiveness is developed. It is the hypothesis of this research that measurement of the level of these variables in the construction firm can yield a valid prediction of its level of organizational effectiveness.

To develop a yard stick against which the levels of the hypothesized variables can be measured, their ideal levels in an effective organizational configuration must be determined empirically. A field survey based on self-administered questionnaires was carried out to collect data from firms operating in the institutional, commercial, and industrial (ICI) construction sectors of the industry in Saudi Arabia. Data collection was based on measurement scales for the identified variables which were constructed and tested for reliability of use. Using the level of past project performance of the construction firm as a referent measure of organizational effectiveness and data pertaining to the fourteen variables, led to the development of a predictive multivariate linear model with five significant variables: organizational attitude toward change, level of multiple project handling ability, strength of organizational culture, level of workers' participation in decision making, and level of planning by the construction firm. The model is validated with a level of accuracy that makes it suitable for use by management of the construction firm to achieve a reliable prediction. Based on the findings of the study, a number of recommendations are made regarding assessment of organizational effectiveness and the natural shift in levels and types of effectiveness criteria that are possibly pursued by the firm during its life cycle as it changes from one configuration to another.

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DEDICATION

I dedicate this thesis to my wife and children who gave me all the support I needed to accomplish this endeavor.

TABLE OF CONTENTS

ABSTRACT iv

TABLE OF CONTENTS ix

LIST OF TABLES xvi

LIST OF FIGURES xvii

CHAPTER (1) - INTRODUCTION 1

1.0. INTRODUCTION 1

1.1. THE RESEARCH PROBLEM 4

1.2. RESEARCH OBJECTIVES 5

1.3. RESEARCH METHODOLOGY 7

1.4. SCOPE OF RESEARCH 10

1.5. OUTLINE 11

CHAPTER (2) - LITERATURE REVIEW 14

2.0. INTRODUCTION 14

2.1. THEORY AND EFFECTIVENESS 14

2.1.1. Classical Perspective 15

2.1.2. Human School Perspective 16

2.1.3. Open-System Perspective 17

2.1.4. Contingency Theory Perspective 20

2.1.5. Institutional-Political Perspective 21

2.1.6. Configurational Perspective 22

2.1.7. Paradoxical Perspective 26

2.2. DEFINITION & CRITERIA OF EFFECTIVENESS 28

2.2.1. Conflicts Among Effectiveness Criteria 33

2.3. APPROACHES & MODELS OF EFFECTIVENESS 35

2.3.1. Goal-Attainment Approaches 35

2.3.2. System Approaches 40

2.3.2.1 Resource Model 40

2.3.2.2 Internal Process Model 41

2.3.2.3 Strategic Adaptation Model 41

2.3.2.4 Open System Model 41

2.3.3. Multiple Constituency Approaches 43

2.3.4. Qualities Of Organization Approaches 46

2.3.4.1. the competing values approach 47

2.4. SUMMARY OF CURRENT APPROACHES TO EFFECTIVENESS 49

2.5. ASSESSMENT OF ORGANIZATIONAL EFFECTIVENESS 51

2.5.1. Existing Methodologies 53

2.5.1.1 Maloney's And Federle's Methodology 55

2.6. SUMMARY OF LITERATURE REVIEW 67

CHAPTER (3) - METHODOLOGY 69

3.0. INTRODUCTION 69

3.1. ISSUES RELATING TO DEVELOPMENT OF AN ASSESSMENT METHODOLOGY 69

3.2. RATIONALE OF METHODOLOGY 71

3.3. METHODOLOGY 76

3.3.1. Identification of Variables 78

3.3.1.1 Category (1): Structural 82

3.3.1.2 Category (2): Flexibility, Control, and Rules and Regulations 97

3.3.1.3 Category (3): Persons-Oriented Processes 101

3.3.1.4 Category (4): Strategy (Means and Ends) 110

3.4. SUMMARY 118

CHAPTER (4) - OPERATIONALIZATION OF VARIABLES 120

4.0. INTRODUCTION 120

4.1. ORGANIZATIONAL EFFECTIVENESS: A REFERENT MEASURE FOR ANALYSIS 120

4.2. OPERATIONALIZATION OF THE FOURTEEN VARIABLES 124

4.2.1. Level of Subcontracting 127

4.2.2. Attitude Toward Change 128

4.2.3. Extent of Rules and Regulations 129

4.2.4. Level of Adherence to Rules and Regulations 129

4.2.5. Level of Control 130

4.2.6. Level of Integration in Services Offered 131

4.2.7. Level of Joint-venturing, Partnering, and Alliances 131

4.2.8. Level of Multiple Project-Handling Ability 132

4.2.9. Strength of Organizational Culture 133

4.2.10. Level of Workers' Participation in Decision Making 135

4.2.11. Level of Coordination 136

4.2.12. Level of Information Flow 137

4.2.13. Level of Planning 138

4.2.14. Level Of Goal Setting 139

4.3. SUMMARY 139

CHAPTER (5)- FIELD SURVEY: QUESTIONNAIRE DESIGN, ADMINISTRATION AND DATA COLLECTION 140

5.0. INTRODUCTION 140

5.1. QUESTIONNAIRE DESIGN 140

5.1.1. Questionnaire Construction 141

5.1.2. Questionnaire Administration 144

5.1.2.1 Number and Levels of Respondents 144

5.2. SURVEY 145

5.2.1. Design 145

5.2.2. Procedures 147

5.3. DATA COLLECTION 148

5.4. SUMMARY 149

CHAPTER (6) - MEASUREMENT AND DATA ANALYSIS 150

6.0. INTRODUCTION 150

6.1. MEASUREMENT 150

6.1.1. Reliability Of Measurement Scales 150

6.1.1.1 The Internal Consistency Method 151

6.2. DATA ANALYSIS 156

6.2.1. Descriptive Statistics 158

6.2.2. Intercorrelations 163

6.3. SUMMARY 166

CHAPTER (7)-MODEL 168

7.0. INTRODUCTION 168

7.1. MODELING 168

7.1.1. Preliminary Steps 170

7.1.2. Dummy Regression 171

7.1.3. Model Fitting and Selection Methods 175

7.1.3.1 Fitted Model Using RSQUARE Procedure 178

7.1.3.2 Fitted Model Using SAS's MAXR Method 183

7.1.3.3 Fitted Model Using SAS's Sequential Procedures 185

7.2. FITTED MODEL 191

7.2.1 Model Diagnostic 194

7.2.1.1 Residual Analysis 192

7.2.1.2 Outliers 192

7.2.1.3 Multicollinearity 193

7.2.2. Inferences Based on Parameters of Fitted Model 194

7.2.3. Validation of Fitted Model 196

7.3. SUMMARY 199

CHAPTER (8)-CONCLUSIONS AND RECOMMENDATIONS 200

8.0. INTRODUCTION 200

8.1. CONCLUSIONS 200

8.2. IMPLICATIONS AND RECOMMENDATIONS 203

APPENDICES 207

APPENDIX (A)-QUESTIONNAIRES 207

APPENDIX (B)-AGGREGATED FIRM-LEVEL SCORES 229

APPENDIX (C)- AN EXPOSÉ ON MULTIPLE REGRESSION 233

C.0. Introduction 234

C.1. Fitting A Model and Assessing Its Utility 234

C.1.1. The F Test For Model Utility 237

C.2. Variable Selection 239

C.2.1. Model Selection Procedures 240

C.2.1.1. All Possible Regression Subsets 241

C.2.1.2. Sequential Selection 242

C.3. Diagnosing and Checking Model Adequacy 245

C.3.1. Residual Analysis 246

C.3.1.1 Outliers 247

C.3.2. Multicollinearity 248

C.4. Inferences Based On The Estimated Model 249

APPENDIX (D)-SAS OUTPUT 250

Part (I)-Results Of 'RSQUARE' Selection Procedure 250

Part (II)-Results Of 'MAXR' Selection Procedure 264

Part (III)-Results Of 'FORWARD' Selection Procedure 275

Part (IV)-Results Of 'STEPWISE' Selection Procedure 286

Part (V)-Results Of 'BACKWARD' Selection Procedure 298

Part (VI)-Fitted Model and Diagnosis 310

REFERENCES 319

LIST OF TABLES

TABLE 2.1: Categories of Indicators of Effectiveness 32

TABLE 2.2: Effectiveness Criteria 33

TABLE 2.3: Types of General Approaches to Effectiveness 35

TABLE 2.4: Culture Profiles Ratings 63

TABLE 2.5: Organizational Effectiveness Profiles 64

TABLE 3.1: Dimensions, Categories, and variables of Effectiveness 81

TABLE 4.1: Constituents' Effectiveness Criteria 121

TABLE 5.1: Types of Measurement Scales & Number of Items 142

TABLE 6.1: Typical Covariance Matrix 152

TABLE 6.2: Scales' Cronbach's Alpha Values 157

TABLE 6.3: Descriptive Statistics 159

TABLE 6.4: Kendall Tau Coefficients (τ) 164

TABLE 7.1: Percentiles of Variables' Scores 173

TABLE 7.2: Coding of Dummy Variables 174

TABLE 7.3: ANOVA & Parameters' Estimates of RSQUARE's Model 180

TABLE 7.4: ANOVA & Parameters' Estimates of MXAR's Model 185

TABLE 7.5: ANOVA & Parameters' Estimates of FORWARD Model 187

TABLE 7.6: ANOVA & Parameters' Estimates of STEPWISE Model 189

TABLE 7.7: ANOVA & Parameters' Estimates of BACKWARD Model 190

TABLE 7.8: Predicted and Actual Levels of Organizational Effectiveness 198

LIST OF FIGURES

FIGURE 1.1: Flowchart Of The Recommended Sequence For Reading Thesis 12

FIGURE 2.1: The Congruence Model 19

FIGURE 2.2: A Firm and Its Stakeholders 44

FIGURE 2.3: The Competing Values Approach's Four Ideal Models 49

FIGURE 2.4: Competing Values Framework By Maloney and Federle 58

FIGURE 2.5: Positive and Negative Zones 61

FIGURE 2.6: Graphical Plots of Manager's and Subordinates' Ratings 66

FIGURE 3.1: Organizational Life Cycle and Criteria of Effectiveness 74

FIGURE 3.2: Three Main Steps Of Methodology 77

FIGURE 3.3: A Model Of A Firm 80

FIGURE 3.4: Horizontal and Vertical Dimensions Of Coordination 94

FIGURE 3.5: A Model For Organizational Change 101

FIGURE 3.6: Organizational Decision Making Process 106

FIGURE 3.7: Workers and Organizational Benefits 107

FIGURE 3.8: Planning Process Model 113

FIGURE 3.9: Example of A Goal-Chain For A Construction Firm 117

FIGURE 4.1: Synthesis of A Referent Measure For Organizational Effectiveness of the Construction Firm 123

FIGURE 4.2: 7-Anchor Points Ordinal Scale 125

FIGURE 5.1: Level and Number of Questionnaires' Respondents 145

FIGURE 7.1: Model Fitting and Selection Methodology 176

FIGURE 8.1: Management Checklist For Calculating A Prediction 201

CHAPTER (1)- INTRODUCTION

1.0. INTRODUCTION

There are many environmental and project factors that affect the performance of the construction firm and which, one could argue, fall outside the immediate control of the firm's management. However, organizational characteristics that fall under the control of management and which represent how the construction firm organizes itself in response to its environmental challenges, is most crucial in determining consistency of performance from project to project and ultimately survival.

The environment of the 1970s in Saudi Arabia and the early 1980s was characterised by high stable growth rates in construction output. This rapid growth stemmed from the level of public investment in infrastructure projects and house building. Construction firms used whatever experience they had to identify markets to which they were most suited. Market specialization occurred, not as any pre-meditated strategy, but rather through the firm's experience to identify projects which were successful for the firm. Organizational effectiveness was dictated by internal

efficiency rather than the external environment because of the certainty that markets would not change dramatically. Little need for reference to the external environment. Most firms focused on cost as a prime indicator of effectiveness. Starting in the mid 1980s demands plummeted to a low level that was not anticipated- as the price of oil barrel sold for almost $ 40 US was selling for $ 9. In these conditions, construction firms struggled to cope with the new uncertainties and low demands. Many did not survive the acute drop in demand, while some changed and developed market strategies that were detrimental to their continued survival. Firms could not focus on costs alone any more. They had to compete within the context of a broad market base. So flexibility was in and focus was out. Decisions to vertically integrate in the 1970s were reversed and firms divested themselves from parts considered outside their core activity. The strategy of steady internal expansion was no longer an option. Many firms developed a wait- and- see- attitude.

In the first half of this decade, the Saudi construction industry witnessed a volatile market demand (acute drop in demand during 1990 and 1991, a recovery and a steady increase until 1994 then an abrupt decline in the last two years), ever increasing clients' demands for top quality of constructed product, increasing complexity of building projects, the move away from traditional forms of building contracts, lack of skilled labor, increasing international competition on the home front by overseas firms, and the advances in new technologies. Only those firms that pursue and maintain higher levels of organizational effectiveness will be able to address these challenges in the future and will be able to grow, and maintain effective performance to ensure continued survival well into the future.

The level of organizational effectiveness of the construction firm is mainly determined

The level of organizational effectiveness of the construction firm is mainly determined by organizational structure, strategy, and cultural factors. These factors influence the adaptation to the environment of the construction industry. In terms of organizational structure, a large percentage of construction firms are of the owner-manager type, highly hierarchical and functional in nature, and follow command and control type of structures. Coordination and control is based on a hierarchical sequence that supervises performance throughout the structure. However, some firms, in an effort to increase their organizational effectiveness, employ a matrix form of structure to accommodate the handling of multiple construction projects simultaneously. Communication in construction firms is frequent and informal and depends on the culture that exists in the firm, bureaucracy is not well established due to the small size of the average firm. To render their service successfully in project organizations, construction firms adopt structures that can be adjusted to suit the nature of their contractual relationship in construction projects with other construction firms. Contractual relationships influence the organizational effectiveness of construction firms when forming a project organization (i.e. general contracting, sub-contracting, joint-venturing, partnering, alliances, and consortiums). These relationships are dynamic and could last the whole project or part of it. These relationships result as a consequence of how the different types of firms in the industry organize to procure services and deliver the constructed product.

Construction firms structure, establish cultures, and strategize themselves to play a part in a complex process that involves a variety of steps and participants. This process has an enormous influence on how the construction firm organizes to deliver performance especially in today's

environment where complex systems are being incorporated more and more into the construction process and construction risks are escalating to a higher level every day. Poor organizational effectiveness lead construction firms, unknowingly, to build inefficiency into their construction projects. These factors make construction firms face increasing uncertainty and ambiguity in their environment. To overcome these situations, the construction firm must control its risks by improving its organizational effectiveness. A fundamental task of control and improvement is measurement. This is advocated by most recently emerging management strategies such as Total Quality Management (TQM) , Rengineering, Partnering, and ISO 9000 principles.

Therefore, it is clearly becoming essential for construction firms to develop valid methods of assessing and predicting their level of organizational effectiveness. Utilizing a valid assessment method will enable construction firms to maintain their effectiveness and, hence, achieve projects' performance consistency.

1.1. THE RESEARCH PROBLEM

Organizational characteristics drive the internal and external interactions of the construction firm and are primary determinants of its performance. One of the prime reasons that a firm is able to maintain and improve its performance is its ability to measure, and adjust its organizational effectiveness, to suit its environment. However, in their quest for simplicity of use, management of most construction firms use only projects' outcome indicators as a measure for their organizational effectiveness. Projects' outcome indicators such as the level

of achievement of specific goals that relate to projects' costs and duration and/or the achievement of certain levels of profit.

These indicators by themselves do not capture all the salient attributes of organizational effectiveness and only serve as crude predictors of the level of organizational effectiveness. Furthermore, in certain instances these indications are inaccurate and misleading. Just being within budget does not mean that the construction firm was effectively organized or determine whether it succeeds or fails.

The main purpose of this research is to develop a valid quantitative assessment methodology, that is based on appropriate theoretical and organizational analysis basis and that can be used to predict the level of organizational effectiveness in the construction firm in a simple and valid acceptable manner.

1.2. RESEARCH OBJECTIVES

Improvement of organizational effectiveness is not a cure-all sold to an organization or a firm to solve its many ills by supplying a magic pill. Improvement in effectiveness must be seen as an effort designed to assist the firm in planning to change for the better. Knox (1992) discussed major goals for objectives and motives for any pursuits of organizational effectiveness assessment activities. These fall in line with the objectives of this research in providing a valid assessment methodology and they are:

1. To ultimately aid in improving performance and productivity of construction firms and maintaining their consistency from project to project.

2. To initiate more participative management techniques by increasing management sensitivity to factors underlying the organizational attributes that influence effectiveness of workers and various groups to do the best work that they can for the firm.
3. To improve quality of feedback information concerning the important organizational attributes that would help management in troubleshooting and adjusting the important organizational attributes to achieve higher levels of effectiveness.

The achievement of these main objectives will lead to improved level of organizational effectiveness. To help in the achievement of these objectives, two strategies are considered while developing the proposed assessment;

1. That the assessment must be based on a simple quantitative model or models for prediction of organizational effectiveness. The model must be based on valid theoretical and organizational analysis basis in the context of the construction firm.
2. That the assessment must provide a prediction that is organizational process (organizational attributes) focused rather than construction product oriented (project-dependent approach).

Given the negative management attitudes towards using complex assessment schemes, developing a simple model will encourage its use and the regular assessment of effectiveness. Developing a model that focuses on the organizational attributes of the firm would make inroads into areas of improving the firm where, traditionally, suggestions to improve or increase effectiveness have been limited to general statements such as reduce costs, improve productivity, etc. By exposing potential sources of ineffectiveness with respect to the organizational attributes considered in the study, the proposed methodology will help the management of the construction firm to evaluate their organization in a better fashion and make appropriate plans and strategy.

1.3. RESEARCH METHODOLOGY

The methodology starts with a comprehensive research review of the current literature that includes the various theoretical perspective of organizational effectiveness; definitions, criteria of measurement, approaches, and models used to understand and study organizational effectiveness; issues relating to developing assessment of effectiveness in light of the available approaches; and review of existing methodologies. The extensive review leads to the identification of a suitable theoretical basis for the development of the methodology. The competing values approach and configurational perspective in organizational analysis are synthesized to formulate a basis on which to develop the desired prediction model. The competing values approach defines four ideal configurations, each with different effectiveness criteria that can be used to rate the effectiveness of the firm depending how close the firm's

characteristics resemble those of the configuration that it attempts to pursue in its quest for effectiveness.

Effectiveness criteria is grouped in four general categories: structural context; flexibility, rules and regulations; person-oriented processes; and strategy means and ends. These categories are used to delineate fourteen variables that are hypothesized to predict organizational effectiveness of the construction firm. These include six variables in the category of structural context: level of subcontracting used by the firm, level of multiple projects handling ability, level of integration in services offered by the firm, level of coordination, level of information flow, and level of using contractual approaches such as joint-venturing, partnering, and alliances in project delivery. Four variables in the category of flexibility, rules and regulations that include: organizational attitude toward change; level of using rules and regulations; level of adherence to rules and regulations by management and workers, and level of organizational processes' control. Two variables are included in the third category of persons-oriented processes of the firm: strength of organizational culture, and level of workers' participation in decision making. Finally, in the fourth category of organizational strategy means and ends, two variables are included: level of planning by the firm and level of goal setting importance.

In order to develop the assessment method, the relationship (model) that relates specific levels of the identified effectiveness criteria and organizational effectiveness must be empirically determined. Therefore, a number of steps are performed. First, all of the hypothesized variables are to be operationalized and scales for their measurement constructed

and tested for reliability of use. Second, a referent measure for organizational effectiveness must be constructed to be used in the analysis and model building. Third, cross-sectional survey of a homogenous group of construction firms will be carried out to collect necessary data. Due to the fact that construction firms pursue different levels of effectiveness criteria (variables) during the different stages in their life cycle, a study of effectiveness based on a snap shot (cross-sectional study) survey of construction firms can only considers a homogenous group of firms operating at approximately the same stage of life cycle in order to generalize its findings. In order to collect the cross-sectional data needed for model building and testing, data collection instruments in the form of self-administered questionnaires will be designed using the various constructed measurement scales that will be constructed. Fourth, a field survey of targeted construction firms must be planned and undertaken. In the survey, the constructed questionnaires will be used to collect relevant data from both management and workers' levels in the construction firm. Fifth, the collected data will be used in the analysis, development, testing, and validation of a multivariate prediction model. The model is based on linear modeling techniques of multiple regression using the various regression procedures to calculate a model which includes the most significant variables that are relatively easy to measure. Statistical data analysis and development of the multivariate regression model is handled through the use of a commercially available statistical analysis computer package called Statistical Analysis Systems (SAS). The package offers various regression procedures that will be used to fit and check the utility of developed model. Finally, the research will offer conclusions and recommendations relating to the developed model, its validity, and suitability

for use as a practical tool by the construction firm to assess its level of organizational effectiveness.

1.4. SCOPE OF RESEARCH

The research considers three levels in the structural hierarchy of the construction firm: the strategic level, the organizational level, and the production level. In this research, the effectiveness of the construction firm at the organizational level is targeted for analysis. There are many factors that affect the overall effectiveness of the construction firm. These include project specific factors and organizational factors. This research will concern itself only with the organizational factors that influence the performance of the construction firm. In addition, the research will target only those firms that are operating mainly in the Institutional, Commercial, and Industrial (ICI) sectors of the construction industry. No particular type of firm is selected. The term "firm" in this research is applicable to all types of construction companies. Hence, a firm could be a general contractor (GC), or any type of subcontractors. It could be a very large firm that performs all A/E and construction work or it could be a firm that performs only the mechanical and electrical subcontracts. No limitation is put on size of work contract that are typically done by the firm or the size of the firm in this study or its volume of business. Finally and because of accessibility issues that relate to the nature of the group of firms that will be targeted by this study, data is collected from firms operating in the ICI sectors of the Saudi Arabian construction industry.

1.5. OUTLINE

The thesis is divided into an introduction, four major parts, and the appendices. The four major parts are arranged as follows:

Part1: Identification and Development of A Theoretical basis

Part2: Determination, Operationalization, and Measurement of Variables

Part3: Experimentation, Development, and Testing of Quantitative Models

Part4: Conclusions and Recommendations

The sequence in which the chapters are recommended to be read is given by Figure 1.1. The first part of the thesis that deals with identification and development of a theoretical basis for the proposed assessment is covered in Chapter (2) and the first section of Chapter (3). In Chapter (2), the following items are discussed and outlined in detail: the various theoretical perspectives on organizational effectiveness and their advantages and disadvantages; various criteria of effectiveness and issues of using multiple and conflicting criteria in the analysis and measurement of organizational effectiveness; the various organizational analysis methods and approaches and models used in the study of organizational effectiveness; issues in developing assessment methodologies; a detailed review of an existing methodology; and finally the chapter culminates with identification of an approach. Based on the review presented in Chapter (2), the theoretical basis and the various steps for the proposed methodology is discussed in the first section of Chapter (3).

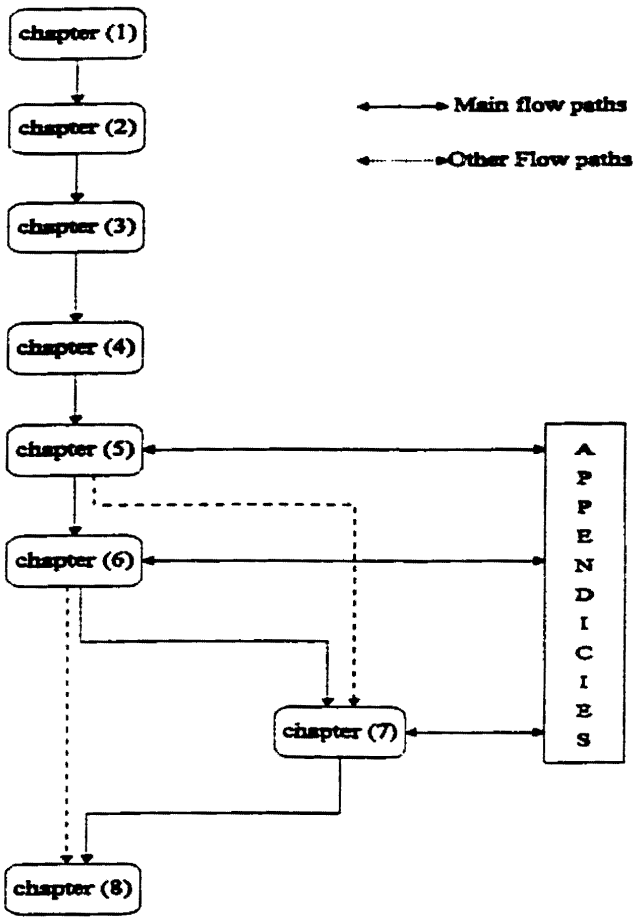


Figure 1.1: Flowchart of the Recommended Sequence for Reading Thesis

The second part of the thesis that deals with determination, operationalization, and measurement of variables, is covered in the reminder of Chapter (3) and all of Chapter (4) and the first section of Chapter (5). The remainder of Chapter (3) is devoted to the presentation of the first step of the proposed methodology. This step mainly deals with identifying the various effectiveness variables that are hypothesized to predict organizational effectiveness of the construction firm according to the selected approach. Chapter (4) covers operationalization and measurements for the independent variables and the dependent variable of the study. First,

a referent measure for organizational effectiveness (dependent variable) to be used in the analysis, is constructed. Second, the independent variables are operationalized The first section of Chapter (5) covers the design and construction of the questionnaires and a discussion of the various steps of a field survey that is carried out to collect necessary data from a number of construction firms.

The third part of the thesis that deals with experimentation, data analysis, development, and testing of the prediction model, is covered in the remainder of Chapter (5), Chapter (6) and Chapter (7). In the second part of Chapter (5), the planning and selection of field survey is discussed along with procedures for the administration of questionnaires. Chapter (6) covers the discussion of methodology used in testing the reliability of measurement scales and data analysis. In Chapter (7) model selection, fitting, and validation, using multiple regression techniques, is detailed.

Finally, Chapter (8) gives the conclusions made from the findings of the study and discusses implications and recommendations for further research, to generalize the use of the developed methodology to include other types of construction firms.

CHAPTER (2)-LITERATURE REVIEW

2.0 INTRODUCTION

The first part of this chapter discusses the various perspectives of organizational effectiveness provided by the major theories of organization. The second part gives a comprehensive review of organizational effectiveness, criteria used for its measurement, approaches and models used by researchers to understand and examine effectiveness. The third part examines currently used and recently developed methodologies to assess organizational effectiveness of the construction firm.

2.1. THEORY AND EFFECTIVENESS

The study of organizational effectiveness represents an important part of organization theory. There are various views of organizations advanced by different theorists that compete for the attention of researchers, each has its strength and weakness. In general, the theoretical evolution of organizational effectiveness parallels that of the evolution of thought about organizations.

Several reviews of the history of general organizational theories serve as a backdrop for a discussion of the evolution of theory regarding organizational effectiveness. Perrow (1986), Scott (1992), Hall (1987), and Whetten and Cameron (1994) each discussed the "progression of thought in the field of organizational effectiveness. Perrow grounded his analysis in Weber's bureaucratic model-arguing that subsequent views of organizations were largely attempts to eliminate perceived weaknesses, or to accentuate the strengths, of this perspective. Scott organized his review around three perspectives of the organization: rational systems, natural systems, and open systems. He argued that the field has basically evolved through a series of stages, in which each of these systems' view dominated contemporary organizational theory. Hall organized his overview using a different set of organizational categories: structures, processes, and outcomes. Whetten's and Cameron's review of the history of theoretical thought on organizational effectiveness was organized along a time continuum of the different periods when the various organizational theories were emerging. This review of the history of theoretical thought, regarding organizational effectiveness, draws on these.

2.1.1 Classical Perspective

The earliest models of organizational effectiveness emphasized models of organization that focus attention on salient or distinctive attributes. Some theorists, also known as the classical school, developed universal principles, or models, that would apply in all situations and treated organizations as closed systems. Weber's (1947) characterization of bureaucracies

is the most well known example. Weber's "rational-legal" form of organization was characterized by bureaucratic authority in the organization that control the organization through hierarchically structured positions in order to achieve effectiveness. Organizational effectiveness was related to decisions based on rules and regulations, equal treatment of all workers, separation of the position from its occupant, staffing and promotions based on skills and expertise, specific work standards, and documented work procedures, including formaliztion of procedures, specialization of work, and centralization of decision making (Hall, 1963; Price, 1968). Early applications of the bureaucratic model to the topic of effectiveness argued that efficiency was the appropriate measure of organizational performance. Given this performance criteria, the closer an organization was modeled after the typical bureaucratic characteristics (e.g., specialization, formalization, centralization), the more effective (i.e., efficient) it was.

One of the principal drawbacks of classical theorists is that they tend to treat all organizations as machine-like closed systems. Therefore organizational control and, hence, organizational effectiveness can be achieved by division of work and establishing lines of authority and discipline. Influence of the external environment is not recognized. As a result, subsequent models of organizations began to challenge these assumptions.

2.1.2. Human School Perspective

The classical view of organization was later challenged by some theorists who advanced the social nature of organizations that were, consequently, referred to as the

'human-relation' school. These theorists view organizations as made up of both tasks and people and represent a human counterpoint to the classical machine view of the organization. An example of this is the work by Barnard (1938) which challenged the classical theories' view that authority flowed from top down. Barnard proposed that management's role in achieving effectiveness was to facilitate communication and to stimulate subordinates to a high level of effort. An example of the human-relation school is participative decision making principles, which emerged from McGregor's (1960) Theory X- Theory Y and which promotes the creation of responsible jobs for workers and developing good group or team relations.

An effective organization from this perspective, therefore, needs to satisfy the needs of its workers by providing adequate inducements to sustain their required work contribution. It must also insure that the workers' actions are controlled by goals and decision making processes

2.1.3. Open-Systems Perspective

The problems associated with the closed system perspective of the organization led Ashby (1956) to view organizations as open systems that continuously exchange resources with their environments, importing various inputs that are then transformed with the aid of the organization subsystems and processes, into goods or services that are exported to the environment. Ashby formulated what he called the "law of requisite variety". It proposes that, in order for the system i.e., the organization or any of its subsystems to be effective, variety

generated by the system or 'regulatory variety' as described by Beer (1974), has to equal or correspond to the variety generated in the internal and external environment of the system.

Katz and Kahn (1966) described the advantages of an open-system perspective in examining the relations of an organization with its environment, in order to be effective and survive. The open system perspective provides a general model of the organization that can guide the study of organizational effectiveness (Daft, 1983; Katz and Kahn, 1978; Nadler and Tushman, 1988). The main elements in the model are inputs, throughputs, and outputs. Inputs include all resources obtained from the external environments and used in the creation of outputs. Throughputs or transformations are activities that are performed on the inputs by social and technological components or subparts that include people and methods of production. Outputs include what the organization transfers back to the external environment. The environments includes all the external organizations and conditions that are directly related to an organization's main operation and its technologies. The systems perspective of effectiveness implies that if any one of the organization's subparts performs poorly, it will negatively affect the performance of the whole system. A systems view of organizations looks at factors such as relations with the environment. This is to ensure continued receipt of inputs and favorable acceptance of outputs, and the flexibility to respond to environmental changes.

Nadler *et al* (1992) advocated an emerging management tool which they called *Organizational Architecture.* They proposed an organizational model that underlines the importance of achieving two types of *fits* in order for the organization to achieve organizational effectiveness; an internal and an external fit. An adapted model for the

construction firm is shown in Figure 2.1. According to the model, effectiveness is driven by three *fits* in the organization internal and external environment; the *internal fit* or congruence among the four components of work, people, informal structure and process, and formal organizational arrangements; the *strategic or internal-external fit* between strategy and work where organizations have to find the right combination of people, formal organization, and informal organization that meets the needs of the strategy; and a *strategy-organization or external fit* in order for the organization's business strategy to meet the demands of the external environment and achieve its purpose.

They concluded that there are very few universally good approaches to organizational architecture. Different ways of organizing will be more or less effective for different contexts, for different technologies and for different people.

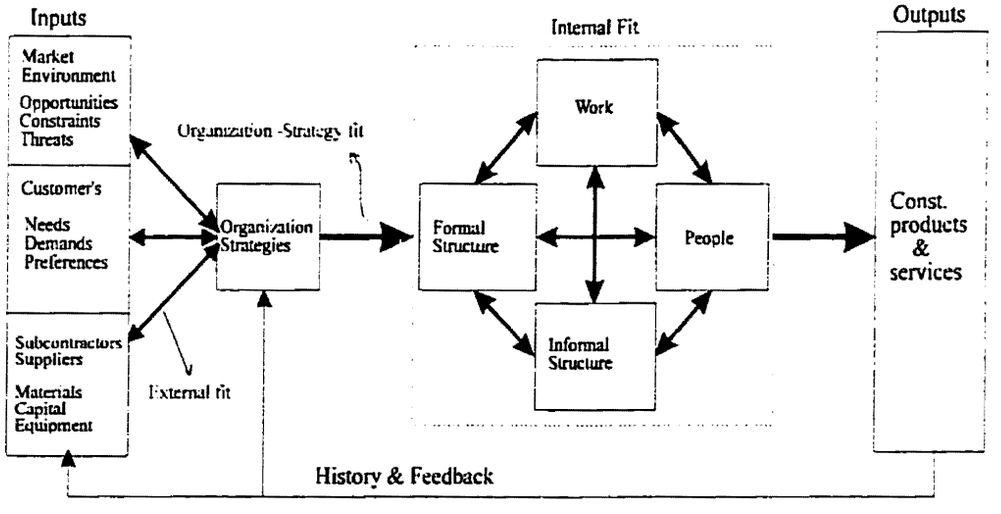


Figure 2.1: The Congruence Model[1]

[1] adapted from Nadler *et al* (1992) *Organizational Architecture*, Jossey-Bass Publishers, pp. 54

2.1.4. Contingency Theory Perspective

This perspective argues that effectiveness is not a function of the extent to which an organization reflected the qualities of a specific ideal profile, such as Weber's bureaucracy, but, instead, it depends on the match between an organization's profile and environmental conditions. The challenge for contingency theorists was to identify the relevant environmental and organizational dimensions and to build theories of 'fit' between them.

Contingency theory started with Simon (1958) who argued that classical theories were just proverbs that contradicted themselves and that in order for organizations to achieve effectiveness, they should study the conditions, or the environment, under which the administrative principles proposed by the theories were applicable. Contingency perspective is embedded in open systems theory because it proposes that the effective design of organizational structural parameters (such as job specialization, unit size, centralization, etc.) are contingent upon, or influenced by, the various characteristics of its environment. These include complexity and stability; the age and size of the organization; the technical system (technology) used for production; and its power system, for example, who controls the organization.

Many contingency theorists have investigated environment-structure relationships and have identified many types of environments and effective organizational structures that best suit these types. Burns and Stalker (1961) defined organic and mechanistic types of organization and argued that mechanistic organizations (those that resemble Weber's bureaucracy) were best suited for highly stable and relatively simple environments. In contrast,

organic organizations (those high on Bernard's characterization of the organization) were better suited for rapidly changing, highly complex environments. Woodward (1965) discussed the importance of technology in determining effective organizational structures. Lawrence and Lorsch (1969) and Pugh *et al* (1969) studied congruence between organizational and environmental dimensions.

The critical difference between bureaucracy and contingency theory thinking is that the former assumed that "one size fits all". That is, effective organizations were distinguished by their fit with a universal set of characteristics or one ideal type. In contrast, contingency theorists argued that effective organizations matched their profiles with prevailing environmental conditions

2.1.5. Institutional -Political Perspective

During the late 1970s, and early 1980s, thinking on organizational effectiveness entered another perspective. This perspective draws attention to the various stakeholders, or constituencies, in the internal and external environment around the organization (Pfeffer and Salanick, 1978; and Connally *et al*, 1980). Stakeholders are groups, or individuals, affected by the organization performance, who seek to influence the organization to satisfy their goals. This perspective proposes that an effective organization is the one that best satisfies the demands of those constituencies in its environment from whom it requires support for its continued existence. As a result of their divergent interests and goals, constituents advocate different ways of judging effectiveness.

This perspective is very similar to the systems view of the organization because both consider interdependence, but this perspective is not concerned with all of the organization's environment. It has a different emphasis. It seeks to consider only those in the environment who can threaten the organization's immediate survival.

There are a number of theoretical and methodological difficulties related to this perspective of effectiveness. The major difficulty is concerned with whose preferences should be weighted first or most heavily in reaching a judgment of organizational effectiveness. Other issues related to this topic are discussed in more detail in the coming section that deals with approaches modeled after this perspective.

2.1.6. Configurational Perspective

Another perspective that considers organization-environment relationships is the organizational configurational theory. This theory seeks to understand effective organizational forms over the life cycle of organizations (Hannan, 1991). This is similar to the population ecology theory of organizations. Unlike other theories where the unit of analysis ranged from the individual to the organization, this theory considers populations of organizations (Evan, 1993). Population ecology theory views the principal source of organizational change to achieve effectiveness is not adaptation or strategic choice by decision makers but rather by environmental selection. New organizational forms evolve and, if they fit a niche, are selected by the environment.

Traditional contingency theory, according to Miller and Freisen (1984), found that organizations must change their internal attributes, structures, strategies, and processes, to cope with changes in the environment. They argued the case for studying configurations, or forms, of organizations to determine effective ones, rather than linking individual attributes to effectiveness, by asking the question " what form does the internal change in these attributes take in response to particular changes in the environment?" They discussed two choices that the organization has: either the organization can try to keep up with changes in its environment by changing itself in piecemeal and perhaps incremental fashion and, by doing so, maintains an environmental fit at the expense of internal consistency or configuration; or it can delay transition until absolutely necessary, thereby, maintaining internal consistency and configuration, but at the price of worsening environmental fit.

Furthermore, they argued that organizations opt for internal consistency, or stable configurations, as long as possible for reasons that include: environmental change can sometimes prove to be temporary and, therefore, it is sensible to delay reaction to it; internal changes are costly and, therefore, it will be resisted, especially when a successful integration of structural and process attributes have been achieved; and, finally, that successful organizations are never sure of the attributes that lie at the roots of their success and, thus, would avoid tampering with their tried and successful configuration. Usually, adaptation is avoided until a major threat is perceived because change must eventually come. They concluded their argument by proposing that in the face of worsening environmental fit,

organizations opt for totally new configurations, changing all their attributes drastically rather than piecemeal attributes' changes.

According to Miller and Freisen, a configuration refers to a multidimensional constellation of conceptually distinct characteristics that commonly occur together. Organizations have numerous dimensions of environments, processes, practices, beliefs, and outcomes, ideologies, groups, members, and gestalts. Configurations may be represented in typologies developed conceptually or captured in taxonomies that are derived empirically from these numerous dimensions.

Organizational approaches that are based on configurations, typically identify multiple ideal types of organization that can be pursued during the various life cycle stages of the organization to maximize organizational effectiveness. These approaches may be interpreted either as restricted to the initial ideal types posited by theory, or as allowing hybridization among these ideal types. A constraint on the set of effective organizational forms is the presence of contingency factors that determine the ideal types of organization that a real organization must resemble, to be maximally effective. When contingency factors are not identified, the organization may adopt any one of the ideal types defined by the particular theory and still remain effective. When the important contingency factors are identified, however, the form that an organization can adopt to be maximally effective may be restricted to a single ideal type. Thus, certain configurations of contextual factors may restrict the selection of structures, strategies, or both.

Miller and Freisen cited studies that uncovered effective configurations, or forms of organizations, such as: Burns and Stalker's (1961) that found "mechanistic" structures in firms dealing with stable environments and "organic" structures in firms found in dynamic environments; Lawrence's and Lorsch's (1969) that found similar structures in firms facing simple and stable environments, and firms facing complex and dynamic environments; Miles and Snow's (1978) which classified organizations into four types, the prospector, the analyzer, the defender, and the reactor, based on their strategies, structures, and managerial styles; and, finally, Mintzberg's (1979) which discussed the effective structuring of organizations into five configurations. These include: the simple structure where the force of direction that the various activities of an organization take to achieve a common goal and results in the entrepreneurial form when this force dominates an organization; the machine bureaucracy, where the force for efficiency becomes dominant and attempts to ensure a viable ratio of benefits gained to costs incurred; the professional bureaucracy, where the force of proficiency is dominant and makes organizations carry out tasks with high knowledge and skill; the divisionalized form, where the force for concentration helps concentrate efforts on serving particular markets; and the adhocracy form, that develops in response to an overriding need to innovate a new product.

The study of organizational effectiveness according to configurations, or forms, is justified in attempting to understand commonalties in organizational characteristics across organizations that make them effective. Dotty *et al* (1993) suggested that based on how close the characteristics of the organization are to that of an identified effective configuration or

hybrids of identified configurations determines how effective it is. According to Meyer *et al* (1993), organizations are driven toward configurations in order to achieve consistency in their characteristics and, rather than trying to do well on everything, effective organizations concentrate on effective configurations and try to bring their elements into line with these configurations. They added that configurational inquiry represents a holistic stance, an assertion that the parts of a social entity take their meaning from the whole and can not be understood in isolation. Rather than trying to explain how order is designed into the parts of an organization, configurational inquiry tries to explain how effectiveness emerges from the interactions of those parts as a whole.

A configurational approach, that models organizational effectiveness criteria that could be pursued by organizations, has been proposed by Quinn and Rohrbaugh (1983). The approach is called the competing values approach. It identifies ideal configurations, or types, based on dominant values of structural context, focus, and strategic means and ends. An organization can pursue the values of these ideal configurations and, depending on how close it is to these values, determine its effectiveness. This approach represents the backbone of the methodology developed in this research and will be discussed in more detail later in this chapter.

2.1.7. Paradoxical Perspective

The view that organizations are simultaneously pulled in opposite directions by the preferences of multiple constituency led Quinn and Rohrbaugh (1981) and Quinn and

Cameron (1983) to introduce the Competing Values Model of Organizational Effectiveness. This model recognized the inherently paradoxical and, sometimes, conflicting nature of organizational life. Management must not only make tradeoffs between day-to-day competing demands on the organization resources, but, more importantly, it must balance competing characteristics regarding the core identity of the organization and how it functions.

From this perspective, effective organizations are both short-term and long-term focused, flexible and rigid, centralized and decentralized, goal and resource control oriented, concerned about the need of members and the demands of the customers. This view represents the natural, logical extension of earlier perspectives on organization. It borrows from contingency theory the emphasis on matching external and internal attributes. Like the multiple constituency perspective, it allows various conflicting or paradoxical criteria for measuring effectiveness. In a sense, the paradoxical perspective can be viewed as a more complex form of its predecessors. It allows for the likelihood of organizations operating simultaneously in different environmental domains, with each domain conveying different expectations. Whereas contingency theory assumed a single domain, for the sake of matching organizational and environmental characteristics, the extension provided by this perspective allows for multiple domains requiring multiple, simultaneous, and inherently contradictory matches.

The evidence supporting the paradoxical perspective of effectiveness is summarized by Cameron (1986a)[2] :

> " It is not just the presence of mutually exclusive opposites that makes for effectiveness, but it is the creative leaps, the flexibility, and the unity made possible by them that leads to excellence. The presence of creative tension arising from paradoxical attributes helps foster organizational effectiveness"

Proponents of the paradoxical perspective use these conclusions to argue that effective organizations are not those that simply match a universalistic model, nor are they characterized by hyper-responsiveness in juggling competing constituency preferences and demands. Instead, effective organizations are characterized as hybrid forms or configurations, consisting of conflicting and uncomplimentary elements. They are both large and small, both growing and downsizing, and both tightly controlled and flexible.

2.2. DEFINITIONS AND CRITERIA OF EFFECTIVENESS

Hitt (1988) discussed the measurement of effectiveness and its importance in the creation and design of effective organizations. Steers (1975), described the measurement of effectiveness as one of the most problematic issues in the field of organization theory. Zummato (1982), also pointed out that assessment of effectiveness has proven to be one of

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[2] p. 549

the more intractable problems in study of organizations. Many researchers have offered a variety of models for examining effectiveness based on the various perspectives discussed, yet there is little consensus as to what constitutes a valid set of effectiveness criteria (Cameron, 1986b; Lewin and Minton, 1986). According to Das (1990), the definitions and, consequently the criteria and approaches employed in evaluating effectiveness, are various and, in some instances, paradoxical, as shown by the variability in the following definitions:

1. Georgopoulos (1957), referred to it " as the extent to which an organization as a social system, fulfills it's objectives without incapacitating it's means and resources and without placing a strain upon it's members"
2. Etzioni (1964), defined it as the degree to which an organization realizes its goals
3. Yuchtman and Seashore (1967), defined it as the ability of the organization, in absolute or relative terms, to exploit its environment in the acquisition of scarce and valued resources.
4. Goodman and Pennings (1977), suggested that organizations perform effectively if relevant constraints imposed by the constituency of the organization can be satisfied.
5. Hannan and Freeman (1977), defined it as the degree of congruence between organizational goals and observable outcomes
6. Price (1982), defined it as "the degree of achievement of goals and observable outcomes"

7. Miner (1988), defined effective organizations as those that receive inputs, transform them into outputs, export them to the environments, monitor the changes in the environments, and take corrective actions to ensure their survival.
8. Robbins (1990), defined organizational effectiveness as the degree to which an organization attains its short-term and long-term goals, the selection of which reflects strategic constituencies, the self interest of the evaluator, and the life stage of the organization.

Organizational effectiveness, as a construct, is conceptually very complex, and so must be its definitions. Closely related to the term effectiveness is the term efficiency. Efficiency is the amount of resources used to produce a unit of output. It refers to, and can be measured as, the ratio between an organization's resource inputs and its outputs. An organization that uses less resources to produce a unit output is deemed more efficient than one that uses a greater volume of resources for producing the same output. Some researchers use efficiency to measure effectiveness. Can an organization be effective without being efficient and vice versa? There are organizations that have inefficient systems, yet these organizations manage to achieve their goals. In the same way, it is possible for an organization to produce the wrong output efficiently. A good example is an organization which produces efficiently, but given market conditions and customer preferences, the wrong products are produced. It is possible to judge an organization as efficient when it is ineffective and vice versa. Therefore, effectiveness is distinguished from efficiency.

It is apparent that a variety of thoughts exist as to what constitutes organizational effectiveness. This is reflected by the number of variables that are being used as indicators of effectiveness. Campbell *et al* (1977) and Steers (1975), found many variables that can be categorized into four types. As shown in Table 2.1, these include: economic indicators such as profit, growth in sales or business volume; technical indicators such as productivity, quality of products and services; organizational indicators such as organizational flexibility and adaptation to changing environment, organizational control quality, stability; and finally, social indicators such as turnover rate, absenteeism rate, satisfaction levels, degree of conflicts between units in the organization, and workers' involvement, morale, and participation. No doubt, these various criteria are due to the diversity of organizations. All of these criteria cannot be relevant to every organization, and certainly some must be more important than others.

It is clear that all effectiveness criteria or domains are derived from different images of preferred organizational states and reflect divergent assumptions about the conditions that promotes these states. Harrison (1994) grouped and classified these domains or criteria used to measure effectiveness into three types. These are: output-goals, internal systems state, and adaptation and resource position (Table 2.2).

Table 2.1: Categories Of Indicators Of Effectiveness

Category	Examples of indicators
Economic	cost, profit, growth, efficiency, productivity
Technical	quality of product (number of defects), quality of service, number of accidents
Organizational	flexibility, adaptability, readiness, quality of control, stability, managerial task skills, managerial interpersonal skills, goal consensus communication
Social	satisfaction, conflict, cohesion, morale, motivation, involvement, participation, turnover, absenteeism, evaluation by external entities, value of human resources

The output-goal criteria as will be explained in the next section, correspond to many of the specific targets toward which the organization strives. They are sometimes expressed in terms of the success or failure to achieve a particular end, such as: the completion of a huge project contract within costs and on schedule; winning a certain percent of all bids entered; achieving 12 percent markup in all projects completed. Effectiveness criteria, dealing with output goals, are most useful when goals are defined in terms of clear, measurable objectives and members of the organization agree on the meaning and importance of these goals. Many of the criteria in the second type in Table 2.2 refer to organizational states and processes that can contribute to the achievement of output goals. Adaptiveness and resource-position criteria are especially relevant for organizations facing rapidly changing environments.

Table 2.2: Effectiveness Criteria

Group	Type	Criteria
Output Goals	Goal-attainment	success/failure
	Quantity of outputs	productivity (units produced); Profits
	Quality of outputs	# of rejects, complaints, customer satisfactions
Internal Systems State	Production/ Services Costs	Efficiency (ratio of outputs to costs), waste
	Human outcomes	worker satisfaction, motivation, work effort, safety
	Consensus/Conflict	agreement on goals, cohesion, cooperation within and among units, disputes
	Work and information flow	smooth flow of work processes & information
	Interperson relations/Culture	level of trust, openness of communication
	Participation	workers' participation in decisions affecting them
	Fit	compatibility of requirements with systems parts
Adaptation & Resource Position	Resource-quantity	size of organization (workers, cash, assets), resource flows (investments)
	Resource-quality	human capital (workers' experience and training)
	Legitimacy	compliance with standards of regulatory agencies
	Competitive/ Strategic Position	market share, size and volume of business rank among competitors, reputation in industry
	Impact on environment	ability to shape behavior of customers, suppliers and competitors
	Adaptiveness	flexibility
	innovativeness	quality of new products, services, procedures, incorporating new technologies & mgmt practices
	Fit	compatibility of internal system elements with reqmts and constraints of external environments

2.2.1. Conflicts Among Effectiveness Criteria

A close inspection of Table 2.1. and Table 2.2 reveals many contradictions, paradoxes, and tensions among the criteria listed. For example, growth is usually taken as an indicator of an organization's success in obtaining needed resources. However, growth can also lead to less participation in decision-making, reduced efficiency, and less ability to adjust to environmental changes (Hall, 1987). Management can hold conflicting priorities and

evaluative criteria without being aware of the conflicts, because they do not evoke the criteria simultaneously or spell out their operational implications.

An additional problem is that few effectiveness criteria equally suit the interests and priorities of all organizational members, units, and the various levels inside the organization. For example: the owners of an organization probably assess effectiveness in terms of short-term profits; management looks for compliance and conformity to regulations, innovation and growth in the long run; workers press for better wages and working conditions. Hence, the effectiveness criteria that reflect the dominant group in the organization will probably conflict with that of workers.

Given that the various effectiveness criteria are not mutually compatible and applicable, how should one choose appropriate criteria in order to incorporate them into an assessment methodology? Many theorists discuss ways to utilize multiple conflicting criteria, Campbell *et al* (1977), Connolly *et al* (1980), Goodman and Pennings (1980), and Quinn and Rohorbaugh (1983), and Cameron (1984, 1986a). According to the competing values approach proposed by Quinn and Rohorbaugh, organizations can flourish while pursuing conflicting or paradoxical criteria of effectiveness. Instead of defining consensual criteria , organizations can adapt multiple criteria that define effectiveness in terms of the organization's ability to satisfy its diverse elements and constituents. According to this perspective, organizations must accept a certain a mount of trade-offs in treating the paradox in criteria. They also must attempt to balance these criteria against each other without going to one extreme or another which, in the long run tends to create imbalance.

2.3. APPROACHES AND MODELS OF EFFECTIVENESS

A review of general approaches, used by researchers in understanding organizational effectiveness would help in understanding the advantages and disadvantages associated with their use. Hannan and Freeman (1977), Zummato (1982), Cameron and Whetten (1983), and Miner (1988), outlined, in a comprehensive manner, the models and approaches that are used to understand organizational effectiveness. As seen in Table 2.3, these general approaches can be classified along four types of approaches, used to understand the concept of organizational effectiveness.

Table 2.3: Types of General Approaches to Effectiveness

Type	Example
Goal-attainment approaches	Goal model
Satisfaction of constituents	Multiple Constituency Approach
Systems approaches	Resource Model, Internal Process Model, Strategic Adaptation Model, Open-system
Qualities of Organization Approaches	Competing Values Approach

2.3.1. Goal-Attainment Approaches

An organization is, by definition, created deliberately to achieve one or more specified goals (Perrow, 1961). This is the main reason why goal is the most widely used criterion of effectiveness. Common goal-attainment criteria include profit maximization, beating out the

competition, etc. Common among these goals is that they consider ends to which the organization was created to achieve. Does the organization achieve its various goals in terms of quality and quantity of outcomes? The degree, or level of attainment, of a certain output goal or goals is an indicator of organizational effectiveness. The approaches assume that organizations are rational, goal-seeking entities and successful goal accomplishment becomes an appropriate measure of effectiveness. However, the use of goals implies that other assumptions must also be valid if goal accomplishment is to be a viable measure. These include: the assumptions that the organization must have a few manageable goals that are identified and defined well; that there is an agreement on these goals and that progress toward these goals must be measurable. Only if these conditions hold, will goal accomplishment be deemed an appropriate criterion. While this is true of several goals (sales, production volume), the assumptions do not hold for other goals that may not be objectively measurable.

A long tradition in organization research defines effectiveness in terms of outputs and goal accomplishment (e.g., Simon, 1964; Price, 1968; and Campbell, 1977). But an almost equally long tradition criticizes the use of the goal model. Most recently, and perhaps most importantly, on the grounds that because organizations are complex entities, the specification of their goals are problematic. Yuchtman and Seashore (1977) listed methodological and theoretical reasons why the goal model should not be used in developing assessment of effectiveness. First, they argued, the assessment of organizational effectiveness, in terms of goal-attainment should be rejected because goals are ideal states that do not offer the possibility of realistic assessment. Second, they pointed out the difficulty in identifying the real

goals of the organization. Organizations may have many goals; these goals can be inconsistent, contradictory, or incoherent. It is often unclear at what level, or with respect to what units, the attainment of goals should be measured The multiplicity of goals is fairly well recognized by the researchers in the field, who define effectiveness as the "balanced attainment of many goals" (Kirchoff, 1977). Some researchers, such as Goodman and Pennings (1977), and Campbell *et al* (1977), argued for measurement of effectiveness by getting the organization to specify (a) complete catalog of concrete and observable organizational objectives; (b) the conditions under which the organization should be able to achieve them; (c) the degree to which each objective should be satisfied. None, though, described or explained how goals are to be identified, nor they treat the complex issues that arise when there is more than a single ultimate criterion or goal.

It is clear that there are a number of problems when this approach is operationalized for use in developing an assessment of effectiveness. First is the question of what type of goals? Official or operative goals? Dependence on official goals does not always reflect the organization's actual goals. Official goals are formally defined outcomes that the organization states it is trying to achieve, and describe the organization's mission, what it should be doing, the reason it exists, and the values that underlie its existence. Official goals sound good but are vague and general in nature and not very specific or measurable, such as "to produce quality products at competitive prices". These goals can not be used as a criteria, given the likelihood that official and actual goals are different. Operative goals are intended to be the means through which official goals are accomplished. They describe desired operational

activities and are often concerned with the short-term. Operational goals typically pertain to the primary tasks an organization must perform . Thus, different operational goals may exist at a variety of levels in the organization and may be differentially pursued by various parts of the organization.

Another issue in applying the approach is, because goals can be short and long term and are some times incompatible with each other and change over time, which ones should be used? Organizations have multiple goals that also create difficulties in operationalization of measurement because, multiple goals sometimes compete with each other. The achievement of "high product quality" and "low costs" are directly incompatible. Multiple goals must be prioritized: but how to allocate a relative importance to goals that may be incompatible and represent different interests? When short-term effectiveness measures set the standards or goals for an organization, the tendency can arise to favor the short-term over the long-term goals (Kanter and Brinkerhoff, 1981). According to Weick (1977), short-term efficiency and production-oriented measures tend to produce ritualistic behavior by the organization that is geared toward quantity rather than quality, and that behaviors, such as an organization's ability to adapt and be flexible in the long-term, may be lost.

Another problem with this approach is that it also assumes a consensus of goals inside the organization. Given that there are multiple goals and diverse interests within the organization, consensus may not be possible, unless goals are stated in such vague terms as to allow the various groups to interpret them favorably. This, according to Robbins (1990), may

explain why most official goals in large organizations are traditionally broad and act to placate the different groups within the organization.

Another major problem with the goal attainment approach is one of substance, rather than measurement. Some researchers have argued that outcome measures of effectiveness are never pure indicators of performance quality because of a number of other factors enter in, most notably: the characteristics of the materials or objects on which the organization performs, the available technology (Mahoney and Frost, 1974); and a variety of environmental factors beyond the organization's control. These factors, affecting goal achievement, led Campbell *et al* (1977) to recommend that measurements of goal attainment should be confined to incidents of accomplishment directly under the organization's control.

Another limitation of the goal attainment approaches is the problem of interpreting the uses of goals in organizations. In some cases, goals are treated as window dressing, designed not to orient the behavior of organizational members, but rather, to provide only symbolic recognition to some constituency and in other cases, goals are seen not as actual targets to be aimed for, but rather, internal messages within the organization of what behavior is desired (Galbraith, 1973; and Hannan and Freeman, 1977). Weick (1979), noted that goals in organizations frequently are inventions to suit activity already performed. They are, or become, the organization's means of forming a rationale for past activity.

Finally, and most importantly, whatever the goal arrived at, an understanding of effectiveness must include not only the achievement of goals, but also an understanding of the factors that are associated with how these goals are achieved. According to Gaertner and

Ramnarayan (1983), in the absence of such an understanding, any goal achievement measure of effectiveness is simple but barren; clear in its measurement, but inadequate in utility. Unless the measurement reaches back into the processes, structures, and intentions that are associated with the goal achievement, little can be done to improve effectiveness.

As a result of these limitations, the theoretical focus has shifted to approaches that focus on organizational processes and structures which, either in the general case or in specific cases, are associated with how the organizational goals are achieved.

2.3.2. Systems Approaches

Systems Approaches represent the second type of approaches. Models that fall into this category are based on the systems view of the organization. They emphasize the organization as a system and attempt to assess the functioning of the system in terms of its inputs, transformation, and outputs. Examples here include the resource model, the internal process model, strategic adaptation model, and the open systems model.

2.3.2.1 Resource Model

The resource model views effectiveness as the ability of the organization, as a system, to exploit its environments. In other words an organization is most effective when it maximizes its position by optimizing its resource procurement. This approach has its limitations. It is known, that in certain instances, resource starved organizations outperform more resource-affluent ones.

2.3.2.2 Internal Process Model

In the internal process model, effectiveness is reflected in the efficiency of the processes inside the organizational systems. Theoretically, looking at the internal processes of the system seems to be more revealing of the effectiveness of the system than any other approach especially when the organization has little control over its environments. However, the approach has a narrow perspective of the functioning of the organization. It has no focus on the external interactions of the organization.

2.3.2.3 Strategic Adaptation Model

Strategic adaptation model suggests that effective organizations monitor their external environment constantly, receive feed back regularly, and take corrective actions to achieve their goals in the short term and ensure survival in the long term. This model recognizes the open-system nature of organizations, and their susceptibility to external forces. A limitation of this approach is that it pays little attention to what goes on inside the organization.

2.3.2.4 Open System Model

The open system approach stresses the view that the organization is a structured set of interconnected parts that communicate and interact together, and with the external environment, to accomplish its goals (Nadler *et al*, 1992). It considers the organization effective if it is successfully functioning as an open system, coping with problems that emanate from within the organization itself and from the external environment: that part of the world

outside that has some relevance for the organization. Effectiveness is indicated by the organization's ability to meet internal and external challenges.

Robbins (1990), discussed two shortcomings of using systems approaches in the study of effectiveness. First, he alluded to the fact that measuring systems variables such as, adaptability to environmental changes or efficiency, may not be possible because one has to be able to develop valid and reliable measures that tap the quantity and intensity of these variables. Whatever measures that are in use, therefore, may be constantly open to question. In discussion of the second shortcoming, he used the argument that it's whether you win or you lose that counts, not how you play the game. If ends are achieved, are means important? The objective is to win, not to get out there and look good losing. The problems with systems approach, he added, emanate from its focus on the means necessary to achieve effectiveness. The problems in assessment of effectiveness arise because there are various interrelated means that are difficult to quantify in some cases, and which could be organized in more than one way in order to achieve effectiveness. This makes systems based assessment organization-specific, rather than generalized, an approach that could be applied to more than one organization.

Miner (1988), argued that systems approach may be distinguished from the goals approach, in that its emphasis on system maintenance and survival remain unchanged from one organization to another and from time to time within an organization. Goals, in contrast he argued, may differ and change. He added that the systems approach may be applied at any

time, while it is unrealistic to evaluate goals achievement until the organization has had time to achieve them.

2.3.3. Multiple Constituency Approaches

The multiple constituency approaches have recently been proposed as a viable alternative to the goal and systems approaches for studying and measuring organizational effectiveness (Whetten, 1978; Connolly *et al*, 1980; Zammuto, 1982, 1984; Tusi, 1990). The multiple constituency approaches are based on the political view of the organization. They integrate the criterion of effectiveness for each group or constituency inside or outside the organization that has a stake in the organization's performance. A stakeholder is any group or individual who can affect, or is affected by, the organization's objectives. Stakeholders could include any number of the groups shown in Figure 2.2. These are the owners of the organization, government and regulating agencies, local community organizations, customers, competitors, workers, special interest groups, environmentalists, suppliers, and the media.

Connolly *et al* (1980)[3] argued that using this type of an approach in effectiveness assessment requires that organizations be viewed as

> " intersections of particular influence loops, each embracing a constituency biased toward assessment of the organization's activities in terms of its own exchange within the loop"

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[3] pp. 215

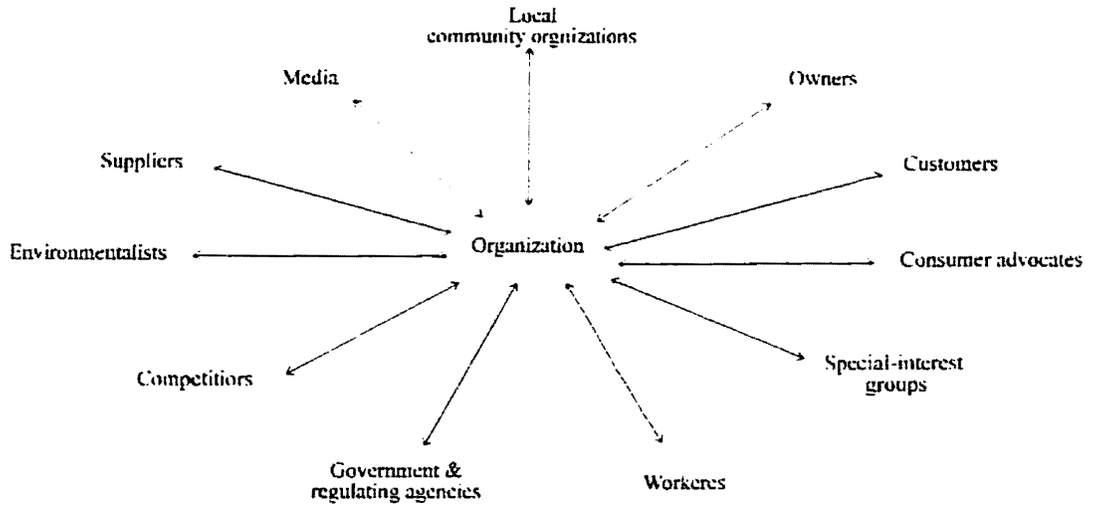


Figure 2.2: An Organization and Its Stakeholders

The multiple constituency approaches have been the underlying theme of many recent effectiveness studies (e.g. Cameron, 1978, 1984a; Jobson and Schneck, 1982; Zammuto, 1984; Wagner and Schneider, 1987; Tsui, 1990). Each of these studies points out that multiple constituency approaches, unlike the goal and system approaches, derive their criteria for assessing effectiveness from the preferences of multiple constituencies for the outcomes of organizational performance.

On this basis, the assessment of effectiveness, according to Daft (1983), provides a more accurate view of effectiveness than any single measure. To a degree, the multiple constituency approach represents an integration of the goal-based approaches. A major limitation is the assignment of proper weights to constituents to indicate the relative importance of satisfying their goals. Zammuto (1984), compared four multiple constituency

models and their differences to address this issue of distribution of weights. Each of the models labeled the relativistic, power, social justice, and evolutionary perspectives provides different answers to the issue. Zammuto, discussed two specific areas of disagreements among the models that emanate from the central question: Whose preferences should be satisfied through the distribution of the outcomes of organizational performance? First, how are judgments of overall organizational effectiveness reached, given the divergent constituent preferences for performance. For each of the four models this becomes a question of whose preferences should be weighted most heavily in reaching a judgment about organizational effectiveness. Second, whose preference an organization should attempt to satisfy through the distribution of performance outcomes.

Whetten and Cameron (1994), listed four difficult theoretical and methodological challenges using these approaches in the assessment of organizational effectiveness: (a) individual stake holders when asked, have difficulty explicating their personal preferences and expectations for an organization; (b) a stake holder's preferences and expectations change, sometimes dramatically, over time; (c) a variety of contradictory preferences are almost always pursued simultaneously in an organization; (d) the expressed or known preferences of the strategic constituencies frequently are unrelated, or negatively related, to one another and to summary judgments made by stake holders about an organization's effectiveness.

According to Miner (1988), several answers have been proposed. One is that all constituents have an equal weight and the goals of every constituency deserve attention. Although this view offers a solution, the notion of equal consideration presents problems. The

fact remains that the goals of certain constituencies may matter very little. For example, an organization can easily ignore the goals of its suppliers, if equal competing suppliers are available as is often the case in the construction industry.

An alternative solution is to consider only the strategic constituencies that immediately influence the organization. However, the problem, of satisfying their sometimes conflicting goals, still remains. In addition, if the assumption is made that the organization pursues and selects goals in response to these strategic constituencies, the favoring of some goals over others means that the other goals are ignored. For example, when the organization gives profits the highest priority, they meet the interests of the owners; however, that might conflict with customer satisfaction, and a supportive work climate, which favors the interests of the clients and workers respectively.

2.3.3. Qualities of Organization Approaches

The qualities of organization approaches relate effectiveness to organizational characteristics, such as degree of formalisation, communication, level of control, and/or other qualities related to structure, culture, and strategy. The competing values approach is an example here. The approach assumes that there is no "best" criterion for evaluating organizational effectiveness and that the concept of effectiveness is subjective. The approach assumes that these diverse criterion can be consolidated; that there are common elements underlying any comprehensive list of effectiveness criteria; and that these elements can be combined in such a way to create three basic sets of competing values. By classifying a wide

variety of criteria of organizational effectiveness along these three sets, the approach creates four diverse models or basic configurations of effectiveness that represents the possible criteria used by organizations to model effectiveness.

2.3.3.1 Competing Values Approach

The competing values approach was first proposed by Quinn and Rohrbaugh (1983). The approach is also discussed by Lewin and Minton (1986), Cameron (1984a), Quinn (1988), Robbins (1990), and Maloney and Federle (1991). The approach is based on the premise that there is no one criterion for evaluating effectiveness. It organizes, consolidates, and integrates multiple criteria in the domains of effectiveness into three sets of incompatible dimensions. These are flexibility versus control, internal versus external focus, and means versus ends. The first set contrasts two dimensions of an organization's structure: flexibility values innovations, adaptation, and change while control favors stability, order, and predictability. The second set deals with whether focus and emphasis should be placed internally, on the well-being and development of the *people* in the organization or externally, on the well-being of the *organization* itself. The third set relates to organizational means versus ends; the former stressing internal processes and the long term, the latter emphasizing final outcomes and the short term.

These three sets are depicted in the four organizational models or configurations shown in Figure 2.3. The models are the open system model, the human-relations model, the rational goal model, and the internal process model. In the figure there are axes of contrasting

values that define the four models. Each model represents a particular set of values and has a polar opposite with contrasting emphasis. The vertical axis pertains to organization structural context and it contrasts stability and control with flexibility. The horizontal axis pertains to focus: whether dominant values are internal or external to the organization. The two inner axes pertain to the organizational means and ends for each model and they contrast the processes or means (e.g. goal setting) to organizational outcomes and the outcomes or ends (e.g. productivity) themselves. In brief, each model has characteristics that differ from the other, and which influence the level of effectiveness in the organization differently. The rational goal model emphasizes control and organizational focus as dominant effectiveness values; planning and goal setting are means, and productivity and efficiency are ends.

The open system model emphasizes flexibility and an organizational focus as dominant effectiveness values; readiness and flexibility are means, growth and external support are ends. Dominant effectiveness values for the internal process model are control and internal focus, stressing communication processes as means and control as ends. The human-relations model emphasizes flexibility and internal focus, with cohesion and morale as means and skilled workers as ends.

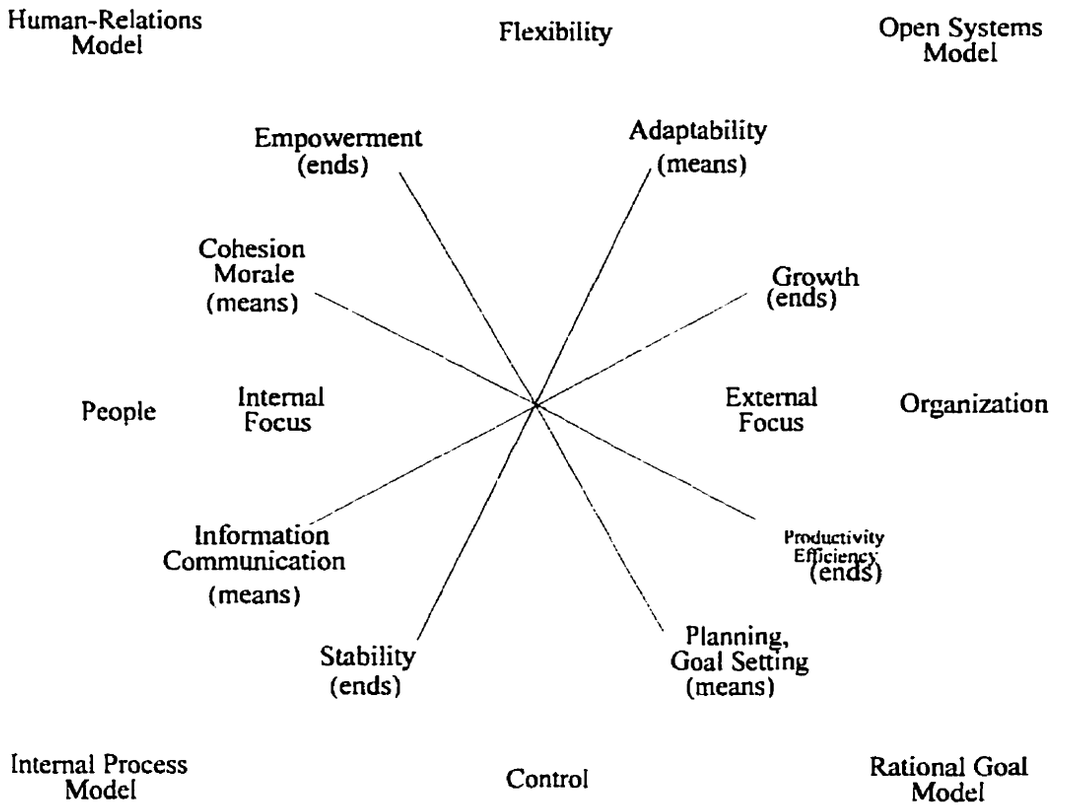


Figure 2.3: The Competing Values Approach's Four Ideal Models

2.5 SUMMARY OF CURRENT APPROACHES TO EFFECTIVENESS

The review of the current literature revealed that there are different definition and approaches to organizational effectiveness. Each has its advantages, but at the same time, each has distinctive disadvantages, partly inherent, and partly owing to limitation in the state of relevant theory and empirical results. These approaches can be characterized by two dimensions : (1) focus of the definition: some definitions focus on measures of terminal outcomes, such as profitability, survival, or goal attainment. Others tend to be more

concerned with organizational processes and structures. (2) intended use of the concept of effectiveness: there are approaches that tend to be organization-specific while others are intended for a generality of organizations. The latter aim for general propositions about either outputs or organizational processes and structures. The former utilize the details available to explain events in a given organization, or class of organizations, in a less generalizable way. These two dimensions, when cross-classified, result in four distinct sets of approaches. The first set of approaches uses the traditional accounting measures, such as productivity, profit, or return on investment as criteria for effectiveness. This set of approaches also includes those that focus on organizational health and survival as the ultimate organizational outcome. These approaches are rooted in the theoretical perspective of population ecology. Problems with these approaches, stem form the fact that they rely solely on general quantitative measures of output, while organizations produce different things that, sometimes, are not easily quantifiable.

Approaches in the second set include all goal-centered approaches to organizational effectiveness. These were discussed extensively in the preceding sections. These approaches yield valuable insights about an organization's character and behavior, because serious goal setting represents an attempt at optimization of potentially conflicting organizational factors, in light of particular past and present circumstances, and desired future. Goal-centered approaches provide a useful degree of detail and context that are lacking in general output/outcome measures. However, in the preceding section, it was seen that goal-centered approaches have limitations. The major limitation is that goals are dynamic and likely to

change over time, partly as reflections of changing external circumstances, and partly due to changes in the management of the organization.

In the third set, the approaches focus on generally effective or contingently effective system's components and processes of organizations. Systems approaches look at the basic processes in an open systems view of organizations (resource acquisition, transformation, output, and feedback) as interconnected, so that overall effectiveness may be assessed at any point in the system loop. Given the problems of defining and applying generally effective structures, system components, and processes, some of the approaches have attempted to develop models of process and structure that are organization-specific, mainly operating as guides to diagnosis and change in particular systems, their components and/or processes.

In the fourth set, the approaches focus mainly on qualitative processes. These approaches provide management with information about qualitative organizational attributes such as flexibility, openness of communication, adaptability, and management style, leadership, decision making, and culture. Although these approaches concern themselves with processes that lead to effectiveness, they also suffer from being too diffuse, not result-oriented, and have a narrow focus on contingently effective aspects of organizations.

2.6. ASSESSMENT OF ORGANIZATIONAL EFFECTIVENESS

In the literature, there are many techniques that were used in developing assessment. The first is traditional and is done by applying one of the common approaches, such as the goal model as the case in Kilmann and Herden (1976) model, Pennings and Goodman (1977)

framework. Other techniques such as Keeley's (1978), and Hitt's (1988), also utilized a single approach; however, they relied on the more elaborate models, such as the resource model or strategic adaptation model.

Some methods synthesized a number of these approaches together such as Parsons' (1959), and Pickle's and Friedlandler's (1967). The Parsons' model synthesized parts of three models of effectiveness. It focuses measurement on four main tasks: adaptation (strategic adaptation model) and it includes such criteria as resource acquisition; development, growth, survival, flexibility, and control of environment; goal attainment (goal model) is measured by productivity and profitability; integration and it includes efficiency and openness of communication as criteria; employee satisfaction (constituency model) measured by employee retention.

The Pickle's and Friedander's model was developed specifically to study a group of small businesses. It synthesized the goal model with the multiple constituencies model. The model concerns itself with goals of seven parties that seek satisfaction from the organization and how to evaluate them. These parties are the owner; the employees; the customers; the suppliers; the creditors; the community in general; and the government. The empirical application for the approach is in the area of determining the distribution of satisfaction i.e. who gets satisfied first and how much? What may be viewed as an ineffective strategy regarding one constituency in the short term, may be viewed as highly effective for other constituencies over longer periods of time.

Some methods utilized the paradoxical perspective based models such as the competing values approach, as in the case of Ostroff and Schmitt (1993) and Maloney and Federle (1993). Maloney's study focused on organizations in the architectural, engineering, and construction industry. Their methodology identified the paradoxical culture types in these organizations and based their assessment on the consensus of four culture perceptions by management and workers. Their methodology is discussed in greater detail in later sections of this chapter.

2.6.1. Existing Methodologies

Most traditional assessment methodologies are based on the goal approach. They measure the level of achievement of a specific goal or goals. Three commonly used indicators ask if work was completed on time and/or within budget, and/or if it met certain quality standards. On-time completion means that the work finished within the scheduled duration of time. Within budget means no cost overruns. Meeting quality standards means that work output reached specific quality goals without significant level of rework. Typically, only under perfect project conditions do all three criteria are met by a construction firm. As a result, effectiveness of a construction firm is usually judged by meeting any one of these criteria.

Other indicators measure levels of achieved profits and/or levels of workers' productivity and compare these levels to specific levels that were established as goals. Profits indicate the difference between price and costs. Profit indicators by themselves are crude and shortsighted. Clearly, an organization can make a profit without being effective. Ineffective

organizations make profits by cutting corners and improper practices; such organizations do not stay in business long.

Another goal-based indicator is productivity. It is the ratio that relates measurements of outputs to measurement of inputs. In construction, as in other industries, increased productivity is one of the traditionally sought after goals. If the organization is judged to have high productivity, it is considered effective. However, the concept of productivity seems to suffer as much debate regarding operationalization and measurement, as the construct of organizational effectiveness itself. Therefore, the questions are: what is productivity, how is it operationalized and measured, and what are the problems associated with measuring productivity, and using it as a measure to reflect organizational effectiveness? Productivity in construction can be defined in a variety of ways depending upon the work being performed, but is generally defined as output/input with output expressed in terms of physical units and input as man-hours required to produce the output. This is very close to the general definition of efficiency. The accurate determination of productivity rates is a problem in the construction industry according to Herbsman and Ellis (1990). They attributed this difficulty to the fact that productivity is influenced by many factors including: technological, such as design; material properties; equipment factors; location (site) factors; construction methods; and organizational factors such as labor factors and social factors. They added that the quantification of these factors in simple terms is too complex to allow a meaningful comparison between organizations or between projects, for a single organization.

The level of achievement of certain goals, in terms, of process time, production costs, profits, and desired levels of productivity, are considered as outcome measures. Outcome indicators, by themselves, simply do not give enough information about the organization. Organizations need evaluation that addresses not only the status of their internal processes, but also how they interact with the external environment.

Gameson (1992), found that one in five commercial construction clients were dissatisfied with the service they received. One of the factors, discussed by him, that leads to such low performance is the use of inappropriate measures to assess effectiveness. Improper assessment by organizations lead to inaccurate conclusions which, in turn, result in sub-standards performance. Although most managers use some indicators (mostly financial), these do not capture all of the salient elements of effectiveness and can not be relied upon as predictors of effectiveness. Measures used by management of construction firms are rarely justified or based on the theoretical approaches of understanding effectiveness. Development of better assessment methods is critical in order to achieve and maintain improved organizational performance. A recently developed assessment methodology (Maloney and Federle, 1993) is discussed in the next section.

2.6.1.1. Maloney's and Federle's Methodology

Maloney's and Federle's assessment methodology is focused on an organizational unit rather than the whole organization. It is based on the perceptions of the unit's manager, his superior, peers, and subordinates. Perceptions are formed of profiles relating to unit's culture,

perceived organizational effectiveness criteria, leadership, and management skills. These profiles are based on typologies or configurations identified by the four models of the competing values approach. The perceptions of each profile are checked for congruence among them. The most important being the culture profile. The lack of agreements in perceptions of the culture of an organization especially that between the manager's and that of his subordinates, according to Maloney and Federle, creates the potential for significant organizational problems. Conversely, agreements in the perception. indicates a common understanding of the organization and the manager.

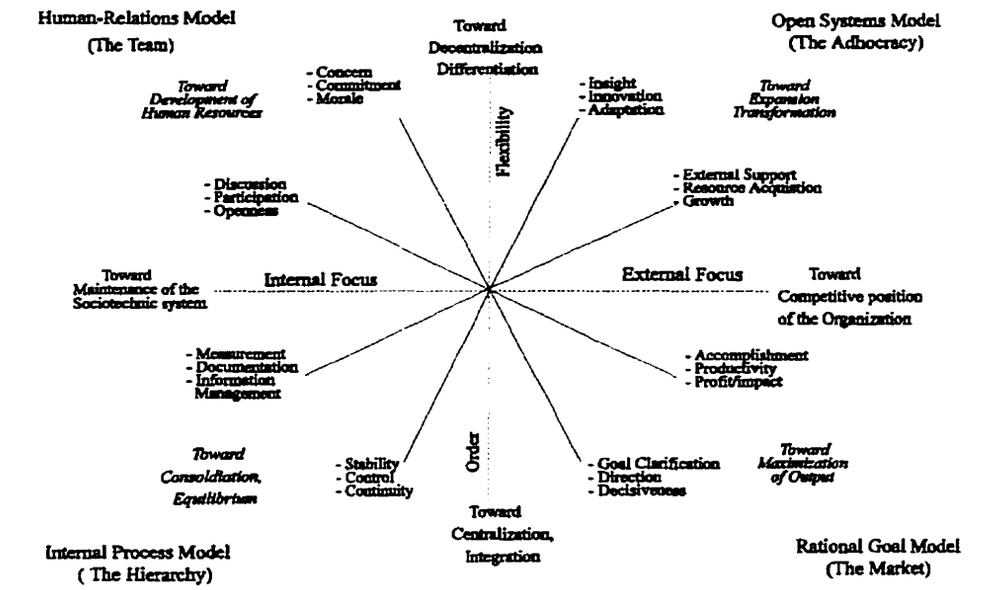
Profiles are then compared with each other to check for consistency of perceptions. Profiles of organizational effectiveness is compared to the culture profile to determine whether there is consistency between the perceived effectiveness criteria and the culture. Also leadership and management skills profiles are examined to determine consistency with the perceptions of the culture.

It is clear that the assessing organizational effectiveness according to this methodology is based primarily on evaluation of culture and the effectiveness criteria typologies identified from the four models in the competing values approach. These typologies or configurations are shown in Figure 2.4.(a) and (b) respectively. In (a), the four cultures configurations emphasize the values in the four ideal models. Under the rational goal model or firm-type organization, the term 'market culture' is used to describe the culture that has emphasis on order, maximization of output, rational production, values goal clarification, providing direction, and decisiveness about what is done. A firm that pursues this type of culture, prides

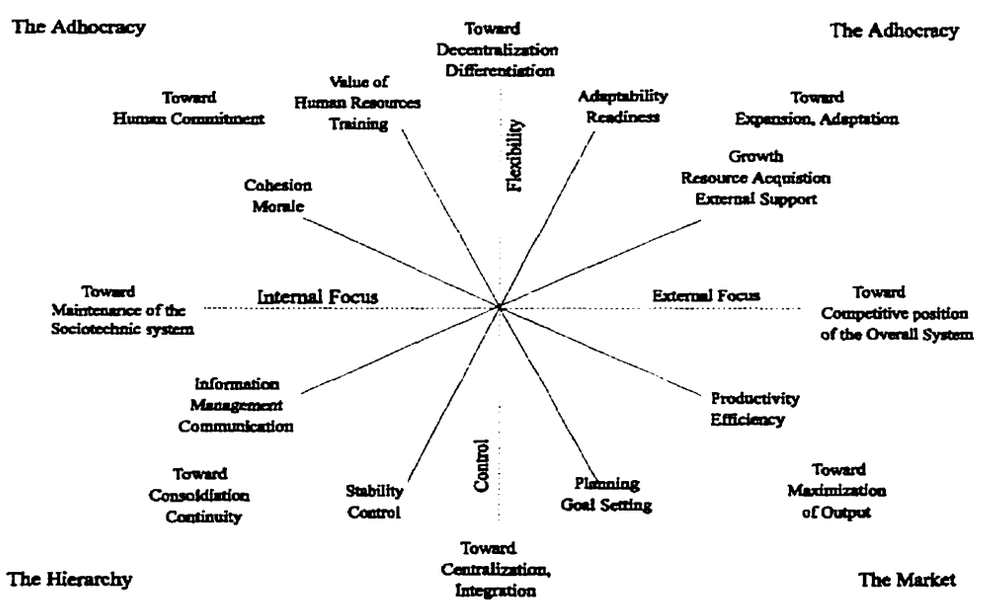
itself on goal accomplishment, making profit, and its external interactions with suppliers, customers, and competitors. The open-systems model has an 'adhocracy culture' that is based upon expansion and transformation. This culture, according to Maloney (1991), prizes resource acquisition and growth. The emphasis of a firm that pursues this type of culture is on innovation, flexibility of structure in conjunction with a focus on external constituencies, and resource providers. This type of culture is at its best when the tasks are undefined. Organizations that pursue the human-relations model have cultures that are referred to as team or 'clan culture'. This culture is a direct opposite to the market culture and it values the human resource in the organization and promotes openness, participation, and involvement. This culture is characterized by team work, consensus decision making and information sharing.

In organizations that pursue the internal process model, the culture is referred to as the hierarchy or 'bureaucratic culture'. It is the opposite of the adhocracy culture and emphasizes stability, control through centralized decision making, and the maintenance and continuity of the organization, through rules and regulations that are used to control the internal systems.

In (b), effectiveness criteria used by organizations pursuing the various culture types are outlined. Organizations with an adhocracy culture use adaptability, readiness, growth, resource acquisition, and external support, Organizations with a clan culture use cohesion, morale, value of human resources, and level of training. Organizations with a market culture use productivity, efficiency, planning, and goal setting as criteria. Organizations with a hierarchy culture use stability, control, information flow, and communication



(a) Culture



(b) Effectiveness

Figure 2.4: Competing Values Framework by Maloney and Federle[4]

[4] Source: Maloney and Federle (1993)

Assessment of organizational effectiveness is achieved in three steps. First, by classification of the unit's culture according to perceptions of the manager, superior, peers and subordinates, along the properties of four types of cultures identified in the competing values approach. Questionnaires are used to solicit perceptions on six main areas of organizational culture and ask the respondents to divide 100 points among four statements (each describes an aspect of the four culture typologies) in each of the six areas. These include dominant characteristics, organizational leader, organizational glue, organizational climate, and criteria of success. Second, by rating the respondents perceptions to an organizational effectiveness questionnaire on the existing and desired level of effectiveness criteria and the importance of the criteria. The questions included relate to the following criteria:

(1) participation, openness, commitment, morale for the clan culture.

(2) innovation, adaptation, external support, growth for the adhocracy culture.

(3) stability, control, documentation, and information management for the hierarchy culture.

(4) Productivity, accomplishment, direction, and goal clarity for the market culture

The questionnaires present the respondents with a series of statements (a total of sixteen) to which the respondents could rate his/her unit using a 5 or 7 point Likert scale. Third, unit's overall ratings or profiles of culture and organizational effectiveness are calculated by averaging the respective respondents' ratings. Fourth, the ratings of the respondents on unit's organizational effectiveness are analyzed and compared with

respondents' overall culture ratings. Data is first presented in tabular format (Table 2.4) where the respondents' overall ratings are compared in tabular form with each other to check for consistency. As mentioned before, particular attention is paid to the comparison of the ratings of the manager and that of his subordinates. If there are significant differences between the perceptions of the manager and his subordinates, the potential exists for major problems. For organizational effectiveness, according to Maloney and Federle, a difference with a value of one between raters must be considered significant and is an indicator of potential problems for the organization.

The data is also presented in a graphical format by drawing pictograms to develop a better understanding of the results. Pictorial representation of all four perception profiles are drawn along the axes of the competing values approach. Maloney and Federle (1990) defined three zones that they used to examine the resulting plots of the data (Figure 2.5). An extremely negative zone in the center of the figure, an outermost negative zone, and an intermediate positive zone. Organizational units with culture plots falling in the extremely negative zone, they stated, have no well defined culture and organizations with a profile in this zone would be ineffective due to strong conflict between cultural values. In the outermost zone, cultures are carried to an extreme and organizations with profiles in this zone may suffer by being either too focused on one type and risk being oppressive if 'market culture', anarchy if 'adhocracy', irresponsible if 'team' and frozen if 'hierarchy', or focusing on all directions at the same time and becoming in Maloney's and Federle's words "a jack of the trades and a

master of none". In the positive zone, trade-offs and balance among the values of the four cultures result in a strong effective culture.

By plotting the overall culture, and organizational effectiveness perceptions for each of the four types of raters, conclusions can be drawn regarding the culture and the unit's effectiveness in a manner consistent with the three identified zones in Figure 2.5.

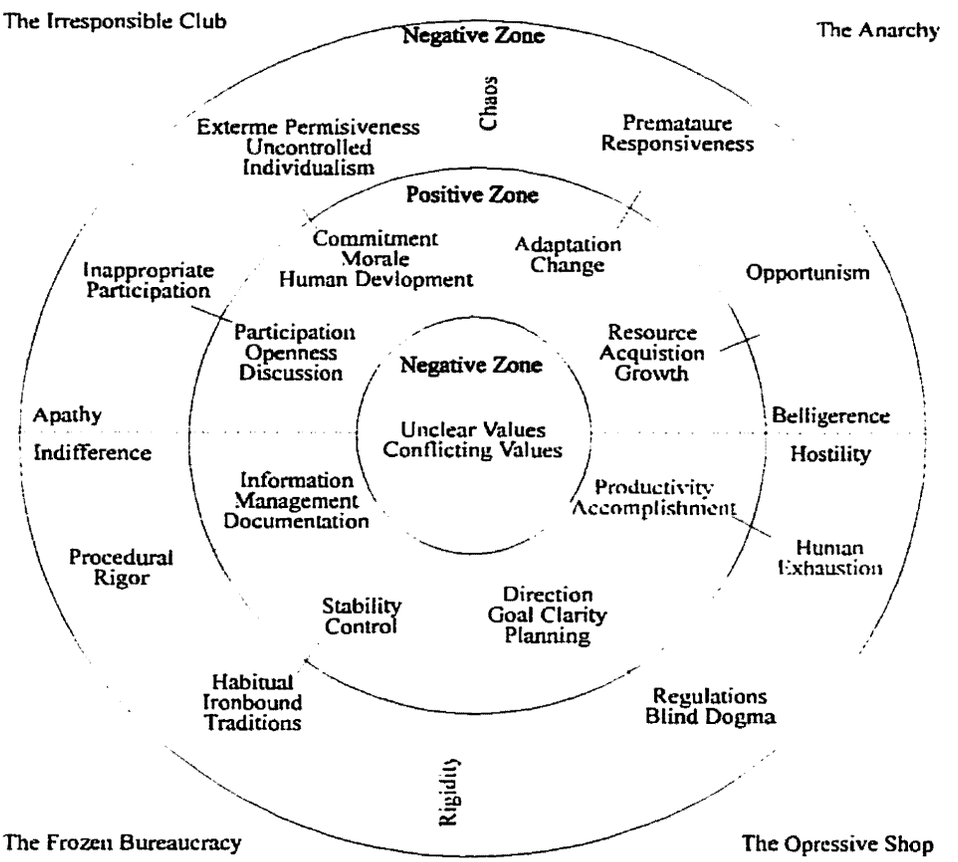


Figure 2.5: Positive and Negative Zones [5]

[5] Source: Maloney and Federle (1993)

An example of using the assessment methodology of a construction organization's unit that was surveyed and assessed by Maloney and Federle, is presented here for clarity.

The unit considered in the example is a field supervision unit of a general contractor organization (Maloney and Federle, 1990). Respondents included a manager, a supervisor, three peers, and nine subordinates. Table 2.4 tabulates data of four culture profiles according to respondents' perceptions of the culture existing in the unit. The unit is perceived to have a strong Market culture by the manager in five of the six areas as evidenced by the high total score of 72 out of 100. The superior's profile is similar to the manager's with the unit perceived as strong in Market culture with a total score of 45, except that the manager is perceived as strongly hierarchical as a leader. The peer's rating is similar for the Hierarchy culture with a score of 31 and a score of 29 for the Clan culture. The subordinates' profile gives an overall rating that is strongest in the Market culture with a score of 33 and in the Clan culture with a score of 28. As a result, it can be concluded that there is congruence among the manager's, superior's and subordinates' perceptions of the unit's culture. The manager, in particular, believes the unit to have a Market culture and gave it a score of 72. However, the other two raters, although agreeing that the unit has a Market culture, gave it lower scores than the manager does. The superior scored it 45 for the Market culture and assessed the unit in the Clan, Adhocracy, and Hierarchy cultures by scoring them 15, 8, 32 respectively. The subordinates scored it 33 for the Market culture and assessed the unit in the Clan, Adhocracy, and Hierarchy cultures by scoring them 28, 25, 14 respectively.

Table 2.4: Culture Profiles Ratings [6]

	Raters			
Culture Element	Manager	Superior	Peer	Subordinates
(1)Dominant Characteristics				
Personal Place	0	30	8	32
Dynamic/ Entrepreneurial	5	10	18	18
Formalized and Structured	5	0	28	9
Production Oriented	90	60	35	41
(2) Organizational Leader				
Mentor/ Father figure	0	0	10	5
Entrepreneur/ Risk taker	10	0	17	16
Coordinator, Organizer	10	70	47	43
Producer/ Competitor	80	30	27	36
(3) Organizational Glue				
Loyalty & Tradition	15	10	42	37
Innovation & Development	10	10	20	9
Rules & Policies	5	10	15	11
Production & Goal	70	70	23	43
(4)Organizational Climate				
Participative	0	20	45	44
Dynamism & Readiness	10	10	10	18
Stability	0	10	25	15
Competitive	90	60	20	23
(5) Criteria of Success				
Sensitivity to Customers	0	10	32	11
Product Leader & Innov.	0	10	3	3
Dependable delivery	90	80	53	67
Market Penetration	10	0	12	19
(6) Management of Worker				
Teamwork	0	20	27	37
Freedom & Uniqueness	10	10	42	20
Security/ Predictability	0	20	15	7
Production & Achievement	90	50	17	37
OVERALL CULTURE				
Team Culture	2.50	15.00	28.89	27.69
Market Culture	71.67	45.00	22.22	33.15
Hierarchy Culture	18.33	31.67	30.56	25.19
Adhocracy Culture	7.50	8.33	18.33	13.98

[6] Source: Maloney and Federle (1990)

Table 2.5 tabulates the organizational effectiveness profiles as a result of the perceptions of the respondents regarding the actual level of perceived criteria of effectiveness, the desired level, and its level of importance. The score range for the actual and desired level is measured on a 7 anchor points Likert scale. The score range for the level of importance is measured on a 5 anchor points likert scale.

Table 2.5: Organizational Effectiveness Profiles[7]

Effectiveness	Raters											
	Manager			Superior			Peer			Subordinates		
Criteria	actual	desired	imp.	actual	desired	imp.	actual	desired	imp.	actual	desired	imp.
Clan Culture												
participation,opennes	5.00	6.00	3.00	5.00	5.00	3.00	4.67	4.83	3.33	4.45	5.35	4.05
commitment, morale	6.00	6.50	4.50	4.50	5.00	3.00	5.00	5.83	3.83	5.15	6.05	4.65
Hierarchy culture												
stability, control	5.50	6.00	4.00	5.00	5.00	3.00	5.00	5.67	4.67	4.85	6.20	4.25
document, info mgt.	6.50	6.50	4.50	5.00	5.00	3.00	4.83	5.50	3.83	4.35	5.15	3.80
Market culture												
productivity, accomp	7.00	6.50	5.00	5.00	5.00	3.00	4.50	5.00	4.33	5.70	5.95	4.30
direction, goal clarity	6.50	6.50	5.00	5.00	5.00	3.00	5.33	5.50	4.17	4.80	6.00	4.45
Adhocracy culture												
innovation, adapt	5.00	6.00	3.50	5.00	5.00	3.00	4.00	4.83	3.50	4.15	5.40	4.05
ext. support, growth	6.50	7.00	4.00	5.00	5.00	3.00	4.17	4.67	3.17	4.75	6.15	4.40

As seen from Table 2.5, all four raters perceive this unit to be most effective in the market culture criteria. There is congruence with the perceptions of the raters of the unit's culture as a market culture from the data in Table 2.4. The manager perceived the unit to be

[7] In Maloney and Federle (1990) pp. 230

very effective in the effectiveness criteria of a market culture (a score of 7 out of 7) The superior, peer, and subordinates perceived the unit as most effectiveness in the same criteria but perceived it less effective as evident from their ratings of 5, 4.5 , and 5.7. Based on the difference of 1.3 (7 minus 5.7) between manager's and subordinates' rating of 7, potential problems can be anticipated. Graphical plots or pictograms of manager's and subordinates' ratings of overall culture and organizational effectiveness (Figure 2.6 (a), (b), (c), and (d)) can also be used to infer the same conclusions.

As described, this assessment methodology, considers the view that performance and effectiveness are primarily determined by the culture that exists inside the organization. However, Kotter and Heskett (1992), recommended that other organizational variables should be considered along with culture in the study of organizational effectiveness. Their study has shown that (according to their definition of culture) there is a positive relationship between strong cultures and organizational effectiveness (good performance). However, in some instances, organizations that were rated to have weak cultures performed just as good, or even better, than organizations with strong culture. Kotter and Heskett attributed these irregularities to the effects of other organizational characteristics, such as structural context, and strategy.

By delineating variables from the competing values' four models, Ostroff and Schmitt (1993), studied configurations of organizational effectiveness and efficiency by operationalization of effectiveness and the variables. Their findings indicated that effective and efficient organizations are influenced not only by strength of culture inside, but also by other

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variables such as participation in decision making, goal emphasis, attitude toward change, and the level of structural contextual emphasis. Although both of the Kotter's and Heskett's, and Ostroff and Schmitt studies did not target construction organizations, their findings suggested the inclusion of other organizational characteristics or variables along with culture in the study of effectiveness seems to be appropriate.

In conclusion, Maloney's and Federle's methodology represents a crucial advance. Their assessment methodology identified and validated, for use by construction organizations, the four sets of culture and effectiveness criteria typologies found in the competing values approach.

2.7. SUMMARY

The review has provided a concise introduction into the relationships between the concept of organizational effectiveness and a number of theoretical perspectives of organization such as: the traditional theories of scientific management principles and Weber's bureaucracy; human-relations school; systems theory; contingency approach; political theory; and configurational approaches. The review also discussed the various criteria used in the assessment of organizational effectiveness and the conflicts that exist among them and recommendation to resolve these conflicts. The review also discussed the various definitions used to define effectiveness, and the approaches used for understanding and modeling organizational effectiveness: the goal model and the multiple constituencies model; systems models such as the internal process model, the strategic adaptation model, and the open

systems model. The discussion also included the shortcomings of using such approaches in the operationalization and the measurement of effectiveness. In particular, the review has focused on the competing values model as a configurational approach and gave a detailed description of it. A review of existing methodologies was given, along with a detailed discussion of a recently developed methodology that uses the competing values approach's criteria to assess the effectiveness of organizational units in construction firms.

In summary, the review has shown that the competing values approach can be used as a conceptual model to categorize the characteristics of construction firms along its four ideal configurations. Its use, in studying organizational effectiveness in construction has been validated by the methodology developed by Maloney and Federle (1993). In the next chapter, the criteria of the competing values approach's four ideal configurations are used to conceptualize and identify four major categories of variables relevant in examining the organizational effectiveness of the construction firm.

CHAPTER (3)- METHODOLOGY

3.0. INTRODUCTION

First, in this chapter, issues in developing an assessment methodology are discussed and the logic of the proposed research methodology is presented. The methodology is broken down into three main stages. The first stage, which is covered in the second part of this chapter deals with identification of variables that are used to develop the prediction methodology. The second and third stages of the proposed methodology, that deals with development of measurement scales, construction of questionnaires, carrying out the field survey, and analyses and model fitting, will be covered in the following three chapters.

3.1. ISSUES RELATING TO DEVELOPMENT OF AN ASSESSMENT METHODOLOGY

The evolution of the methodologies used to study organizational effectiveness has progressed along roughly parallel lines with the development of the various theoretical models. Because no single methodology is suitable for the plethora of theoretical perspectives, the key to developing a valid assessment methodology rests with addressing the following seven questions:

1. What time frame is being employed? Short-term effects may differ from long-term effects, and different states in an organization's life cycle may produce different levels of performance.
2. What level of analysis is being used? Effectiveness at different levels of analysis in an organization (e.g. Subunit performance versus organizational adaptation) may be incompatible.
3. From whose perspective is effectiveness being judged? The criteria used by different constituencies to define effectiveness often differ markedly and often represent unique constituency interests.
4. On what domain of activity is the judgment focused? Achieving high levels of effectiveness in one domain of activity in an organization may mitigate against effectiveness in another domain.
5. What is the purpose for judging effectiveness? Changing the purposes of an evaluation may change the consequence and the criteria being evaluated.
6. What type of data are being used for judgment of effectiveness? Official documents, perceptions of members, participant observations, and symbolic or cultural artifacts all may produce different conclusion about the effectiveness of an organization.
7. What is the referent against which effectiveness is judged? No universal standard exists against which to evaluate performance, and different standards will produce different conclusions about effectiveness.

In developing this methodology, these seven questions are answered in a very detailed and sufficient manner in the following sections of this chapter and the chapters that deal with developing and testing the methodology. However, in brief, in developing the proposed assessment, this research focuses on a homogenous group of construction firms that operate in the same market and undergo the same forces in the environment.

The methodology is geared to assess organizational effectiveness at the firm level. The perspective of the assessment is from the management point-of-view, for the purposes of predicting the level of organizational effectiveness and uncovering the significant sources of ineffectiveness in the critical organizational attributes, in order to develop strategies to correct and adjust the organizational configuration. Workers' and management perceptions are the primary instrument upon which the assessment methodology is based.

Organizational effectiveness is judged in the analysis and development of the model, against a measure that consists of the three measures most commonly used to rate performance of a construction firm, namely, duration of execution of work, cost of completing the work, and finishing the work while conforming to quality specifications.

3.2. RATIONALE OF METHODOLOGY

Miller and Friesen (1984), in their analysis suggested that researchers should attempt to use an approach based on recurring patterns or configurations of attributes that relate to effectiveness empirically. According to Meyer *et al.* (1993) using configurational approaches in organizational assessment can be justified on grounds of attempting to understand

commonalties across a homogenous group of organizations. This research is focused on developing an organizational effectiveness prediction methodology for construction firms that can be considered to form a homogeneous group. The construction firms targeted by this research have been selected from a group of construction firms serving the same construction market where they operate under the same conditions, and due to the relative young age of the Saudi ICI market, most of these firms operate within similar stage of life cycle.

After careful review of all the models and approaches, the competing values was chosen as the most valid configurational approach through which the proposed method of predicting effectiveness is developed. The reasons being: first it has been validated by Maloney and Federle (1993) in the assessment of construction organizations and their cultures; second, its four models or configurations, emphasize characteristics that represent the integration of most effectiveness criteria already used by researchers and managers.; and third, use of the multiple criteria represented by the four ideal models in the approach allow a more realistic depiction of the values and criteria of effectiveness that are typically pursued by a firm from one stage in its life cycle to another while changing its configuration.

The use of multiple criteria or characteristics is represented by the hybridization of values between the four models of the competing values approach. This hybridization results in certain tradeoffs between the different levels of conflicting or paradoxical values, based on the specific environmental situation faced by the organization. For example, stressing a moderate level of competitiveness and external focus by an organization does not exclude it from placing some emphasis on the development of its workers, and adopting strategies to

enhance morale and cohesion among them. Cameron (1986a), supported the inclusion of paradoxical or conflicting criteria in assessments of organizational effectiveness in order to achieve a better assessment. Cameron (1983), suggested that in order to develop accurate measurement at the organizational level, variables and measures must be combined with some overall model that indicates performance in the multiple domains of effectiveness. He added that, although organizations could operate in multiple domains of effectiveness, they may also perform well only in a limited number of them. In other words, organizations can not satisfy all possible criteria of effectiveness. Tsui (1990), argued that, using a multidimensional view of effectiveness implies that different patterns of relationships between organizational effectiveness and its determinants will emerge, depending on the environment in which a particular organization functions.

Figure 3.1 (a), (b), (c), and (d) show pictograms of competing values criteria used in the assessment of effectiveness over the life cycle of the organization, as suggested by Quinn and Cameron (1983). It is clearly seen that organizations tend to pursue the values that belong to more than one model at the same time, regardless of the stage they are in. The only factor of difference from one stage to another is the differing levels of these values or criteria pursued by organizations, as seen in states (a), (b), (c), and (d). In state (b) the organization values flexibility but somewhat less than in (d), where more emphasis is put on flexibility. During stage (a), the organization places emphasis on flexibility just as much in (d) however, it places very little emphasis on control of its processes. In (c), the organization places less flexibility than in (a) and (d), but places more than in (b). This view represents a more realistic

model of the nature of the firm, and how it organizes itself to achieve effectiveness. This is the view considered by this research.

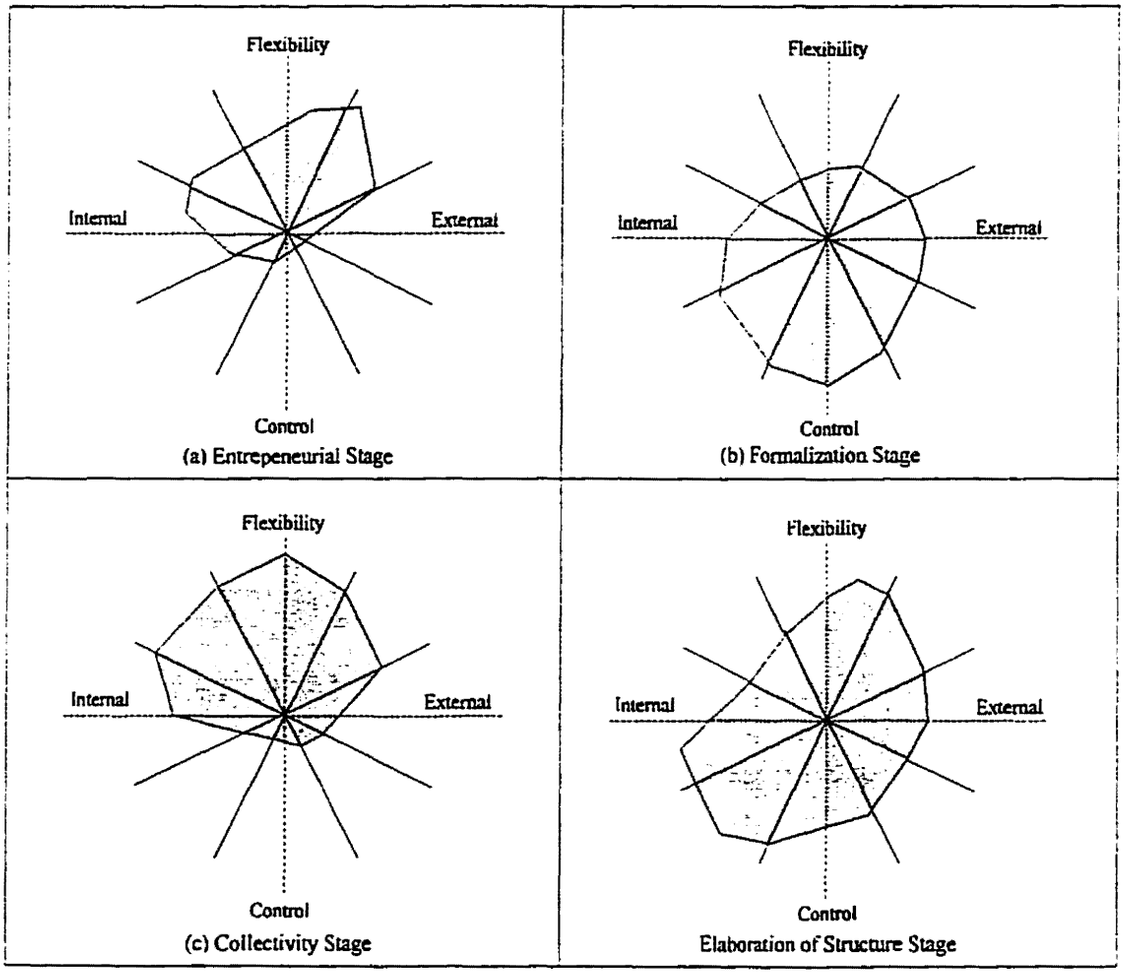


Figure 3.1: Organizational Life Cycle and Criteria of Effectiveness [1]

From this perspective, a homogenous group of firms that are within the same stage of their life cycle tend to pursue similar levels of criteria of effectiveness. These levels are

[1] Source: Quinn and Cameron (1983)

determined as the result of hybridization of certain levels of values of the four models of the competing values approach to represent another configuration. Therefore, the levels of the hybridized criteria in this configuration/model can be used to predict the organizational effectiveness of firms. This is achieved by: gauging the levels of hybridized criteria in existing effective firms through empirical experimentation; and using the determined levels of these criteria as a gauge against which, levels of criteria in firms under question, can be compared.

Three main steps can be considered in order to develop valid quantitative models based on configurational inquiry (Dotty *et al*, 1993). First organizational configurations in an identified approach must be conceptualized and modeled as ideal types where effectiveness is highest because the fit, among the contextual, structural, and strategic factors is at a maximum in these configurations. In this research, the competing values approach was selected as a valid configurational approach that conceptualizes and identifies four ideal models of effectiveness criteria that can be pursued by construction firms to achieve effectiveness.

Second, organizational characteristics of the particular group of organizations or firms which represents the different effectiveness domains, in the ideal types, must be first integrated into an overall multivariate profile or model. The model must be fitted and tested empirically, using a valid referent measure of organizational effectiveness. This is done in order to identify those characteristics that are significant in the prediction of organizational effectiveness and their levels. Third, based on an assessment of the levels of these significant organizational characteristics, the overall model can then be used to predict the level of organizational effectiveness of the firm.

3.3. METHODOLOGY

A number of researchers have noted that when developing effectiveness measurement it is important to specify whether it is the variables that predict effectiveness, or the variables that indicate effectiveness, that are of interest (e.g. Cameron, 1986). This research focuses on developing a methodology to predict the organizational effectiveness of the construction firm. A multivariate model is developed and validated to achieve the best prediction. The model relates levels of identified organizational characteristics in a homogenous group of construction firms to an operational measure of their organizational effectiveness.

As seen in Fig 3.2, this was done in three main steps. First, organizational characteristics' categories and variables relevant for examining effectiveness of the construction firm were identified. Second, a field study was designed and carried out. In the study, a number of tasks as indicated, were accomplished:

- The identified variables were operationalized.
- A referent measure against which organizational effectiveness is judged, was constructed using the three common domains of effectiveness in construction: execution of work within scheduled duration, or completion of work within budgeted cost, and/or performance of work according to contractual standards and specifications.
- Scales of measurements were constructed for the variables and their reliability tested.

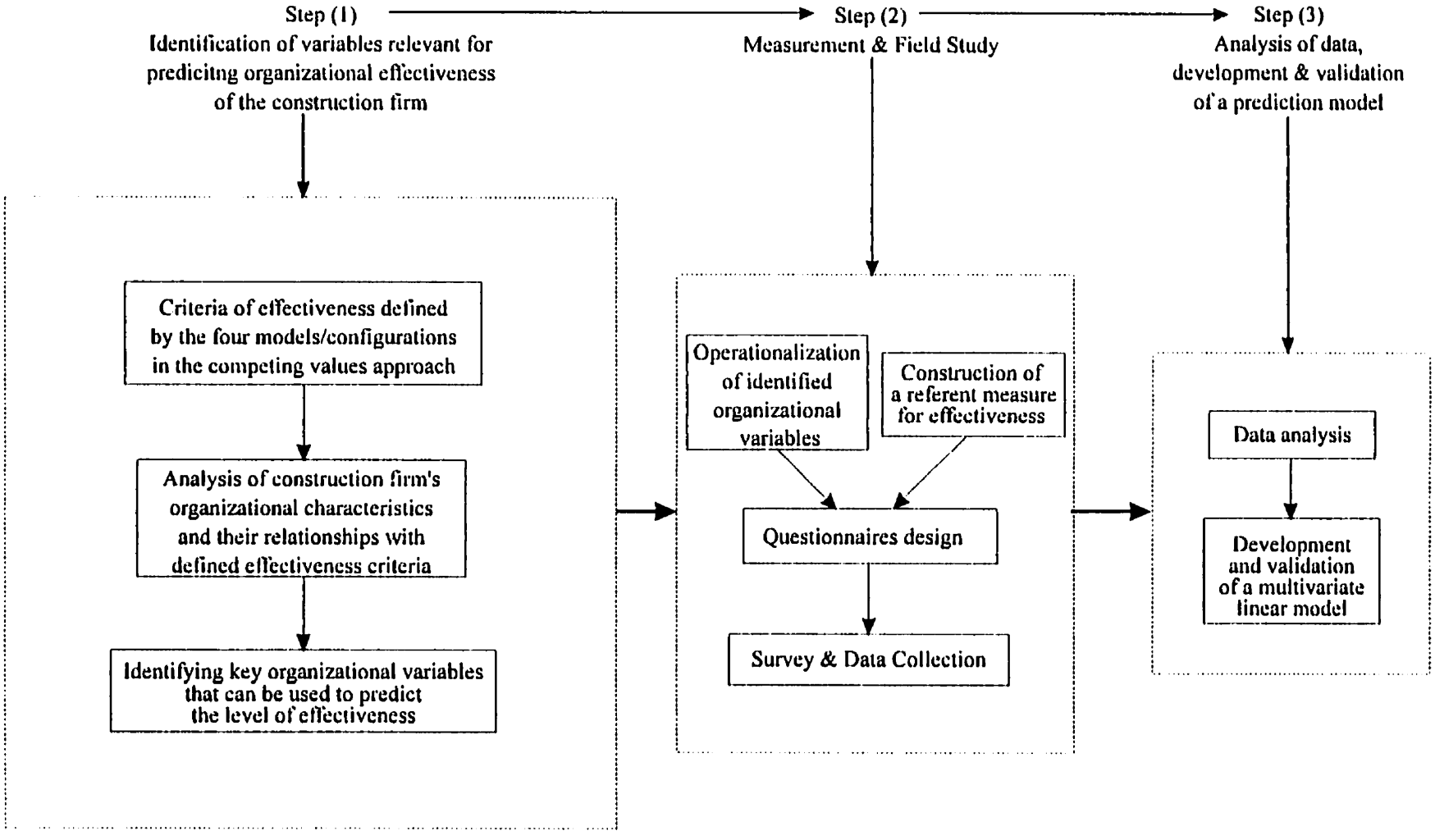


Figure 3.2: Three Main Steps of Methodology

- Self-administered questionnaires were constructed to collect data from management and workers in the construction firm.
- A field survey was carried out using the constructed questionnaires to collect cross-sectional data from a homogenous group of construction firms.

In the third step, the data collected from the field survey is used to test the hypothesis that organizational effectiveness, as operationalized, can be predicted using the developed measures of the identified variables. A multivariate linear regression model is developed and validated as a predictive model of the proposed assessment methodology. The rest of this chapter includes a discussion of the first step concerning the identification of variables, the following four chapters will discuss steps II and III of the methodology.

3.3.1. Identification of Variables

In order to have a comprehensive understanding of organizational effectiveness, the key variables in the domain of effectiveness of the construction firm, must be identified. The types of variables or criteria that can be used vary by domain and level of analysis. The target of this research is the construction firm and the level of analysis is at the organizational level. An analysis of the construction firm's characteristics that pertains to structural context: organizational flexibility, rules and regulations; organizational focus; and strategy (means vs. ends) along the dimensions of effectiveness as represented by values of the four models, helped to identify the important variables used to develop the methodology.

For analytical purposes, the construction firm can be viewed as having some form of vertical structure, or hierarchy, and operating within an environment (Figure 3.3). The external environment of a construction firm impact on it through different types of forces. The firm has a boundary. The firm's boundary is moveable because people from within it are in constant interaction with others from organizations outside the boundary. A construction firm's environment would comprise regulating agencies, competitors, suppliers, sub-contractors, consultants, etc. Inputs from the environment cross the firm's boundary and are transformed through the production process into outputs.

In the traditional sense, the primary role of the construction firm is the assembly of resources and transforming them into a product (a facility or part of it) using its skill in the techniques of construction and in the management of construction operations. It is becoming common for the construction firm to be involved in more than the construction phase of the building process. To accomplish its role, the construction firm usually: provides and direct its own workforce to do a portion of the actual work; supervises the work of subcontractors; plans, coordinates, and supervises parts or all of the construction process; and is responsible for completing the work on-time, on budget, and in accordance with specifications.

In considering the hierarchical structure of the typical construction firm, Langford and Male (1991), identified three different levels of management (Figure 3.3). The *institutional* or *strategic level* is concerned with adapting the firm to the external environment through planning and goal-setting, the *organizational level*, where the primary focus is on the lateral and vertical relationships within the firm's structure, and the *technical* or *production level*,

concerned with transforming inputs from the environment into outputs to the environment. Each level has to accomplish their different tasks if the firm is to achieve organizational effectiveness in the face of uncertainty.

The production level is concerned very much with the present and getting the job done. The concern at the organizational level is one of mediation between the strategic level and the technical level as well as maintaining structural relationships between the various parts of the firm or with other external entities. There is less emphasis at this level on the technical skills and more on organizational skills such as the ability to handle people, organizational structure, systems, procedures and controls. Uncertainty of the construction environment requires that the firm operates in two time frames, the short term when dealing with the production level, and the longer term, when dealing with the strategic level. The question here is one of survival and adaptation to the forces of the construction industry. This research focuses on the organizational level of the construction firm.

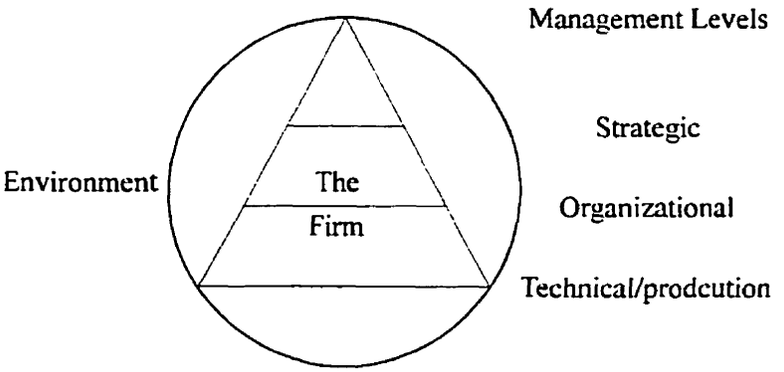


Figure 3.3 A Model of A Firm[2]

[2] Source: Langford and Male (1991)

As stated before, a firm could pursue any of the criteria of four models in the competing values approach. Analysis along the values of the four configurations of the competing values approach helps in identifying the key variables to be included in the model. The analysis identifies fourteen variables that are deemed related to the construction firm's organizational effectiveness in four general categories (Table 3.1): structural; flexibility, rules, and regulation; person-oriented processes, and strategic means and goals.

Table 3.1 Dimensions, Categories, and Variables of Effectiveness

Competing Values Dimensions	Categories of variables	Variables
Structural	Structural context	1. Level of integration in services offered 2. Level of joint venturing, partnering, and alliances 3. Level of subcontracting 4. Level of multiple project handling ability 5. Level of coordination 6. Level of information flow
	Flexibility, rules, and regulations	1. Extent of rules and regulations 2. Level of adherence to rules and regulations 3. Level of control 4. Attitude toward change
Focus internal/external	Person-oriented processes	1. Strength of culture 2. Level of workers' participation in decision making
Means/ends	Strategic means and goals	1. Level of planning 2. Level of goal setting

3.3.1.1 Category (1): Structural

According to Daft (1983), firms can be defined as multi-dimensional social entities that are goal-directed, with a deliberately structured set of interconnected and mutually dependent parts that communicate and exist together to strive for a common purpose in a changing environment. The environment of a firm is the set of environmental elements with which the firm seek to interact, or has to interact, to accomplish its goals. Firms emphasize the need for fighting disorder in their environment and attempt to achieve order (i.e. effectiveness) by forming effective structures, promoting strong culture, controlling efficient internal processes, and devising new strategies to increase their competence.

What type of structure does a firm need in order to be effective? According to Ansoff (1988), the distinct types of responsiveness in which a firm seeks to engage can be used to identify the structure it needs. The types of responsiveness are: operating, competitive, innovative, entrepreneurial, and administrative. Ansoff classifies these responsiveness types into four basic forms or structures: the functional operating form which, minimizes the operating costs of the organization; the divisional-competitive form which, optimizes the organizations profits; the project matrix-innovative form that develops the organizations near-term profit potential; and the multistructure-responsiveness form which, addresses the different needs in different strategic business areas to develop the organization's long-term profit potential.

Mintzberg (1979), advanced that organizational structure of a firm is determined by interplay of seven forces; direction, efficiency, proficiency, concentration, innovation,

cooperation, and competition. Based on the degree of interplay among these forces, he identified five types of structures or forms that include the simple or entrepreneurial structure, machine bureaucracy, professional bureaucracy, diversified structure, and adhocracy. The simple structure has direct supervision as its prime coordinating mechanism. The key part of the firm is at the strategic level and, as its name implies the structure is simple, uncluttered by rules and regulations, and has more participative decision-making. This type of organizational structure characterizes small construction firms such as a sub-contractor, employing a few workers.

Standardization of work processes is the prime coordinating mechanism in the machine bureaucracy structure. This type of structure typifies large sized general contractor firms which, use many rules and regulations, functional departments, and centralized decision - making that follows the chain of command. The professional bureaucracy structure has as its prime coordinating mechanism the standardization of skills. The production level is the key part of the firm. The majority of workers in this firm are highly skilled-professionals-with considerable work autonomy and decentralized decision-making. A typical example would be a turn-key construction firm with construction management services as its main core and which subcontracts the bulk of the construction work in its contracts to outside sub-contractors.

The divisional structure has as its prime coordinating mechanism the standardization of outputs. This type creates a series of relatively autonomous smaller divisions with functional structures. Grouping of divisions tends to be by markets. This structure is common in the very

large general contractors firms with divisions serving in the various markets of the construction industry. The adhocracy structure is team based. The teams are highly flexible to achieve adaptation and decision-making within the team is decentralized with minimal supervision. The adhocracy structure is typified by the project structured construction firm.

Mintzberg argued that there is no one best structural form for effectiveness and in order for a firm to be effective, it has to model itself along one of forms he identified and manage its consistency of form. Tatum's (1990), conclusion, that there is no best organizational form that a construction firm can follow to achieve effective performance, is similar to Mintzberg's. Tatum asserted that what's really important is that the construction firm must attempt to maintain its effectiveness regardless of the form it takes. According to Pilcher (1990) a large percentage of construction firms are small, owner-style run business. The emphasis of firms in the construction industry is on producing a product while minimizing the risks associated with the effects of a very unstable and variable construction demand and still achieve an acceptable level of profits.

The organizational structure can be described by a number of dimensions that pertain to internal characteristics of the organization. These dimensions are: formalization, specialization, standardization, hierarchy of authority, complexity, and centralization. Formalization pertains to the degree of documentation of organizational procedures, regulations, and policy. Large organizations tend to be more formalized than small ones. Secondly, is specialization, which refers to the degree to which organizational tasks are subdivided into separate jobs. If specialization is extensive, each worker performs only a

narrow range of tasks. If it is low, a worker performs a wide range of tasks in his job. Specialization is sometimes referred to as the division of labor.

The third structural dimension is standardization, which is the extent to which similar work activities are performed in a uniform manner. The fourth dimension is the hierarchy of authority and it describes who reports to whom, and the span of control in the firm. The fifth dimension is complexity, which refers to the number of activities or subsystems within the organization. Complexity reflects the number of vertical levels in the hierarchy, the number of departments existing horizontally across the organization, and the number of geographical locations where it exists. Centralization in an organization refers to the hierarchical level that has authority to make decisions. When decisions are delegated to lower levels, the organization is decentralized and vice-versa. The arrangement of tasks, roles, authority, and responsibility gives every organization its unique structure, through which it does its work. Throughout the history of organizations, structure evolved in response to the dual challenges of external diversity of the organizations strategic position, and their internal complexity.

According to the four models of the competing values approach, the structural criteria used to describe the four models are: flexibility, to describe the open system model; stability in the internal process model; planning and coordination in the rational goal model; and cohesion and culture in the human-relations model. In Table 3.1, two categories of variables that relate to the structural dimension of the construction firm are considered along the values of the four models in the competing values approach. These are: structural context; and flexibility, rules and regulations.

In the category of structural context, the study hypothesizes six variables as important attributes that can be used to indicate how effective the structural component of the construction firm is in dealing with its external and internal environment. This category of variables includes: level of integration in services offered by the construction firm; level of subcontracting used in majority of work projects; level of multiple project handling ability; level of using joint-venturing, partnering, and strategic alliances in project delivery; level of inter and intra-organization coordination; and level of information flow inside the firm. These are discussed in details as follows:

1. Level of Integration in Services Offered

Integration in services is defined as the degree to which a firm does things with in-house workers (Hansen, 1987). Porter (1980), defined integration as "the combination of technologically distinct production and/or other economic processes within the confines of a single firm". Porter discussed two types of integration, forward and backward integration. A firm integrates forward when it integrates toward the market it ultimately intends to serve .i.e. a construction firm building, owning, and leasing retail space to its clients. Backward integration occurs when the firm gains control over the supporting businesses in the overall process. An example is when a construction firm acquires the ownership of its suppliers, such as a concrete ready-mix company in order to supply its own concrete.

Hasegawa (1988), stressed the need for construction firms to formulate structures based on local market analysis and outlines three approaches; product differentiation, business

diversification, and market segmentation. Hillebrandt and Cannon (1990), advocated four means of product differentiation for the construction firm. These are: offering a range of project management methods; extending into A/E design; extending into financial packaging; and extending into facilities management. They recommended the adoption of *Total Build Service* where the construction firm guarantees the final cost and completion date of a construction project and also gives a warranty on the quality and performance. The *Total Build Service* also offers facilities management and building management. According to Krippaehne *et al* (1992), a construction firm may integrate forward by performing land-development services, providing A/E design capability, owning and leasing facilities, and offering construction financing. It may also integrate backward by offering construction materials supply and other services.

When a firm integrates, it means that the firm is expanding a product or service position. As such, integration represents more administrative transactions within the firm's structure. Measuring the level of integration of services in the construction firm would gauge the effectiveness of the firms' structure in addressing the added structural complexity of organization as a result of the integration strategies by the construction firm in its attempt to control the quality and range of its construction product.

Therefore, it is important to evaluate the level of integration of services offered by the construction firm, for two reasons. First, because the level of integration influences the effectiveness and the strategic flexibility of the firm's structure, especially where firms, with integrated services, tend to develop defensive strategies and rigidity in their structures to

compensate for increases in risks and potential increases in fixed costs. Second, because it underlies the effectiveness of the firm's structure to increase market share and exercise a greater degree of control over the quality of the construction product.

2. Level of Subcontracting

Construction work, in its conventional form, employs an intensive technology (Thompson, 1967) and requires the contribution of a variety of trades. Most construction firms obtain business by submitting competitive bids for projects with owner-determined specifications. Because of the custom-building nature of the construction process, it is difficult to predict the nature of future work and input requirements. The site-based nature of production also makes it highly prone to uncertainties in climate and site-conditions, and availability of resources in the local environment in which the work is carried out.

The use of subcontracting emerged in construction as a means of coping with these uncertainties. Subcontracting is a strategy that has long been used successfully in the construction industry. The nature of the industry, construction process, and the construction product, allow and encourage construction work to be at least partially performed by specialty subcontractors who specialize in a certain part or kind of construction process and work. As noted by Brensen *et al* (1984), by passing on some of the risks associated with the construction project to subcontractors, the general contractor retains flexibility. Subcontracting is used widely by General Contractors construction firms, to save money and time, and to gain strategic flexibility during times of change.

Construction subcontractors are usually more specialized and can do the work quicker and for less money than general contractor firms. Eccles (1981a), has shown the influence of subcontracting in increasing the complexity of structure in the general contractor construction firm. As the level of subcontracting used by the firm increases, the amount of coordination, information flow, and sub-contract management tasks increases. If the firm's structure is not able to address the increased complexity that results from utilizing subcontracting, the construction firm's ability to control its work will be lessened. Clarke (1980), argued that increased subcontracting has reduced the general contractor's control over the construction process, leading to cost and time overruns. Usdiken *et al*, (1988), argued that the extent of control over subcontractors emerge as a critical consideration in subcontracting strategy of the construction firm. The discussions in the literature suggest that certain organizational structural properties are linked to the level of subcontracting used by the particular construction firm. Eccles (1981a), for instance showed that construction firms carrying more complex projects, subcontract more. But Clarke (1980), observed that the construction firm faces a dilemma in regard to selecting a suitable level of subcontracting. On the one hand, the construction firms develop their competence in one or two trades, and limit their activities to, the winning of projects, and resort to extensive subcontracting. On the other hand, a strong commitment to in-house production and as, Harrigan (1985) noted, the need to safe guard production control, can be a strategy requirements making subcontracting less desirable.

The measurement of the level of subcontracting used by the construction firm underscores the firm's attitude towards structural flexibility, by risk sharing and enhancing its

costs effectiveness. A construction firm that pursues strategic flexibility must have a structure that is better suited for contractual arrangements that provide the flexibility of subcontracting. Although subcontracting may provide costs effectiveness, it limits the degree of control the organization has over its processes. The result of this limitation will be more pronounced and negative when the firm's structure is not able to cope with the added complexity of subcontracting. However, when the firm's structure is suited for the proper use of subcontracting strategies, it can significantly enhance the construction firm's flexibility. If a general contractor manages a portfolio of subcontractors who have a broad cross section of abilities, the contractor should be able to successfully adapt to changes that may occur in the construction marketplace.

3. Level of Multiple Project Handling Ability

The typical construction firm is very project oriented and the majority of management's functions are thus directly related to individual projects (Rossow and Moavenzadeh, 1976). When the construction firm assumes the responsibility for handling more than one project at the same time, it increases the complexity of its structure. Thomas and Bluedorn (1986), discussed the factors that influence the choice of an authority structure by construction firms handling industrial construction projects and productivity. One of the influencing factors discussed is the number of projects, or the work load from other projects. The level of planning, organizing, control, and coordination, resulting from handling other simultaneous construction projects, affect the organizational structure effectiveness in

delivering desired performance in these projects. The relationship between organizational structure of the construction firm and project characteristics and its influence on productivity and organizational effectiveness was also discussed by Thomas *et al* (1982, 1983).

This variable reflects the ability of the construction firm's structure to handle simultaneous work at different locations in order to increase its volume of business and its profits (Eccles, 1981b). The ability to handle multiple simultaneous projects is influenced by the organization's ability to deploy necessary resources in a manner that requires accurate planning and resource management. Deployment of resources, in different locations at the same time requires a suitable organizational structure to handle issues related to control, coordination, information flow, and communication. Multiple work projects affect the structure of the construction firm and tend to make it flatter, where project managers assume more control for their projects than the home-office manager. The measurement of the multiple project handling ability of a construction firm reflects the degree of success of the organizational structure in meeting the demands put on it, for more coordination among the various sites and home office, for more control of the resources, and for more information flow when multiple projects are handled.

4. Level of Joint-Venturing, Partnering and Alliances

This variable reflects the effectiveness of the firm's organizational structure in integrating with other construction companies' structures when the firm enters in such relationships. These relationships are usually entered into by the construction firm to access

new technology, share risks, secure financing, enter new markets, improve competitive position, and meet project requirements. According to Badger and Mulligan (1995), construction firms tend to cooperate across local boundaries of their structures by forming joint ventures, consortia, and by pooling technical expertise, to reduce the level of exposure to risk. This is done mainly by establishing collaborative relationships with manufacturers, financiers, and other suppliers. The relationships could be called upon when needed.

Partnering is an emerging tool that influences how the firm links its structure with that of other organizations to enhance performance. Partnering represents a long-term commitment between two or more firms for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources. A partnering relationship has a long-term perspective, builds trust and openness between the partners, encourages innovation, and increases awareness of needs, and objectives of all partners. Partnering forms when a set of independent firms work together to manage the flow of goods and services along the entire value-added chain in order to improve competitiveness and performance. Firms that partner have the coordination and scale associated with large firms and the flexibility, and low overhead usually found in smaller firms.

Partnering is being advocated for construction firms as means of enhancing their effectiveness. In construction, the partnering chain could start from collection of raw material to the ready-to-manufacture material phase, to components' production stage, to assembly, installation, and site construction, to the final delivered product. Construction is cited as a good example where value added partnerships (VAPs) can work very well since, it has been

using subcontracting for a long time (Cook and Hancher, 1990). Subcontracting, however in its present form, can not be qualified as a partnering relationship because, as Gardiner and Simmons (1992) outlined, general contractors usually hold the subcontractors at arm's length and attempt to keep any economic gains to themselves. Cook and Hancher concluded that construction firms can use effective partnering as a contracting strategy to replace the potentially adversarial atmosphere of the traditional bidding methodology.

5. Level of Organizational Coordination

Coordination is defined by Petit (1975), as the fitting together of the subtasks needed to accomplish an overall objective, i.e., the proper functioning of the organization. The purpose of coordination is to once again integrate the parts of a task that are separated, due to division of work. Coordination occurs in an action and time dimension. The division of work breaks up the actions required to perform the total tasks into a series of linked actions. It does so in a time dimension, so certain types of actions precede others. Coordination reunites the separate activities, with emphasis on synchronization of effort, which is required for effective production.

Without coordination, the firm's tasks would not be realized in an effective manner. This is so because workers do not understand how their activities are related to others in the firm. They do not see the "big picture" of how things are done clearly enough to know how best to integrate their work with other members work and attain the best overall results. Coordination is directed by the firm's management. This directed coordination leads to the

hierarchical structure of the firm. Activities are linked by putting the workers, who perform these activities, under the authority of a supervisor who coordinates the various tasks. When the number of workers exceeds the upper limit of the number of subordinates that a supervisor can coordinate, the task of coordinating is subdivided among two supervisors. This leads to a new need for coordination, called second order coordination of the two supervisors from still a higher level in the firm. As the size of the firm grows, additional layers of coordination must be added, and the hierarchical structure of the firm is developed. Thus, coordination has a vertical as well as a horizontal dimensions in firms (Figure 3.4). In the structural hierarchy, coordination becomes complex and more difficult. It is impossible for management at the top to cope with all the coordination problems that come up through the hierarchy. Therefore, various formal procedures are used to enhance routine coordinative work (Litterer, 1965).

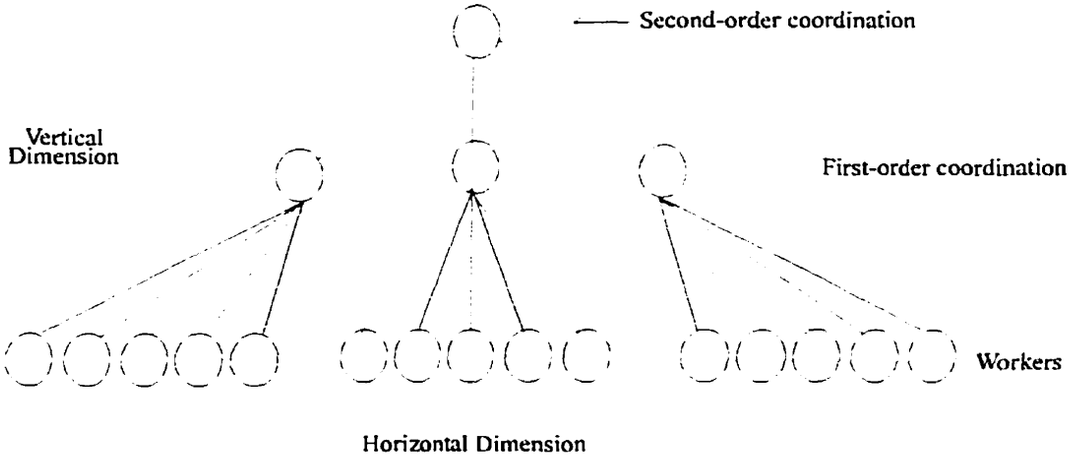


Figure 3.4: Horizontal and Vertical Dimensions of Coordination[3]

[3] Source: Petit (1975)

In brief, coordination is a necessary process that must be performed by the various management levels in the firm to ensure that basic functions such as decision making, planning, organizing, and control are carried out in a manner that ensures organizational effectiveness.

The measurement of this variable reflects how effective the organizational structure is in coordinating its internal and external relationships. It is crucial for the construction firm, especially the one which emphasizes planning in its structure to coordinate its activities and its relationships in the context of the construction process, especially since construction project organizations usually include multiple organizations. Coordination, as a criteria for effectiveness would underscore the organization's attempt to utilize necessary means to ensure cooperation and proper information flow, both internally and externally, respond to internal conflicts and possible problems arising in contractual relationships.

6. Level of Information Flow

Nearly every management textbook stresses the need for effective communication inside the firm in order to achieve organizational effectiveness. Managers and researchers agree that information flow processes underlie most aspects of organization functioning and are critical to organizational effectiveness. Snyder and Morris (1984), studied organizational-level performance measures and the relationship between four aspects of information flow (adequacy of information about organization policies and procedures, information exchange within the work group, management-subordinates information exchange, and feedback

information). Their study provided empirical evidence that supported the existence of a relationship between a high level of information flow and overall organizational performance.

According to Furnham and Gunter (1993), communication of information is a vital process in every organization. They added that when the communication of information is accurate and effective, an organization can function smoothly, but when there is a failure or breakdown in communication, or when information is distorted, there can be serious repercussions for the performance of any firm. Information flows in and around the firm and in different directions. Information also flows into and out of the firm. Within the firm, information flows up from lower to higher levels or down from higher to lower levels, and across levels in the organization. As well as formalized channels of communication, most firms contain informal channels where information flows between individuals with no restrictions. Information flows through informal channels, are sometimes more important and quicker than formal information flow (Baskin and Aronoff, 1989)

Dawson (1989), identified five important characteristics of an ideal information flow:

1. Accuracy: Message clearly reflects intention and truth as seen by sender and is received as such.

2. Reliability: diverse observers would receive message in the same way.

3. Validity: messages are consistent, allows prediction and incorporates knowledge.

4. Adequacy: Message is of sufficient quantity (detail) and appropriate timing.

5. Effectiveness: message achieves the intended result from sender's point of view.

The measurement of this variable will indicate the degree of openness and quality of information being communicated formally and informally within the organizational structure of the construction firm.

3.3.1.2 Category (2): Flexibility, Control, and Rules and Regulations

In the second category, of flexibility, control, and rules and regulations, the study hypothesizes four variables that influence how effective the organizational structure is in mediating between the flexibility-control points in the flexibility-control dimension of the competing values approach. These include:

1. Extent of Using Rules and Regulations

Rules and regulation are a set of guidelines established by the management of the firm in an effort to regulate its internal processes and interactions, and its relationships with the external environment. Fink, *et al* (1983) pointed out that all firms establish rules, procedures, and policies that govern members' behavior in ways that are not covered by other methods of control in the organization. In general, a firm aims to have rules and policies that are broad, flexible, and subject to change, in order to provide management with the freedom to involve workers (where appropriate) in the process of establishing rules that are functional to their jobs and to the overall work effort. Flexible, broad and general rules also allow management to modify and update rules in response to changing demands both inside and outside the organization. The extent of using rules and regulations underscores the firm's effort to exert

more control on its processes. Measurement of this variable underscores the extent to which regulations are being used by the construction firm. in work procedures and evaluation

2. Level of Adherence to Rules and Regulations

An important element that affects the effectiveness of established rules and regulation is influenced by the level of adherence by workers and management in an organization. Rules are no more effective than the willingness of the management and workers to abide by them. This is the prime reason why rules are established to be flexible so as to allow management to modify, update and bend rules when necessary, to suit both the internal and external environments. This variable measures how the construction firm (management and workers) adheres and complies to rules and regulations established to govern tasks and work processes.

3. Level of Control

Internally focused organizations that value control emphasize stability and control as criteria for effectiveness. Control underscores the firm's attempts to exert its influence over its processes to achieve stability. Control is a way of making sure that things happen the way they are supposed to happen. Control, in an organization is gained through mechanism and procedures. A budget is a control device and or how it is used is a control method. Flow of activities inside organizations are managed through control systems. A control system is a combination of control devices and procedures established and organized to make sure that the activities of the organization achieve the intended results.

Control systems serve a variety of purposes that include maintaining required task roles, maintaining organizational character, and minimizing and/or correcting deviations from established standards relative to quantity, quality, flow of work, costs, and safety.

The sources of control in firms stem from different levels that include: supervisory control; self-control; social control (culture); and system control. In assessing the level of control, factors that must be considered include degree of control and its affordability (effects on the organization costs and profits); sources of control given the nature of the firm and people employed by it; the impact of the control system on other organizational activities; congruence between control system and organizational goals and values.

The measurement of the level of control reflects the degree of control that the construction firm tries to exert over its processes in an attempt to ensure stability and quality of operations and, hence, organizational effectiveness.

4. Organizational Attitude Toward Change

Some firms treat change as an accidental occurrence, while others plan change. Firms that persist in resisting change eventually fail. Management in firms, or those who have sufficient influence on the firm itself, take actions to institute change because they feel a need for change. The objective of planned change is to keep the firm viable. Firms, in certain times, seek to bring about changes that would: align its structure, improve human resource practices, use of new construction processes, enter into new construction markets, or expanding into other sectors of the industry. According to Cummings and Worley (1993), effectiveness

depends, in part, on how well the firm manages these changes, especially in the face of the resistance to change that sometimes occurs without proper management of the change. Robbins (1989), discussed the organizational change process in the model (Figure 3.5). He described three actions for successful change: the unfreeze of the old state; change into the new state; and refreezing the new state. Unfreezing is necessary to overcome the pressures of both individuals and group conformity or resistance to change from the status quo. Resistance can be reduced by communication of the logic of change to workers; increased involvement of workers in the process of change, to obtain commitment; and giving support during change, through new training. After change takes place, refreezing represents the smooth incorporation of changes into the organization's system, making it more permanent.

There are a host of factors which stimulate change in firms. These include: strategic, structural, cultural, new technology, and management succession. Most of the major organizational changes originate from external events. Organizational attitude toward change, given the characteristics of the environment, plays a major role in how successful the firm is in changing and adapting to challenges in the environment. The change process can be considered a success only if the future state desired is achieved; the functioning of the firm works as planned; and the transition occurs without undue cost to the firm.

The measurement of organizational attitude toward change underscores flexibility of management and workers in the construction firm, toward instituting change in organizational processes, tasks, and work methods in order to bring about improvements to deal with the challenges facing them.

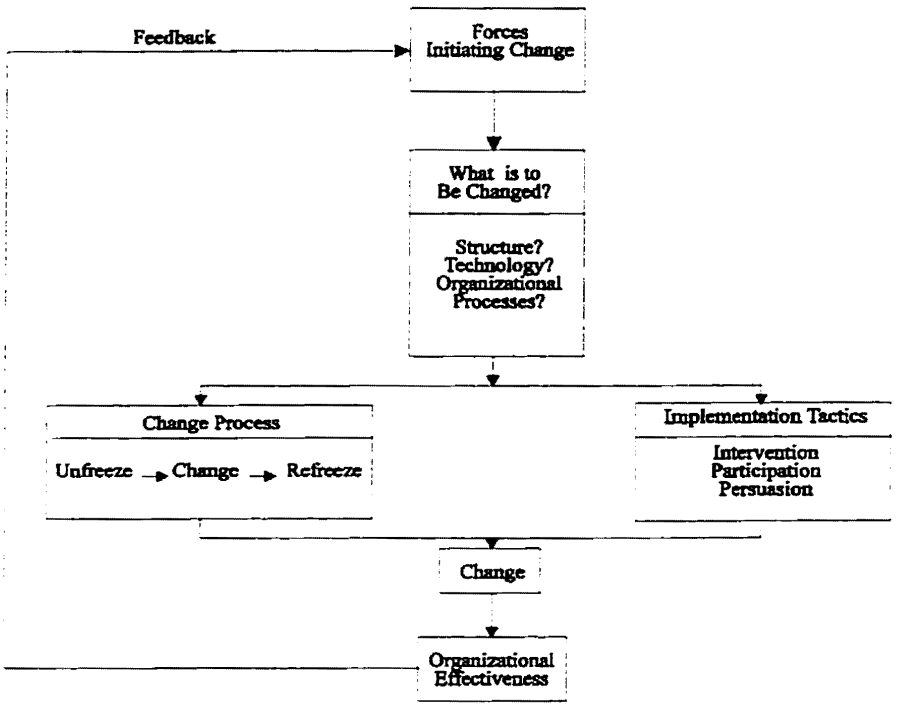


Figure 3.5 : A Model For Organizational Change[4]

3.3.1.3 Category (3): Persons-Oriented Processes

Evans (1986), listed the focus of attention on human resource management, as one of the most important factors that influence organizational effectiveness. Sophisticated human relations and human resource policies, have been found to be a common denominator in successful firms (Foulkes, 1980).

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[4] Source: Adapted from Robbins (1990)

The third category of variables in the methodology is based on the dimension of focus in the competing values approach and it is represented by how much emphasis the construction firm puts on its internal organization and persons-oriented processes. All firms must manage their internal environments through processes that target their workers. In brief, firms have to motivate their workers and create the appropriate environments to maintain their motivation. This must be done by complementing the traditional authority inside the hierarchical structure with procedures and processes to establish and pay attention to human relations in order to improve the quality of working life. Two variables are identified from this category that could describe the persons-oriented processes: strength of organizational culture existing in the firm and level of workers' participation in decision making.

1. Strength of Organizational Culture

The aims of any firm should be to create an environment in which the objectives of the organization, can be most economically and satisfactorily achieved, while at the same time providing satisfactory working conditions for the human resources (people) involved. Job satisfaction is: the extent to which workers feel satisfied or dissatisfied with work, with their place in the organization in relation to colleagues with whom they work and with the environment in which they work.

The relationship between firms that promote cultures with strong emphasis on the persons-oriented processes and performance is well established (Kotter and Heskett, 1992). Gordon and DiTomaso (1992), investigated the relationships between culture strength and

performance. Their findings supported those of Dension's (1990); that a strong culture is predictive of short-term future performance. Maloney (1989), stated that "managing culture is the key to organizational effectiveness" [5]. Taylor and Bowers (1972), determined that relationships exist between employee perceptions and attitudes, and firm success. Hansen and Wernerfelt (1989), found that a strong emphasis on human resources, and having a strong culture are significant predictors of profitability. Therefore, this variable is considered because it reflects the internal climate of the firm and its strength or weaknesses, which are directly tied to performance.

A review of the literature revealed many definitions of organizational culture. It is been defined as that sum of shared values, behavior patterns, symbols, attitudes, and normative ways of conducting work that differentiates one organization from all others. It is also defined as the shared beliefs, ideologies, and norms that influence organizational actions Deal and Kennedy (1982), identified key elements that influence organizational culture: business environment; values or norms of behavior shared by members of the organization; the rites and rituals to reinforce the values or norms of behavior, and communication and management of the cultural network that sustains the culture.

Every firm exists within a particular type of business environment and must adapt to that environment. The organization must develop expertise within that environment to perform effectively. Maloney and Federle (1990), argued that the business environment has

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[5] In Maloney, W. (1989) Organizational Culture: Implications for Management. *ASCE Journal of Management in engineering*. Vol. 5, (2), pp. 137

perhaps the largest influence on an organization's culture because it determines what is important to the organization.

Values and norms that are shared by the members of the organization represent an important element of culture. Allen and Kraft (1982), stated that norms are needed in an organization to guide interpersonal relationships. Deal and Kennedy (1982), asserted that workers who upheld good values, make success attainable, provide role models, symbolize the organization to the external environment, preserve and set standards of performance, and motivate other workers. Rites and rituals are needed to reinforce the values and norms. Several types of rituals are important; communication and social rituals; work rituals; management rituals; and recognition rituals. Communication rituals and social rituals concern issues such as how people should be addressed in the organization, how people are cultured into the organization, and how conflict is settled. Work rituals are the procedures that are utilized by members to perform the work. Management rituals govern the conduct of manager and how and by whom decisions are made or coordinated. Recognition rituals are used to illustrate the values the organization seeks to uphold.

Communication, as an element of culture, not only involves the actual information being communicated, but also the interpretation of that knowledge. Maloney and Federle (1990), argued that effective communication depends upon what they termed as the cultural network more than on the formal structure because, they reasoned, that most of the communication takes place within the cultural network. They added that managing the cultural network is the key to organizational effectiveness. Organizations must learn to identify

characters in the network, the rules that govern the network, and how to manage communication through the network. Organizations should promote strong cultures in order to reach higher level of effectiveness.

Hendrickson and Tung (1989), argued that in construction, creating a culture that promotes a workers' job satisfaction is a very complex issue. They added that construction firms must adopt strategies to lessen the effects of market demand fluctuation and their practice of firing and laying off workers as their volumes of work decline. In addition, they listed two factors that negatively, influence the strength of cultures in construction firms: the method of grouping workers into crews that are supervised in a hierarchical fashion (scientifc management philosophy); and limitations put on workers' participation in decision making due to the low level of training offered by the average construction organization and low skill level among construction workers entering the job market.

2. Level of Workers' Participation in Decision Making

Decision making, from an organizational perspective, is part of a large process (Figure 3.6). Information must be gathered, and this establishes the parameters of what can be done. Once the information is gathered, it must be interpreted. This interpretation is transmitted as advice to the decision maker as to what should be done. The decision must be authorized and conveyed before it is executed. Referring to the figure, it can be said that decisions are most centralized when the decision maker controls all the steps. As others gain control over these steps, the process becomes more decentralized.

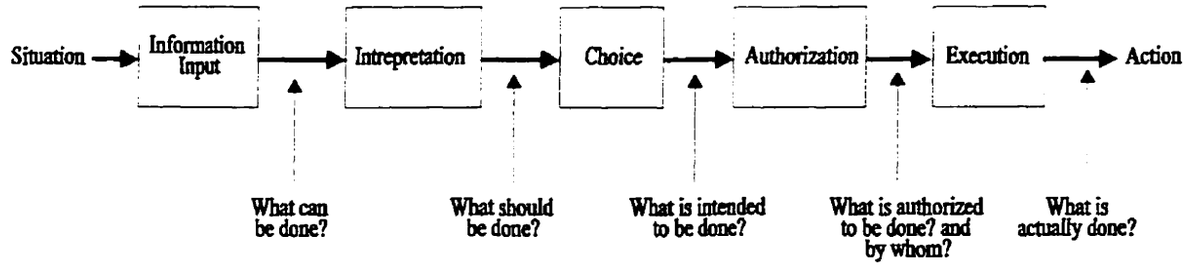


Figure 3.6: Organization Decision making Process

It is often difficult, in a firm, to identify who made a particular decision. At first glance it would appear that management, who has the final responsibility for taking a particular action makes the decision. However, according to Petit (1975), if the formal and informal channels of communication that contribute information to the decision making process are studied, it becomes clear that many individuals participate in the process upon which the decision is based.

Why is participation in decision making by workers important to the organizational effectiveness of the firm? In addition to speed, which is needed to respond rapidly to changing conditions at the point at which the change is taking place (avoiding the need to process information through a vertical hierarchy), sharing in the decision making process, can provide more detailed input into the decision. If those most familiar with an issue make the decision, more of the specific facts relevant to that issue would be available. Another important reason

for an organization to incorporate participation in decision making is the increased motivation to workers, by allowing them to make decisions that will affect how they do their jobs.

A long trail of motivational theories, beginning with McClelland (1953), and including McGregor (1960), Maslow (1970), and numerous other researchers, leads one to the conclusion that workers' participation in decision making contributes directly, and indirectly to desired organizational outcomes through three important factors affecting the workers. These are shown in Figure 3.7 and include job satisfaction, personal growth and development, and a willingness to change. For instance, high job satisfaction results in lower turnover, fewer absences, and slightly lower accident rates. It also leads to a better quality of output and to a healthier workforce (Kearney and Hays, 1994). Other research has correlated high levels of job satisfaction with reduction in lax behavior to "good citizenship" among workers (Bateman and Organ, 1983).

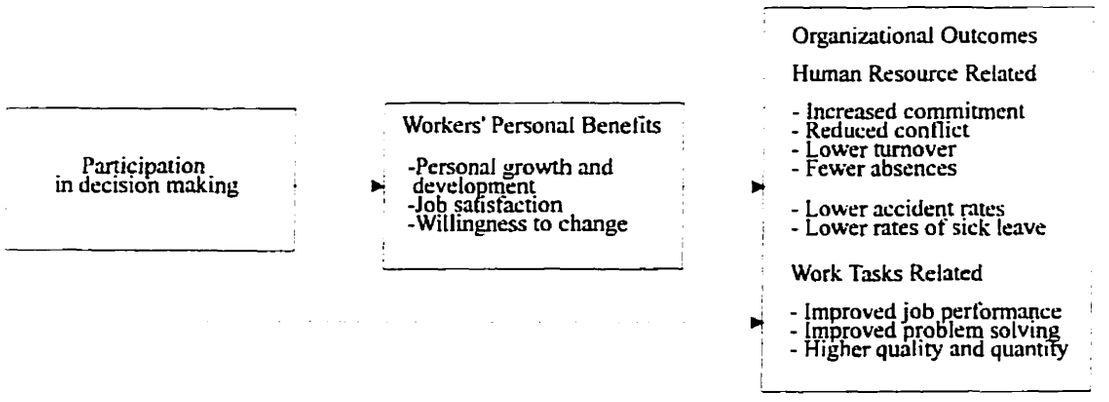


Figure 3.7: Participative Decision-Making and Workers and Organizational Benefits

The job satisfaction that results from participative decision making has been also associated with stronger organizational commitment which, Kearney and Hays (1994) held consists of (a) a willingness of workers to exert high levels of effort on behalf of the firm, (b) a strong desire to remain in the firm, and (c) an acceptance of the firm's goals and values. Using these and other definitions, researchers have linked organizational commitment resulting from participative decision-making, to high performance levels, low turnover, and other measures of organizational effectiveness (Angle and Perry, 1983).

Borcherding (1977), explored the relationship between participative approaches to decision making and their effects on job satisfaction and productivity. On the one hand, he concluded that participative decision making is common among construction firms, especially those dealing with small size projects, and usually leads to higher productivity. On the other hand, he argued that because participative decision making no longer takes place on large industrial projects, supervisors, and especially workers in firms handling such projects, lose their enthusiasm toward construction work, and frequently, work productivity is reduced.

Maloney (1993, 1994), discussed the fact that construction firms in the U.S. suffer declining performance because worker involvement is minimal due to workers management practices in most US construction firms are mainly characterized by the scientific management philosophy. Furthermore, he argued that, it is important that worker involvement must become a way of life and that the greater the worker involvement, the greater the benefits to the firm.

Schrader (1972), reported that a workers' participation in decision-making leads to increased effectiveness and productivity in construction firms. He based his conclusions on a study in which the productivity of a work group that participated in changing work methods increased 14 %, as compared to another group that did not participate in the decision-making process. In construction firms, he concluded that a high level of participation by the workers in the decision-making process would eventually result in improved construction production methods, lower resistance to change, and more enthusiastic commitment.

Schrader also discussed two reasons used by management of construction firms to explain their failure to use participative decision-making in a regular fashion: the long period of time required for participative decision-making to become effective; and the short length of time the average worker is employed in construction. He discussed a practical approach to participative decision making in construction work crews such as crew performance analysis by members of the crew, the use of workers of long standing, plus a crew elected representative to help plan methods. This, he argued, would create a sense of involvement in the group that would be carried to the crew. He also argued that very little time is required for studies of daily construction operations of the crew which are characterized by a low need for expertise and coordination beyond the crew. Furthermore, he concluded that construction employment is reasonably stable, even though many workers can still be labeled temporary. He argued that these workers are, nevertheless, a good source of new ideas and practical know-how.

Measurement of the level of participation in decision-making by workers reflects the style of how the construction firm manages its workers and their involvement in decision - making to promote commitment. Internally focused construction firms that value flexibility in the assessment of effectiveness, are more sensitive to their workers. They allow a higher of degree of participation in decision making through a strong culture of team work. Internally focused construction firms that value control in the assessment of effectiveness, stress adequate communication and information management through a strong culture of hierarchy, with clear rules and regulations for performance.

Drucker (1988), in his information-based organizations approach that enhances organizational effectiveness, advocated that workers must be organized as teams. The members of teams must do different tasks, participate in decision making and direct themselves. In these teams the culture is strong because the workers are empowered to do their work. The key to effectiveness is that everyone in these task focused teams constantly thinks through what information he/she needs or can give to maintain and improve organizational effectiveness.

3.3.1.4 Category (4): Strategy (Means and Ends)

The fourth category reflects what strategic means and ends is used by the construction firm to achieve organizational effectiveness. This category of variables underlie a firm's attempts to adopt effective strategies in an effort to increase its competitiveness and adapt to its environment. There are common themes in the definition of strategy. Strategy is concerned

with the means to meet ends. According to Ansoff (1988), a strategy is also a set of rules for guiding decisions about organizational behavior. Strategy can be thought of as the firm's intent, that is often expressed in a plan. The plan states the mission, objectives, goals, and the actions required to fulfill them, in the context of the firm's internal and external environments. In business terms, strategy is fundamentally how to position a firm in its competitive environment in a way that allows continuous superior performance to that of others. Strategy could be explicit as a part of a formal strategic planning process or an implicit intent across the organizational functional dimensions and structures.

Organizational strategy is typically formulated for three levels: technical/production level; business level; and corporate level. A technical/production strategy determines how the firm's internal operation deals with the transforming of inputs into outputs and is mainly concerned with the present and getting the job done. Business strategies are formulated in order to position the firm competitively in markets. Corporate strategy identifies the firm's missions and main objectives. The firm's mission is its *raison d'être*. A mission may be narrowly or broadly defined and probably has emanated from the founding entrepreneur's vision of what the firm should be and it is normally expressed in qualitative terms. A firm's objectives stem from the mission and is expressed normally in quantifiable terms.

Two views have emerged on the nature of strategy. The first perspective views strategy as a planning mode. A strategy is worked out in advance, is explicit and firms develop a systematic and structured plan to meet objectives. The second perspective sees strategy as an evolutionary mode. Strategy evolves over time, it is not thought out and planned but it is a

stream of significant decisions. This is the evolutionary mode, or logical incrementalism as called by Ansoff (1988). Planned strategy is worked out in such detail that it becomes difficult to alter once implemented. An evolutionary strategy, on the other hand, requires the selection of the best strategy under a given set of circumstances. It advocates flexibility to be able to adapt. This requires careful environmental scanning, monitoring, and evaluation. Typically, a firm's overall strategic posture is determined by a mixture of both.

According to the competing values approach, externally focused firms that value control in the assessment of effectiveness, emphasize planning and goal setting that promotes productivity and accomplishment. Therefore, in this category, the methodology hypothesizes two variables: the level of planning carried out by the construction firm; and its level of goal-setting.

1. Level of Planning

Planning, as a strategy, is described by Hunger and Wheelen (1993), and shown in Figure 3.8. The process includes four main phases. In the first phase, the firm carries out an environmental scan where the firm analyzes its strength (S), weakness (W), opportunities (O), and threat (T). This is commonly referred to as 'SWOT' analysis. In the second phase, firm's mission, objectives and strategies to achieve them, and policies of strategies are formulated. Programs, budgets, and procedures are carried out in the third phase to implement the formulated strategies. The last phase includes evaluation and control of strategies.

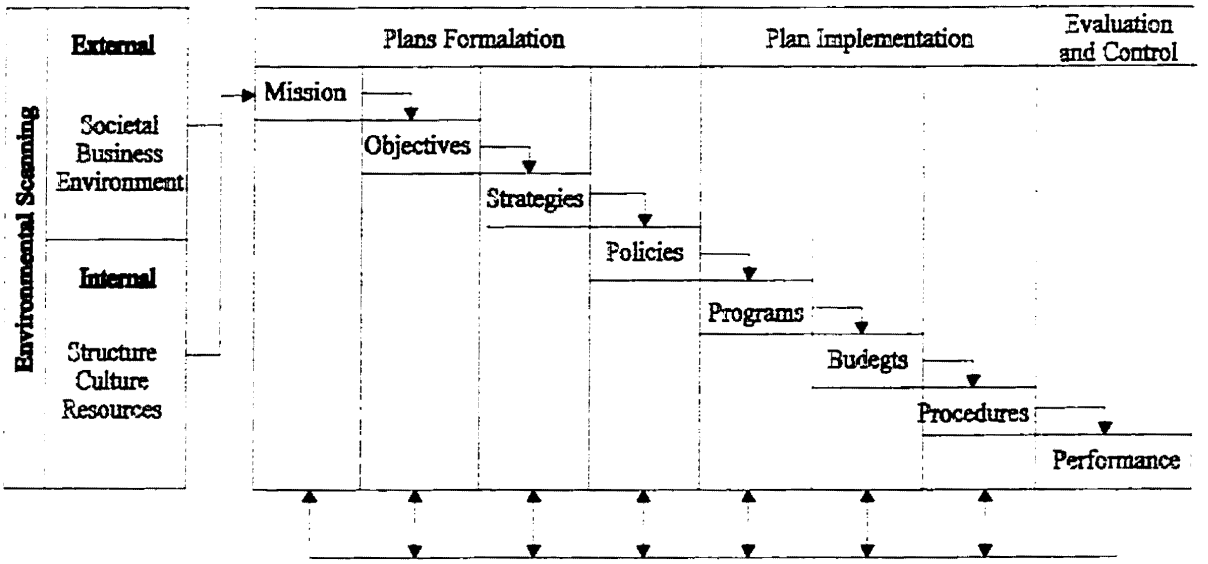


Figure 3.8: Planning Process Model[6]

Many researchers discussed the importance of strategic planning to the effectiveness of construction organizations, large and small, regardless of the aspect of construction in which they are involved. Furthermore, these researchers stress that strategic planning should be recognized as an important aspect of the organization's overall activity and requires as much attention as routine operations, Warszawski (1994). Betts and Ofori (1992), Langford and Male (1991), advocated the use of strategic planning and management techniques for the construction firm to gain organizational effectiveness and hence a competitive advantage.

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[6] Source: Adapted from Hunger and Wheelen (1993)

The measurement of the level of planning by the construction firm underscores the firm's attitude toward utilizing planning in routine operations and in adapting to its internal and external demands in its environment in achieving organizational effectiveness.

2. Level of Goal Setting

Bengtsson (1984), reported that goals are indispensable to the effective management of construction firms. Naylor and Ilgen (1984), observed that over 90% of the reviewed studies, that deal with goal setting, reported at least some beneficial effects on performance. They concluded that goals can strongly influence performance, and that the process of setting goals is an important aspect with respect to work motivation.

Whatever the firm's ultimate goals, there are a number of means of pursuing each of them. A goal of profit can be served by an efficient production activity and a creative marketing and bidding program. A goal of safe working conditions can be promoted through procuring equipment with built-in safety features, good maintenance and training of workers, all of which encourage the workers to follow safe operating practices.

There are a number of descriptive ways of categorizing goals, Dawson (1992) gave the following categories that are typical for a business firm: financial goals, marketing goals, production goals, quality goals, technological goals, growth goals, and social goals. Scott[7] identifies three models: rational, natural, and open system as sources of any organizational

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[7] In P.S. Goodman and J. K. Pennings, eds., New Perspectives on Organizational Effectiveness (San Francisco: Jossey-Bass, 1977), Chap. 4

goal. The rational model, in which goals are specified from goods, services, activities, and productivity levels; the natural model, in which goals emerge reflecting human needs of the organization at the different levels; and the open system model, which recognizes organizational goals such as adaptability, flexibility in the exchange of resources between the organization and its environment.

Goals are established as necessary consequence of the firm's self definition, its purpose of existence, and managing them involves dealing with goal conflicts. These conflicts stem from inherent differences in the nature of goals, due to the competition of resources associated with having different goals at the different levels of the firm. Firms are normally faced with an enormous number and variety of goals to manage. General goals versus specific goals; long- term versus short- term goals; organization level goals versus sub-organization goals; and high priority versus low priority goals. The ideal situation for a firm is when there is congruence among the different types of goals and the firm can cope with situations where congruence is not possible and manage the conflict in order to minimize its negative effect on the rational goals.

Two characteristics of such means to a final goal are noteworthy. The means themselves constitute ends (goals). First, efficient production does not just happen, rather, it is a goal that firms strive to obtain. It is a sub-goal that itself can be pursued through variety of means, and these means constitute sub-sub-goals. Each major goal of a firm is the beginning of a chain of goals and sub-goals, in which each sub-goal is a means to a larger goal. Second, each sub-goal tends to be more concrete and more of a tangible objective than the related

goal. The goal of efficient production activity is more concrete, in the sense that it is a more definitive guide for decision making, than is the goal of high profit. According to Fink *et al* (1983), as one moves along the means-ends chain, the sub-goals tend to become ever more "operational". Thus, one can visualize firm's goals as a tree shaped structure of goals, with a mean-ends chain fanning out from each major goal to more operational goals. In Figure 3.9, section of a possible means-ends chain of goals for a construction firm is shown.

Various perspectives have been given for goal setting strategy in the context of the construction firm. Channon (1978), alluded to goal setting strategy in terms of the extent of diversification. Newcombe (1990), also discussed the extent of market diversification, by the type of the constructed product, and geographical expansion (i.e., spread of activities). Newcombe considered four markets: single market, dominant market, related market and unrelated market; local, regional, national, and international. He concluded that construction firms start as small, local and single market and gradually grow, mainly through goals deliberately set by the firm.

The measurement of the level of goal setting by the construction firm underscores its strategy to motivate workers toward effective performance by the achievement of organizational-level goals such as increasing profits levels, increasing costs effectiveness, growth into other construction sectors, improving level of process quality, improving client satisfaction, and increasing workers' involvement. Most of the current literature recommends that management strategize to find ways of incorporating these goals into their construction

firms to increase performance. Bengtsson (1984), found that the goal of profit within the construction firm headed the aggregate reply at all hierarchical levels in the firm.

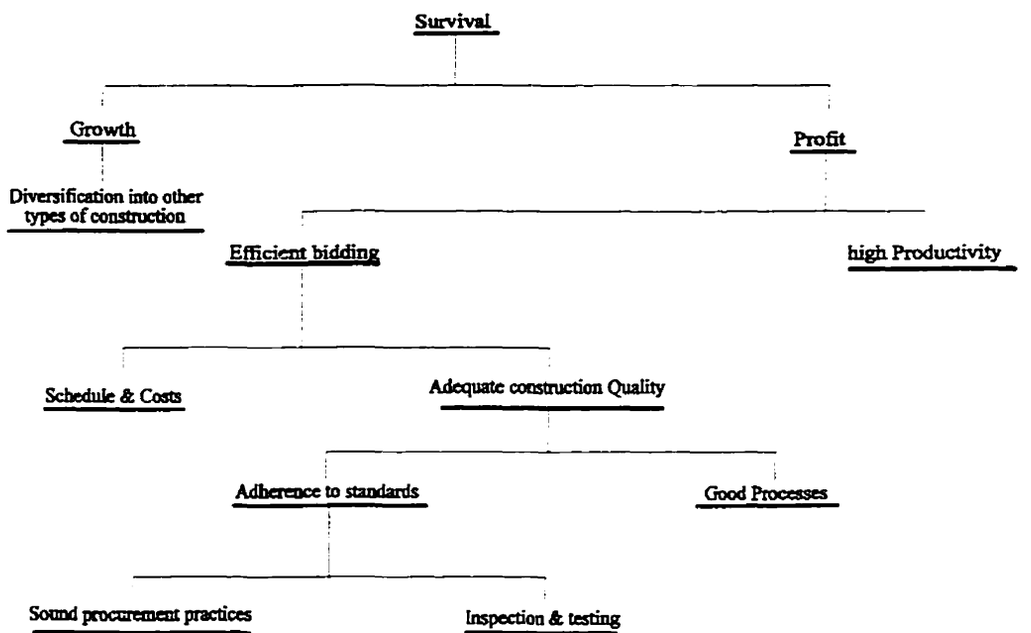


Figure 3.9: Example of A Goal-Chain For A Construction Firm

Maloney (1994), discussed the strategic planning for human resource management and stated that the typical construction firm pursues a strict hierarchical method of workers management which leads to decreased workers involvement. Therefore, when a construction firm sets a goal of increased workers involvement, this indicates the level of importance that the firm attaches to changing its traditional hierarchical process of workers management to practices that have the potential of worker satisfaction and higher performance.

3.4. SUMMARY

In this chapter, the logic of the proposed methodology was first discussed. The competing values approach is selected as valid approach. The proposed methodology uses the effectiveness criteria in the approach's four ideal models, to hypothesize four categories of fourteen variables deemed relevant for examining organizational effectiveness of the construction firm. The ideal levels of these variables, represent the levels that a homogenous group of construction firms attempts to pursue at a certain stage in their life cycle in order maximize their organizational effectiveness. The levels of these variables are used to predict the organizational effectiveness of firms depending how close the levels of these variables in the firm to the ideal levels.

Secondly, because the ideal levels of the hypothesized variables are not known, three main steps were outlined to determine, empirically, a quantitative model. This model relates the ideal levels of these variables to a referent measure of organizational effectiveness. The process of model development outlined, includes (a) the identification of variables that will be used to predict effectiveness according to the criteria of the four ideal models in the competing values approach; (b) a field study in which the identified variables are operationalized, measures constructed, and data collected; and (c) data analysis, model selection and validation.

The rest of the chapter was devoted to discussing the identification of variables. This section dealt primarily with how the fourteen variables were identified from four categories of criteria relevant for examining effectiveness along the three dimensions of the competing

values approach of structure, focus and strategy means and ends. These variables are hypothesized to influence the organizational effectiveness of the construction firm, and hence, can be used to predict it. In the first category of structural context, six variables were identified that include the level of integration of services offered by the construction firm; level of using joint-venturing, partnering, and alliances; level of subcontracting; level of multiple project-handling ability; level of coordination; and level of information flow.

In the second category of flexibility, rules and regulations, four variables were identified that include the level of rules and regulations used by the firm; level of adherence to rules and regulations by management and workers; level of process control; and organizational (management and workers) attitude toward change. In the third category of persons-oriented processes in the firm, the methodology identified two variables. These include the strength of organizational culture and the level of workers' participation in decision making. Finally, in the category of strategic means and ends, two variables were identified: the level of planning; and level of strategic goal-setting by the firm.

Measurement scales for the identified variables must be constructed in order to test the usefulness of these fourteen variables in predicting the level of organizational effectiveness of the construction firm. In the following chapter, measurement of the variables is discussed.

CHAPTER (4)-OPERATIONALIZATION OF VARIABLES

4.0. INTRODUCTION

In order to perform analysis, to test the study's hypothesis and develop a model of prediction, a valid referent measure of organizational effectiveness must be constructed and the fourteen hypothesized variables operationalized. In the first section of this chapter, a description of how organizational effectiveness of the construction firm is operationalized into a measure that can be used as a referent in data analysis and model building. In the second part, measurement of the fourteen hypothesized variables is described.

4.1. ORGANIZATIONAL EFFECTIVENESS: A REFERENT MEASURE FOR ANALYSIS

This research uses the synthesis of the goal model and multiple constituencies approach to operationalize a measure for organizational effectiveness of the construction firm to be used in the analysis and model building. This is achieved by incorporating into the measure, the three performance domains or goals that are most commonly used to rate the

achievements of the construction firms, by management and the constituents of the construction project. These three domains relate to the firm's level of performance in construction projects. These are: duration of execution, and whether or not the firm accomplishes its work tasks without any delays according to the stipulated time schedule in the work contract; costs of performance, and whether or not the firm accomplishes its work tasks within budgeted costs; and, finally, quality of execution, and whether or not the firm's work is within specifications. Table 4.1 shows the effectiveness criteria that the four main parties, typically involved in the construction project use in their evaluation of the construction firm, and possible satisfaction indicators that are used to measure these criteria.

Table 4.1: Constituents' Effectiveness Criteria

Constituents	Effectiveness Criteria	Satisfaction Indicator
Customer	Work quality, price, and duration	Satisfactory costs and quality level, no delays
Firm's Owner	Project's performance	Within budget, schedule, and contractual specs High profits
Subcontractors	Contractual relationships	Satisfactory transactions
Public agencies	Compliance to Codes	No codes violation.

The most common criteria used by constituents of construction firms to evaluate the satisfactions of their goals can be linked to the level of performance in completed construction work. Past performance achievement in the three domains can be shown to influence the

concerns of the constituents as shown in Figure 4.1. The percentage of construction work projects that were completed within scheduled time (p_1), percentage of construction work completed within budgeted costs (p_2), and percentage of construction work finished within contractual quality specifications (p_3) can be used to indicate how effective the firm was for the period considered in satisfying its goals and those of its constituents.

Completion within scheduled time, would not only satisfy the goals of the customer, but also that of the firm itself, especially if there is an incentive for more profits with timely completion. The suppliers and workers of the firm would also stand to gain from timely completion because of the increased probability that payments and salaries will be made on time. In addition, timely completion means that the firm could free its resources and make itself available for more work which could bring in more profit and at the same time secure longer employment for the workers and give its suppliers an opportunity for more work.

Completion of the work tasks within the scheduled duration or less, also implies that no gross code violations occurred. Delays usually result from work failing inspections and firms having to perform considerable rework to satisfy clients' specifications and public codes.

Completion of the work tasks within budgeted costs or less means that there were no cost overruns that the customer or the firm itself had to incur, through claims or work stoppage. This implies that the firm would realize planned profits. It also, implies that estimates used by the firm in procuring subcontractors and suppliers for part of the work were accurate, which means that the transactions with these suppliers were completed satisfactorily. Completion of the work with quality, in a manner as specified by the contract,

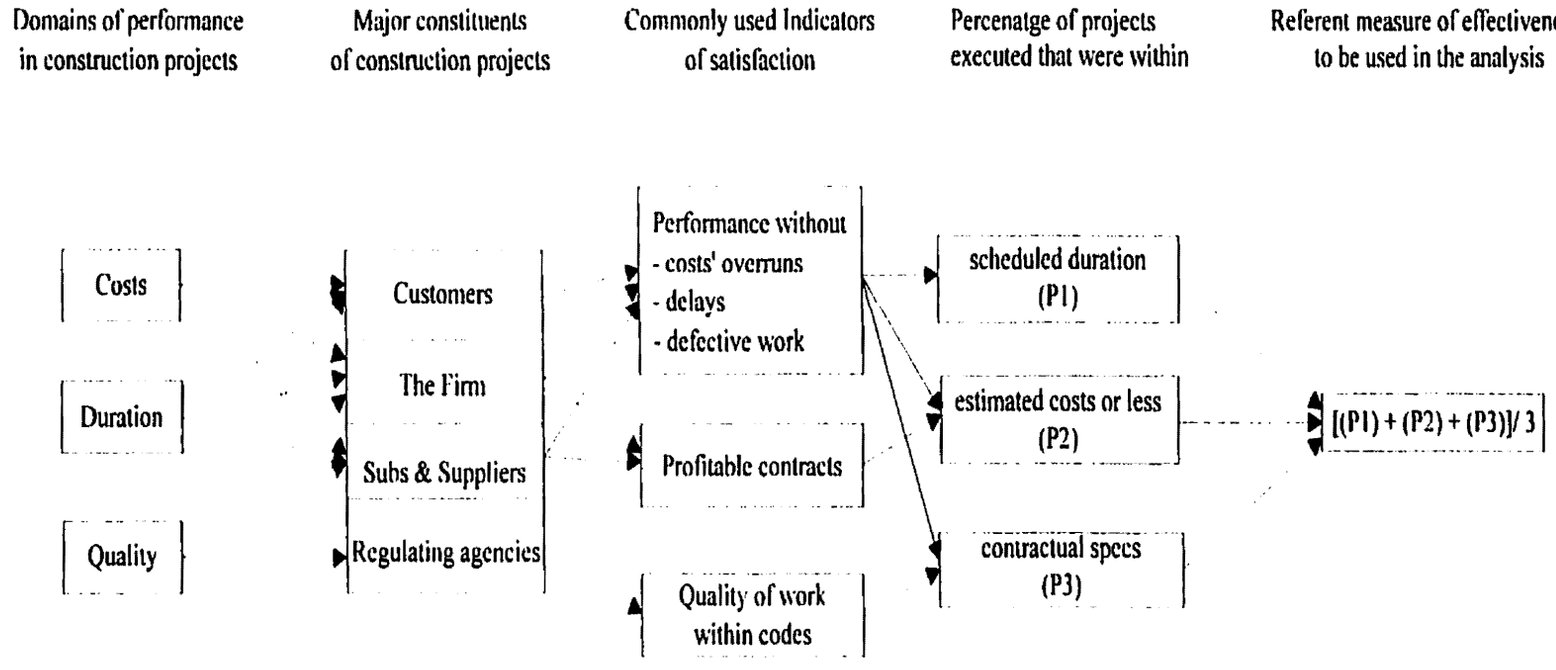


Figure 4.1: Synthesis of A Referent Measure For Organizational Effectiveness of the Construction Firm

would not only satisfy the customer, but also public agencies who monitor the work's compliance to governing codes and regulations. In these three domains, past projects performance could provide a snap shot of how effective the firm has been in satisfying its major constituents. The methodology uses the level of past project performance as a referent measure of organizational effectiveness to be used in the analysis.

As shown in Equation 4.1, the measure is calculated as the average of three percentages: percentage of projects that were completed within scheduled duration (p_1); percentage of projects that were completed within budgeted costs or less (p_2); and percentage of projects that were completed without any claims by customers for defective work or excessive rework as a result of bad work quality (p_3). Equal weights are assigned to each component of the measure, since it is the assumption taken here that they are equally important in determining how effective the level of performance is.

$$\textit{Level of performance } (Y) = \frac{(p_1 + p_2 + p_3)}{3} \qquad \textbf{Eq (4.1)}$$

where:

p_1 = percentage of projects that were completed within scheduled duration.
p_2 = percentage of projects that were completed within budgeted costs or less.
p_3 = percentage of projects that were completed without any claims by customers for defective work or excessive rework as a result of bad work quality.

4.2. OPERATIONALIZATION OF THE FOURTEEN VARIABLES

Since all the identified fourteen variables can not be directly observable through hard quantitative measures, ratings are used to measure management and workers perceptions of

variables' characteristics, aspects, and magnitudes in the firm. According to Furnham and Gunter (1993), although perceptions-based measurement are essentially subjective in nature, using such measures is just as systematic as using hard measures, and can yield valuable organizational data in a quantifiable form that can be treated as hard measures, if proper research techniques are used. According to Babbie (1992), rating can be used to ask the respondents to estimate the magnitude (level) of a characteristic or quality that an object possesses. Quantitative scores, along a continuum, such as shown by Figure 4.2, have been supplied to respondents and are used to estimate the strength of the attitude, perception, or belief. In other words, the respondents indicate on a scale, the position where they would rate the level or quality of the object under question. The ordinal scale arranges objects or alternatives, according to their magnitude, in an ordered relationship. The Likert scale is such a scale, where respondents indicate their ratings of the attribute under question by checking the appropriate number on the scale.

In the 7 anchor-points ordinal Likert scale, shown in the figure, the anchor value 7 indicates a very high level, the anchor value 6 indicates a high level, the anchor value 5 indicates an above average level, the anchor value 4 indicates an average level, the anchor value 3 indicates a below average level, the anchor value 2 indicates a low level, and the anchor value 1 indicates a very low level.

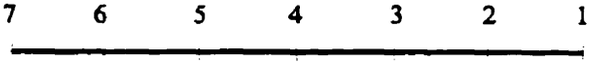


Figure 4.2: 7-Anchor Points Ordinal Scale

Typically, there are multiple items (statements) according to which the respondents rate the attributes of the variable under question. To measure the level of the variable under question, rating for each attribute is assigned a weight, then the ratings are added to determine the overall rating. Usually the weights are assumed to be uniform across the various items because the priori contribution of each item to the overall level of the variable is not known. An example illustrates the above. Suppose there are four items used to measure the various attributes of the variable, then the ratings for all items are added up and divided by the number of items (equal weights are assigned) which is four in this case, to determine the overall average rating of the variable.

All variables are measured using summated rating method (Likert method) using a 7 anchor-points scales that are constructed similar to the one described above. The reason that a 7 anchor-points scale is chosen rather than one with five or three anchor points, is that a better and more accurate rating will result from using such a scale. The strength of culture variable is measured using the constant sum scale discussed by Zikmund (1994) and used by Maloney and Federle (1993) in their methodology to assess organizational culture. Constant-sum scales are typically used to measure attitudes and they approximate an interval type measure, however it is still considered an ordinal scale.

In order to overcome response bias, measurement of variables is based on multiple ratings and two different levels of workers within the construction firm. Multiple ratings are solicited from the managerial level and from the workers' level. Ratings obtained from the two

different levels in the firms are first aggregated and then averaged within each firm in order to create organization-level scores.

For each variable, the research generated a number of items that reflect the various aspects of the variable without emphasis on any one. Multiple items are used for each variable because they constitute a more reliable measure than individual items. Each item can be thought of as a "measure" in its own right, of the strength of the variable in that aspect. Theoretically, according to Devellis (1991), the universe of items is assumed to be infinitely large, and that precludes any hope of identifying it when items are developed to measure constructs or variables. This research attempted to identify multiple items for each variable or construct that exhaust the possibilities for types of items that capture the essence of the variable. Items that are used to operationalize and the measurement of the fourteen variables are as follows:

4.2.1. Level of Subcontracting

The level of subcontracting used by the construction firm is assessed in thirteen areas that rate the extent to which in a typical construction project, architectural and construction activities are entrusted out to other firms. The scale used to measure the level of subcontracting by the firm asks the respondent to rate the extent to which, in an average size project, the following activities are entrusted out to other firms:

1. Design and planning.
2. Site work.

3. Substructure.
4. Superstructure (skeleton).
5. Floor systems.
6. Interior wall system.
7. Exterior wall system.
8. Roof systems.
9. Masonry work.
10. Metal work.
11. Electrical system.
12. Mechanical systems.
13. Finish work.

4.2.2. Attitude Toward Change

Organizational attitudes toward change is assessed using a 7 anchor-points Likert scale that ranges from strongly agree '7' to strongly disagree '1'. Eight areas are addressed that deal with the following:

1. Level of accepting changes by the workers and their ease in accepting changes in organizational processes.
2. Level of viewing changes as an effort to improve processes by the workers in the construction firm.
3. Level of eagerness exhibited by workers to understand changes in processes.

4. Level of eagerness exhibited by workers to adopt alternative work methods in case of adopting new work processes.
5. Level of encouragement exhibited by management for needed organizational change.
6. Level of changes based on regular processes reviews by management.
7. Rate of introducing changes to improve processes that keeps pace with improvements by other organizations in related fields.
8. Level of achieving the resumption of smooth operations in a reasonable time period once changes are introduced in the firm.

4.2.3. Extent of Rules and Regulations

The extent of rules and regulations variable is assessed using a 7 anchor-points Likert scale that ranges from very extensive regulation '7' to very little regulation '1'. Four areas that relate to the extent of using regulation in work procedures, instruction, and evaluation by the construction firm are addressed and they are as follows:

1. Extent of using rules and regulations in management of all work processes.
2. Extent of using rules and regulations in instructions and procedures for performing work tasks.
3. Extent of using rules and regulations in work evaluation.
4. Extent of using rules and regulations to control management and workers' actions.

4.2.4. Level of Adherence to Rules and Regulations

The level of adherence to rules and regulations variable is assessed using a 7-point Likert scale that ranges from very strict adherence '7' to very little adherence '1'. Assessment is performed in three areas that relate to the level of adherence to rules and regulation by management and workers of the firm and they are as follows:

1. Level of adherence by management of the construction firm to established rules, regulations, and procedures.
2. Level of adherence by workers to established rules, regulations, and procedures.
3. Level of adherence by the firm to established rules, regulations, and procedures that govern relationships with external entities such as suppliers, subcontractors, other partners and allies.

4.2.5. Level of Control

This variable is measured using a 7 anchor-points Likert scale, that ranges from very high '7' to very low '1'. Level of organizational control is assessed in the following areas:

1. Level of using documentation and formalized rules, jobs descriptions, and work procedures in all organizational processes.
2. Level of using control systems to standardize outputs.
3. Level of controlling all organizational processes to meet quality standards.
4. Level of using control tools and methods by management in monitoring processes' quality.

5. Level of using various methods to check, monitor, and update progress of all work activities to ensure that production is within target schedule and budgeted costs.
6. Level of maintaining smooth operations in all organizational processes.

4.2.6. Level of Integration In Services Offered

Measurement of this variable is performed by using a 7 anchor points scale that asks the respondent from the management level to rate the firm according to very high level '7' to very low '1'. The level of integration in services offered by the construction firm is assessed in five areas that measure the level of integration up-stream or downstream of the construction phase in the construction process as described by Sanvido (1988). These five areas are assumed to have equal weights in determining the overall level of integration in the firm and they are as follows:

1. Extent of services offered by the organization in the A/E design field.
2. Level of self owned construction materials supply.
3. Level of construction financing services offered to clients.
4. Operating and maintenance services offered by organization to its clients.
5. Extent of providing construction management services.

4.2.7. Level of Joint-venturing, Partnering, and Alliances

The level of joint venturing, partnering, and alliances is assessed in four areas that measure the degree of utilizing such contractual methods by the construction firm in project delivery and the quality of entering such relationships. These are as follows:

1. Level of developing these relationships with other organizations, i.e. suppliers, subcontractors, general contractors, A/E consultants or any other related fields.
2. Level of improvement in quality and cost of performance when these relationships are used.
3. Level of accepting contracts that requires joint venturing agreements.
4. Level of maintaining the quality of these relationships with other firms if any in a positive manner.

4.2.8. Level of Multiple Projects Handling Ability

The level of multiple project handling ability is measured in five areas that assess the construction firm's ability to perform satisfactorily when assuming multiple projects responsibilities. The 7 anchor-points scale, from strongly agree '7' to strongly disagree '1' is used to measure this variable by asking the respondent to rate the statements regarding the following aspects of multiple project handling:

1. Absence of any noticeable negative changes in quality of organizational processes when the organization assumes the handling of multiple projects. This is emphasized because any negative changes would indicate poor handling by the organization.

2. Organizational structure suitability for handling simultaneous projects' responsibilities.
3. Acquisition of needed resources (labor, equipment, material, capital) for handling multiple projects in a reasonable and timely manner. This is an important consideration in rating this variable because it shows whether the firm can acquire the necessary resources to carry out its responsibilities in a satisfactory fashion, or not.
4. Frequency and size of multiple projects handled simultaneously by the firm. Regularity indicates, to some degree, that the firm has the capabilities to deal with complex organizational issues involving multiple projects handling.
5. Level of satisfaction of the various projects' constituents when the construction firm is handling multiple projects simultaneously.

4.2.9. Strength of Organizational Culture

Culture has been defined as coherence (Deal and Kenndey, 1982; Weick, 1985); as homogeneity (Ouchi and Price, 1978); as stability and intensity (Schein, 1985); as congruence (Schall, 1983); as internalized control (DiTomaso, 1987). While there are many definitions of culture, very few researchers tried to operationalize it. These various researchers seem to consider cultural strength a function of some combination of the following: who and how many accept the dominant values in the firm; how strongly, deeply or intensely the values are held; and how long the values have been dominant. Gordon and DiTomaso (1992),

operationalized the strength of culture by the consistency of survey responses, across work groups within the firms, to questions that dealt with eight cultural factors. These were: clarity of strategy/shared goals, systematic decision-making, integration and communication, innovation/risk-taking, accountability, action orientation, fairness of rewards, and development and promotion from within. They defined consistency as the inverse of the variance in questionnaire responses (the degree of gap between the different perceptions). Based on this method, the degree of agreement on cultural characteristics across respondents is related directly to performance. As mentioned in chapter 2, Maloney and Federle (1993), discussed the degree of gap between perceptions of cultures by managers and their subordinates in construction and engineering organizations, as an indicator of the state of effectiveness in the units studied. This study adopted the questionnaire developed by Maloney and Federle to rate the strength of overall culture in the firm. The main reason for using Maloney's and Federle's questionnaire is because the way it is constructed. In line with the competing values approach, Maloney's and Federle's ratings method considered that different types of cultures can be equally effective while other methods did not allude to this factor.

The strength of organizational culture variable is thus measured using the constant method scale developed and used by Maloney and Federle. The scale contains statements about culture's six major aspects of dominant organizational characteristics: organizational climate, success factors, organizational glue, leadership style, and management style. In each area, four statements are given, with each describing one of the four types of cultures in the ideal configurations as identified by the competing values approach. The respondent is asked

to rate the firm according to how similar the situation is inside the firm to that description, by dividing 100 points among the four statements. The division is accomplished by distributing more points to the statements that describe very closely the situations inside the firm. If the situation inside the firm resembles only one of the statements, then all 100 points are assigned to that statement, if two statements describe the situation equally, then 50 points are given to each statement. If all four statements describe the situation equally, then 25 points are given to each, etc. Ratings are added for each of the four types across the six areas and averaged.

Scoring the strength of culture is done then by identifying the minimum deviation in perceptions between management average total and the workers' average total across the four types of culture. The degree of deviation in perceptions of culture across the four types is converted to a measure of cultural strength on an ordinal scale with 7 "very strong" to 1 "very weak" using the expression in Equation. 4.2 below. Maximum possible deviation is 100 points. A deviation in perception of this magnitude corresponds to a very low rating of 1 on the 7 anchor-points Likert scale, indicating a very weak culture. Therefore, it follows that when the deviation is approximately zero, the corresponding rating on the Likert scale should be very high or very strong '7'. Therefore each, 100/7 or approximately 14 points of deviation in perception, equal one point reduction on the 7 anchor-points Likert scale .

$$\text{Rating using a 7 anchor points Likert scale} = \left(7 - \frac{|\textit{Total Dev}|}{14}\right) \qquad \text{(Eq.) 4.2}$$

where

$|\textit{Total Dev}|$ = absolute value of total deviation between workers' and management's overall culture perceptions

4.2.10. Level of Workers' Participation In Decision Making

The level of workers' participation in decision-making in the construction firm is assessed in seven areas that measure the degree and quality of participation in decision-making by workers. These relate to the following:

1. the degree that decision making responsibilities is based on sharing and participating among all workers in each organizational unit and across all units.
2. the level that management encourages workers to initiate and take decisions concerning work processes.
3. the level that management encourages workers to participate in decisions making by soliciting their input and ideas regarding all organizational processes.
4. the level that management consults with workers before making decisions concerning work processes.
5. the level that decisions making within organizational units is actually based on consensus of almost all workers or their teams.
6. the level that workers in the organizations are not penalized for wrong decisions but are encouraged to take responsibilities for their actions in a constructive manner.
7. the level that positive workers' attitude exist in the organization towards participation in decisions making responsibilities as evident by their volunteering of opinions in decisions making.

4.2.11. Level of Coordination

The level of inter- and intra-organizational coordination activities is assessed using a scale that ranges from very highly coordinated '7' to very little coordination '1'. The firm's level of coordination is assessed in five areas that measure the following :

1. Level of coordination in activities that govern work flow in all organizational processes.
2. Level of coordination of work relationships inside the various organizational units.
3. Level of coordination of work relationships among the various organizational units.
4. Level of coordination in activities concerning problem and conflict resolution in and among organizational units.
5. Level of coordination in activities concerning work relationships between the construction firm and its subcontractors, suppliers, allies, and partners.

4.2.12. Information Flow

Information flow (openness and quality of communication) is assessed in six areas that was addressed by Guevara and Boyer (1981), to test problems in quality and openness of flow of information within construction firms both vertically within the organizational hierarchy and laterally across organizational units. 7 anchor-points scale of strongly agree '7' to strongly disagree '1' is used to rate the following:

1. Level of noticeable interruptions in flow of information, both vertically within the organizational hierarchy and laterally across the organizational units.

2. Level of accuracy of information being communicated across all levels of the firm and associated level of distortion in communicated information.
3. Level of regularity and sufficiency in information quality and quantity, communicated inside the firm.
4. Level of accessibility and availability of information when needed by workers.
5. Level of regularity and timeliness of feed-back information about organizational processes and work tasks.
6. Level of quality and quantity of information flow with external entities sharing in work relationships. i.e., other firms, suppliers, subcontractors, and partners.

4.2.13. Level of Planning

Level of planning by the construction firm is assessed in four areas that relate to the following:

1. Level of planning used by management to develop strategies to achieve stated general business goals and process quality goals.
2. Level of regularity of the planning process.
3. Level and frequency of scanning the internal environment (internal organizational audits) of the firm in development of planning strategies for improvement of internal organizational processes.
4. Level of using strength, weakness, opportunities, and threats (SWOT) analysis in development of planning business strategies for the firm.

4.2.14. Level of Goal Setting

The level of goal setting is assessed by the level of importance the construction firm attaches to goal setting in six major areas that deal with the following goals:

1. Increasing profit levels.
2. Increasing costs effectiveness.
3. Growth into other construction sectors.
4. Improving level of process quality.
5. Improving client satisfaction.
6. Increasing workers' empowerment.

4.3. SUMMARY

A measure of organizational effectiveness of the construction firm is developed to act as a referent, against which organizational effectiveness is judged in the analysis and the development of the methodology. It is determined by the average level of performance over the last five years of operation and is calculated as the average percentage of percent of projects completed within scheduled time or less, percent of projects that were completed within budgeted costs or less, and percent projects that were completed without claims and within acceptable levels of compliance to clients specifications.

The fourteen variables were operationalized and scales for their measurement were developed. Likert scales were constructed for measurement of all the identified variables except for the strength of culture, which was measured using an existing scale. All other variables were measured by multiple items scales that rate the magnitude of the important attributes for each variable.

CHAPTER (5)- FIELD SURVEY: QUESTIONNAIRE DESIGN, ADMINISTRATION, AND DATA COLLECTION PROCEDURES

5.0. INTRODUCTION

The first part of the chapter covers the design of the questionnaires used to collect data needed for model development. In the second part, survey and data collection procedures are discussed.

5.1. QUESTIONNAIRE DESIGN

Two types of self administered questionnaires were used in this research (appendix A). A questionnaire that targeted management of the construction firm and a second one that consists of only parts of the first one and is targeted at the workers level in the firm. The reason that a single questionnaire was not used in this survey was because a number of questions regarding data concerning the firm could not be answered at the workers' level. For example the scales that measured the level of subcontracting, level of integration in services offered, level of planning, and level of goal-setting were omitted form the workers' level questionnaire. This is also the case concerning values that had to be

extracted from firm's records by management concerning performance relating to time of execution, costs, and quality levels of projects handled in the past by the construction firm.

In designing these questionnaires to collect the necessary data for the variables of the study, as discussed in the last chapter, Likert scales were mostly used. Each scale is composed of various items that attempts to measure the underlying attributes of the particular variable. The number of items in each scale is given in Table 5.1 Each item is represented by a statement to which the rater could indicate his rating according the scale associated with the variable. Statements of items in all the scales were made as clear as possible to facilitate response by rater in indicating his attitude about the items in his respective firm. Open ended questions were strictly avoided which eliminated the need for coding of answers by respondents and raw data collected were transferred directly into a computer format. In the interest of being unambiguous and precise, items were made as short as possible so the rater could understand without any misinterpretation and respond quickly without any difficulty.

5.1.1. Questionnaire Construction

Babbie (1992) discussed the importance of the formatting and arrangements of items in self administered questionnaires and points out that the format of the questionnaire is just as important as the nature and wording of the statements used in acquiring the ratings. Based on his recommendations, the questionnaire used by this research in the data collection were constructed to be uncluttered, spread out, and of reasonable length.

Table 5.1: Types of Measurement scales and Number of Items

	variable	type of scale used	No. of items
1	level of subcontracting	Likert scale with 7 anchor points	13
2	attitude toward change	same	8
3	extent of rules and regulations	same	4
4	adherence to rules and regulations	same	3
5	level of control	same	6
6	level of integration in services offered	same	5
7	level of joint-venturing, partnering, and alliances	same	4
8	multiple project handling ability	same	5
9	strength of organizational culture	Constant-sum scale (divide 100 points among four statements per item)	6
10	workers' participation in decision making	Likert scale with 7 anchor points	7
11	level of coordination	same	5
12	level of information flow	same	6
13	level of planning	same	4
14	level of goal setting	same	6

Items in each scale were ordered to begin with the simplest and most interesting statements to motivate the respondent to give viable answers and avoid response-set among

the respondents where answers are patterned after each other. This could happen especially if the set of statements began with several that indicated a particular orientation.

Scales were ordered by arranging the items relevant to each variable together. Variables were not given names in order not to bias responses. Each variable was assigned a code number. Clear basic instructions are given using phrases as to exactly how to use the scales in indicating the appropriate rating of the items under question. An example is the instruction used in scale used for measuring the level of goal setting variable where the respondents were first told exactly what is the intention of the scale i.e. to rate the importance of setting the specific goals listed, then they are informed how the scale works in assigning the appropriate rating i.e. that each described goal should be assigned a rating from highly important (7) to highly not important (1).

Since the firms considered in this study are comprised from ICI firms operating in the Saudi Arabian construction industry, the questionnaire was constructed using Arabic and English languages (appendix A shows English version). This is so because of the nature of firms operating in the Saudi theater. Although all firms surveyed are Saudi owned, it became apparent that provision of questionnaires in both languages is a must because there are some managers and workers that are non-Arabic speaking. In the survey, in some cases, both management and workers of a number of firms surveyed used the questionnaires which were written in Arabic and in other firms, only management used the questionnaires written in Arabic and workers used the version written in English. In a small number of firms surveyed, both management and workers used the questionnaire written in English.

5.1.2. Questionnaires Administration

5.1.2.1. Number and Levels of Respondents

The questionnaires are designed as self-administered. In each organization, three workers' level questionnaire and two management's level questionnaire are distributed to be filled out. As seen in Figure 5.1 the management level questionnaire is used to collect ratings from two different people. The first must be from a higher management position in home-office i.e. manager of operations, and the second is from the management ranks in the field operations i.e. field project manager. In the second type that targets the workers' level in surveyed firms, three field workers' responses are solicited. These three workers are to be chosen randomly and must be at the skilled worker level.

There are two main reasons for seeking responses from two levels in the firm. The first and most apparent is to avoid response bias in measurement of organizational attributes. This is achieved by averaging and aggregating the ratings from the two levels when calculating variables' scores. The second reason pertains to the measurement of certain variables such as strength of culture where the gap in perceptions of the two levels was used to arrive at an aggregate score of the variable for the firm. In order to measure response consistency, Denison (1990) used the inverse of the variance (gap) in questionnaire responses across work groups within firms. Gordon and DiTomaso (1992) used the deviations in perceptions of different levels of work groups within firms to measure adaptability and stability.

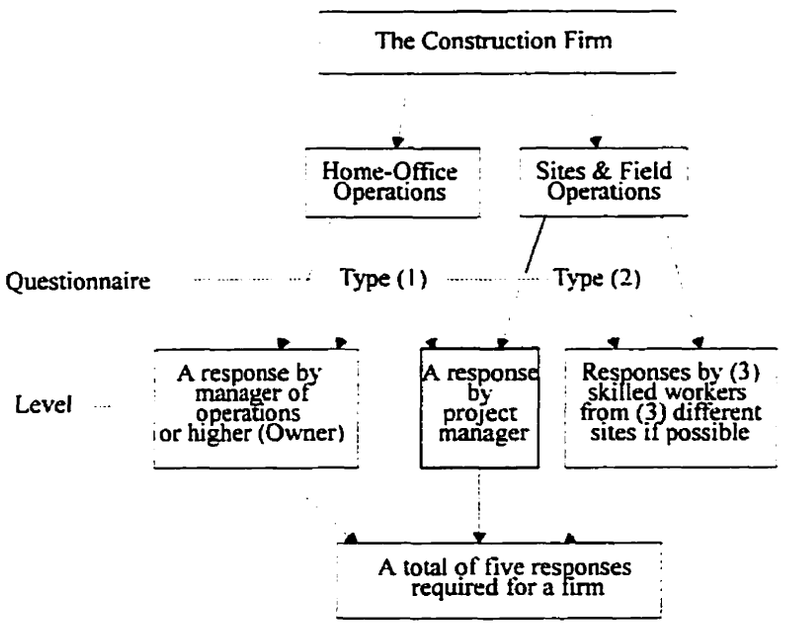


Figure 5.1: Level and Number of Questionnaires' Respondents

5.2. SURVEY

5.2.1. Design

Zikmund (1994) described five stages in selection of a sample for field studies which include defining the target population, selecting a sampling frame, determine if a probability or non probability sampling will be used, determine sample size, and select actual sampling units. As mentioned before, the target population of this study is all construction firms operating primarily in the institutional, commercial, and industrial sectors of the construction industry limited to the Saudi Arabian markets and been licensed to operate in these sectors for the last ten years. This may represent a limitation to generalize the research results to other firms that

have just started operating in ICI construction and for other ICI firms operating in different regions of the world. However, regardless of the regional differences between industries between the different countries in the free world, due to its nature, construction firms operating in these industries still share many characteristics which lessen the impact of focusing the study only on one market.

As a sampling frame, the Saudi Ministry of Commerce's official commercial register[1] was used to identify construction firms that are classified as ICI firms operating in Saudi Arabia. Therefore, this study only considered those firms that are officially registered as such and have the appropriate licenses to operate in such capacities and been licensed for the last 10 years to handle contracts in ICI construction. The sampling frame contains many types of construction firms: general contractors (GC) type firms; specialty subcontractors type firms in all types of electrical, mechanical, petro-chemical, and industrial installations, and turn-key constructors.

The sampling frame contained more than 500 firms. This number represents the firms that define themselves publicly as exclusively operating in one type or a combination of the three types this research is focused on. A number of these firms have regional offices in large cities of the country and had local branches in smaller ones. The actual number of firms who are performing ICI work might be higher, however the bulk of their activities are focused on other types of construction such as residential, building, and heavy construction.

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[1] See the Saudi Exclusive Companies Directory 1994. Shrooq Publications. Jeddah. Saudi Arabia

A sample size of approximately 30 percent or 150 firms was chosen from the total number of firms in the sampling frame. It was felt that this sample is sufficient to represents the various characteristics and environments existing in the industry. More than 200 construction firms operating in the ICI sectors of the Saudi construction industry were initially contacted to seek agreement to participate in the study and to ensure sufficient number of responses. However only 120 firms or approximately sixty percent of those firms contacted agreed to participate in the survey.

The firms were selected randomly from the sampling frame. This was done by arranging a list of all names in the sampling frame in a random manner based on the first and last letter of the name of the organization. Then the names were selected based on the position of the name on the list where every third name was chosen. This last step was repeated until the desired number was chosen. Once the firms in the survey were identified, management in each firm was contacted personally in order to explain the purpose of the research and its goals. Forms of the questionnaires were given manually to the management and passed to three field workers at work sites, randomly identified by the management.

5.2.2 Procedures

The first thirty cases were administered personally by the author over a period of three months to firms selected randomly from the list of chosen ICI construction firms. During this period extensive preparation were taken, where in each case, multiple visits were necessary to allow management the opportunity to review their records and to arrange for a final meeting

with all respondents in some cases to discuss the language used in the questionnaires and any misinterpretations that may be encountered. This was primarily done to eliminate problems concerning language used and misinterpretations by prospective respondents. As a result, minor adjustments were made in the format and language used.

The distribution of questionnaires to the rest of the cases chosen was performed manually where the questionnaires were delivered to management with a cover letter explaining the administration procedures. Follow-ups through Facsimile and telephone conversations ensured the collection of remainder of questionnaires distributed.

5.3 DATA COLLECTION

As stated before the first thirty records were collected manually in person by the author. Due to time constraints, all possible number of remaining records were collected within two months period through facsimile and regular mail after telephone follow-up.

Upon checking and decoding the questionnaires with the marked scales, the results were tabulated using a commercially available spreadsheet software. Firms' records with any missing data were deleted. Only complete records are considered by this study. Although, some researchers are of the view point that records with missing data, still could be used by substituting average values in place of missing values, in this study, it was decided to reject any record with missing data because of the difficulty of determining how much missing data warrants acceptance or rejection. As a result, only the complete records of seventy one

percent of those agreed to participate in the survey or eighty six records were deemed satisfactory to use to develop and test the desired prediction model.

5.4. SUMMARY

Based on the operationalization of variables in the last chapter, scales for their measurement with various number of items are constructed in two types of questionnaires These two types solicit perceptions from management and workers levels in the construction firm in order to collect necessary data to perform analysis and model building, testing and validation. Requirement of five responses from each firm is necessary to avoid bias in perceptions and improve reliability of data collected.

Survey design and procedures are discussed. ICI firms surveyed by the study were firms licensed for operating in the Saudi Arabian construction market for the last ten years and maintaining operations for the last five years. A total of eighty six data records were deemed complete and satisfactory for use in data analysis and developing and validating the desired prediction model that is discussed in the next chapter.

CHAPTER (6)- MEASUREMENT AND DATA ANALYSIS

6.0. INTRODUCTION

In this chapter analysis of collected data and results are presented. In the first part reliability of scales used in measurement is discussed. In the second part, descriptive statistics and intercorrelation analysis of the fourteen independent variables and the dependent variables are presented.

6.1. MEASUREMENT

6.1.1. Reliability of Measurement Scales

Ghiselli *et al* (1981), considered reliability the fundamental issue in measurement. Devellis (1991), defined scale reliability as the proportion of variance attributable to the true score of the variable to be measured by the scale. An assessment to test the reliability of using the constructed scales in measurement of the variables was performed. This was accomplished in two steps. First, the scales were used in measurement during data collection. Second, the data collected by each scale were checked for reliability using the widely used measure of reliability called the internal consistency method (Carmines and Zeller, 1979).

6.1.1.1 The Internal Consistency Method

Internal consistency is typically equated with Cronbach's (1951) coefficient alpha (α). This method gives a value similar to Cronbach's alpha measure. Alpha measure is examined in some detail for several reasons. First , it is widely used as a measure of reliability. Second, an exploration of the logic underlying the computation of alpha provides a sound basis for showing how it measures reliability.

Variability in a set of scale's items scores can be attributed to two sources. Either as the result of actual variation that the scale measures (i.e. true variation in the variable), or the result of error in the scale. Another way to think about this is to regard total variation as having two components: "signal" (i.e., true differences) and "noise" (i.e., score differences caused by everything else) . Computing alpha measures as explained in next sections partitions the total variance among the set of items in a scale into signal and noise components. The proportion of total variance that is signal equals alpha. Thus, another way to think about alpha is that it equals 1-error variance.

To understand internal consistency more fully, it helps to examine the covariance matrix for a multi-items scale. A typical covariance matrix for three items scale that measures a variable (X) is shown in Table 6.1. A covariance matrix is a more general form of a correlation matrix. The diagonal elements of the covariance matrix are variances (i.e., covariances of items with themselves-just as the unities along the main diagonal of a correlation matrix are variables' correlations with themselves. The off-diagonal values are covariances, expressing relationships between pairs of items scores. Using the customary

symbols, the covariance matrix of three items that, when added together, make up a scale that measures a variable (X) is shown in Equation. 6.1.

Table 6.1: Typical Covariance Matrix

	Item (1)	Item (2)	Item (3)
Item (1)	Var_1	Cov_{12}	Cov_{13}
Item (2)	Cov_{12}	Var_2	Cov_{23}
Item (3)	Cov_{13}	Cov_{23}	Var_3

$$X = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \sigma_{13} \\ \sigma_{12} & \sigma_2^2 & \sigma_{23} \\ \sigma_{13} & \sigma_{23} & \sigma_3^2 \end{bmatrix} \qquad \textbf{(Eq.) 6.1}$$

What can this matrix tell us about the relationship of the individual items to the scale as a whole? The covariance matrix has a number of useful properties. Among these, is the fact that adding all of the elements in the matrix together (i.e., summing the variance, which are along the diagonal and the covariances off the diagonal), gives a value that is equal to the variance of the scale as a whole (assuming that the items are equally weighted). So, if the terms are all added up, the resulting sum would be the variance of scale (X) or (σ_x^2).

Alpha (α), is defined as the proportion of a scale's total variance that is attributable to a common source, presumably the true score of the variable underlying the items. Thus, to compute alpha (α) , it would be useful to calculate a value for the scale's total variance and a value for the proportion that is "common variance".

All variation in items that is due to the variable, X, is shared or common. The term "joint" is used to describe this variation. When X varies, as it would, for example, across firms having different levels of the variable X, scores on all the items will vary with it because it is a cause of those scores. Thus, if X is high, all the items scores will tend to be high; if X is low, they will tend to be low. This means that the items will tend to vary jointly. So, the underlying variable affects all of the items and, thus, they are correlated. The error terms, in contrast, are the source of the unique variation that each item possesses. Whereas all items share variability due to X, no two share any variation from the same error source under measurement assumption.

Each item's score in a scale varies as a function of the shared variation with other items due to variation of the underlying variable and the unshared variation as result of error. It follows that the total variation of a scale measuring a variable (X) as a whole must be a combination of these two sources. According to definition of reliability (Devellis, 1991), alpha (α) equals the ratio of common-shared variation to total variation.

Now, consider a n-item scale that measures a variable (X) whose covariance matrix is as follows:

$$\begin{bmatrix} \sigma_1^2 & \sigma_{12} & \sigma_{13} & \cdot & \cdot & \cdot & \sigma_{1n} \\ \sigma_{12} & \sigma_2^2 & \sigma_{23} & \cdot & \cdot & \cdot & \sigma_{2n} \\ \sigma_{13} & \sigma_{23} & \sigma_3^3 & \cdot & \cdot & \cdot & \sigma_{3n} \\ \cdot & \cdot & \cdot & & & & \cdot \\ \cdot & \cdot & \cdot & & & & \cdot \\ \cdot & \cdot & \cdot & & & & \cdot \\ \sigma_{1n} & \sigma_{2n} & \sigma_{3n} & \cdot & \cdot & \cdot & \sigma_n^2 \end{bmatrix}$$

The variance (σ_x^2) of the n-item scale equals the sum of all matrix elements. The entries along the main diagonal are the variances of the individual items represented in the matrix (the variance of the *i* th item is signified as (σ_i^2) with itself as a result from computing the sampled scores from the sample. Each represents variation that is unique to that single item. Therefore, the sum of the elements along the main diagonal, $\sum \sigma_i^2$, is the sum of variances of the individual items with themselves. The covariance elements between the variables represents joint variation. Thus we can express the ratio of unique or non-joint variation to total variation in *X* as:

$$\sum \sigma_i^2 \Big/ \sigma_x^2$$

It follows that alpha as the proportion of shared or joint variation, is the complement of the ratio above which equals as follows :

$$\alpha = 1 \; - \; (\sum \sigma_i^2 \Big/ \sigma_x^2)$$

To adjust for the number of items (n) in the scale and limit the range of possible values for alpha (α) to between 0.0 and 1.0, theoretically, the expression above is multiplied by (n/n-1) which results in Equation (6.2). It is clear that the number of items (n) in a scale, that attempt to measure the various attributes of the underlying variable, affect the reliability of the scale. This expression for alpha measures was used in this research to calculate reliability of scales used to measure all the variables, except for the strength of culture.

$$\alpha = \frac{n}{n-1}\left(1 - \frac{\sum \sigma_i^2}{\sigma_{xi}^2}\right) \qquad \text{Eq. (6.2)}$$

As an example of using the method described above to compute an alpha value for a scale used by this methodology, the covariance matrix computed from collected data is shown below of the eight items in the scale that was used to measure the attitude toward change variable.

$$X_{11} = \begin{bmatrix} 0.45 & 0.26 & 0.28 & 0.29 & 0.07 & 0.11 & 0.01 & 0.14 \\ 0.26 & 0.35 & 0.23 & 0.21 & 0.07 & 0.07 & 0 & 0.13 \\ 0.28 & 0.23 & 0.34 & 0.23 & 0.08 & 0.12 & 0.02 & 0.17 \\ 0.29 & 0.21 & 0.23 & 0.53 & 0.24 & 0.22 & 0.16 & 0.23 \\ 0.07 & 0.07 & 0.08 & 0.24 & 0.49 & 0.33 & 0.22 & 0.31 \\ 0.11 & 0.07 & 0.12 & 0.22 & 0.33 & 0.45 & 0.18 & 0.16 \\ 0.01 & 0 & 0.02 & 0.16 & 0.22 & 0.18 & 0.26 & 0.16 \\ 0.14 & 0.13 & 0.17 & 0.23 & 0.31 & 0.16 & 0.16 & 0.42 \end{bmatrix}$$

All variances values were calculated using the responses to each item that were collected from the seventy six surveyed construction firms. For each item, there was a total of 380 different scores (5 respondents per firm times 76 firms). The sum of variances along the diagonal that represents ($\sum \sigma_i^2$) is equal to 3.28 and the sum of all elements in the matrix, which represents the total variance of the scale (σ_x^2), equals 12.9. In order to calculate an alpha value (α) for the scale that was used to measure the attitude toward change variable, we substitute in Equation (6.2). The value is calculated to be 0.85 which, indicates that the scale has a very good reliability. According to Devellis (1991), scales with Cronbach's alpha values above 0.60 have a fair degree of reliability. $\sum(\sigma_i^2)$ and (σ_x^2) values, for all scales, indicate alpha (α) measures between the values of 0.62 and 0.88 (Table 6.2). These results indicate a fair degree of reliability for some measures and good reliability for others. As mentioned previously, all Cronbach's alpha values were based on 380 responses.

6.2. DATA ANALYSIS

The data were analyzed using the commercial Statistical Analysis Systems (SAS) computer software package provided by SAS Institute Inc. The SAS is an integrated system of software products that enables to perform statistical and mathematical analysis among other things. Various SAS language and procedures were used in calculating the descriptive statistics, intercorrelations analysis, and multiple regression analysis used in model fitting and checking model adequacy.

Table 6.2: Scales' Cronbach's Alpha (α) Values

Scale	Variances $\sum(\sigma_i^2)^a$	Variances $(\sigma_x^2)^b$	n[c]	n/(n-1)	alpha (α)
X_1	4.62	25.10	13	1.083	0.88
X_2	3.28	12.89	8	1.143	0.85
X_3	1.32	2.86	4	1.333	0.72
X_4	1.21	1.90	3	1.67	0.62
X_5	2.63	7.20	6	1.20	0.76
X_6	1.82	4.27	5	1.25	0.71
X_7	1.77	3.64	4	1.33	0.66
X_8	1.48	3.95	5	1.25	0.78
X_9	.	.	.	.	.
X_{10}	2.45	8.55	7	1.167	0.83
X_{11}	2.12	5.10	5	1.25	0.75
X_{12}	3.24	7.83	6	1.20	0.70
X_{13}	1.55	4.16	4	1.33	0.83
X_{14}	1.66	5.17	6	1.20	0.81

[a] the sum of variances of the individual items with themselves
[b] the sum of covariances of all items and variances of the individual items with themselves
[c] number of items in the scale

SAS procedures were used and yielded an output that helps in interpreting the results of the analysis performed. Explanation of the various SAS procedures that were used, and meaning of their outputs are covered in SAS user's guides.[1]

[1] See SAS language and Procedures and SAS User's Guides. Version (6) fourth edition. 1990. SAS institute Inc.

6.2.1. Descriptive Statistics

X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, and X_{14} represent the fourteen hypothesized variables, where:

X_1 = *Level of subcontracting*
X_2 = *Attitude toward change*
X_3 = *Extent of rules and regulations*
X_4 = *Level of Adherence to rules and regulations*
X_5 = *Level of control*
X_6 = *level of integration in services offered*
X_7 = *Level of joint venturing, partnering, and alliances*
X_8 = *Level of multiple project handling ability*
X_9 = *Strength of organizational culture*
X_{10} = *Level of workers' participation in decision making*
X_{11} = *Level of coordination*
X_{12} = *Level of information flow*
X_{13} = *Level of planning*
X_{14} = *Level of goal setting*

Based on the aggregated organizational level scores for the seventy six construction firms (appendix B), Table 6.3 shows the values calculated for the mean, standard deviation, and aggregated minimum and maximum scores for each of the fourteen variables and (Y), the referent measure of organizational effectiveness. The values are based on data from the seventy six records used in model fitting and selection. Level of subcontracting (X_1) has a mean score of 4.79, standard deviation of 0.32 with a minimum score of 3.92 and a maximum score of 5.62 on the Likert scale. The mean score indicates that, on average, the firm within the surveyed group, perform the majority of its work contracts with a slightly above average level of subcontracting in the thirteen specialty areas considered by the study.

Table 6.3: Descriptive Statistics

	Descriptive statistics				
Variable	N	Mean	Std Dev	Minimum	Maximum
X_1	76	4.79	0.32	3.92	5.62
X_2	76	4.47	0.44	3.72	5.34
X_3	76	4.96	0.19	4.5	5.25
X_4	76	4.70	0.35	3.88	5.25
X_5	76	5.93	0.27	5.00	6.33
X_6	76	4.36	0.44	3.58	5.25
X_7	76	5.14	0.42	4.25	5.93
X_8	76	3.87	0.36	3.00	4.66
X_9	76	5.00	0.59	3.81	6.54
X_{10}	76	4.81	0.34	4.00	5.50
X_{11}	76	4.49	0.22	4.06	5.18
X_{12}	76	3.05	0.39	2.00	4.00
X_{13}	76	4.79	0.23	4.25	5.25
X_{14}	76	5.05	0.15	4.50	5.30
Y	76	0.68	0.14	0.40	0.90

The variable attitude toward change (X_2) has a mean score of 4.47, a standard deviation of 0.44, and a minimum and maximum scores of 3.72 and 5.34 respectively. This points out that on average, the (ICI) construction firm from the surveyed group, accepts and

views organizational change positively as a way to remain flexible and adaptable to its environment.

For the extent of rules and regulations variable (X_3), the mean score is 4.96, the standard deviation is 0.19, and the minimum and maximum scores are 4.50 and 5.25. The mean score indicates an above average use of rules and regulations by the firms surveyed, as a prime method of organizational control. The level of adherence to rules and regulations (X_4) has a mean score of 4.70, a standard deviation of 0.35, and a minimum and maximum scores of 3.88 and 5.25. These results indicate that the workers and management of the firms surveyed, have an above average level in using and adhering to the rules and regulations as means of organizational control. This is emphasized by the mean score of 5.93 for the level of control variable (X_5), which indicates that the firms surveyed have a high level of control inside their organizations. It is interesting to note that both the mean scores for the control and the attitude toward change variables among the surveyed group are above average level, which might be understood as that this group of firms value both control and flexibility in their pursuit of organizational effectiveness. This is in line with Cameron's (1986a) suggestion that firms pursue paradoxical criteria of effectiveness

The nature of markets in ICI construction tends to lead the average firm operating in such markets, especially GC type firms, to offer more services in order to be competitive. This is confirmed by the mean score of 4.36 for the level of integration in services offered variable (X_6). Results show that the surveyed firms have a slightly above average level of integration in

offering the services evaluated by this study which include in-house A/E, material supply, financing, operating and maintenance, and construction management.

Regarding use of joint-venturing, partnering, and alliances (X_7) in project delivery by the surveyed firms, the results show an above average level with a mean score of 5.14, a standard deviation of 0.42, and a minimum and maximum scores of 4.25 and 5.93. This level can be attributed to the nature of ICI construction contracts especially in the industrial sector, where joint-venturing and alliances are usually requested and promoted by the owners.

Results show the multiple project handling ability variable (X_8) with a mean score of 3.87, a standard deviation of 0.36, and a minimum and maximum scores of 3.0 and 4.66. The surveyed firms have a slightly below average level. This could be explained by the nature of work contracts in ICI construction, which, because of their size, tend to limit most firms operating in such sectors to one job at a time. One could argue that this indicates a better competitive position for firms that can operate with a high level of multiple project handling ability.

The variable strength of organizational culture (X_9) has a mean score of 5.0, a standard deviation of 0.59, and a minimum and maximum scores of 3.81, and 6.54 which indicates that most firms surveyed, have an above average cultural strength. This could be explained by the fact that in order for firms operating in ICI construction to be competitive, they need to be managed in a way that foster a better internal climate, strong leadership, strong organizational glue, clearly defined success criteria, and conducive management style. This is emphasized by

the mean score of 4.81 for the level of workers' participation in decision making (X_{10}), which shows an above average level for the firms surveyed.

A mean score of 4.49 for the level of coordination (X_{11}), shows that the firms surveyed have an average level of coordination in their intra- and inter-organizational activities. The level of information flow (X_{12}) has a mean score of 3.05, standard deviation of 0.39, and a minimum and maximum scores of 2.00 and 4.00. This indicates that on average, the ICI firm among the surveyed group has a below average level of quality and openness of information as defined in this study.

The mean score for the level of planning (X_{13}) is 4.79, which indicates that this groups of firms pursue an above average level of using activities' planning as an organizational strategy. For the level of goal setting (X_{14}), the mean score is 5.05, which indicates that among the group, there is an above average level of importance of setting goals such as increasing profit levels, increasing costs effectiveness, growth into other sectors, improving quality, improving clients' service, and increasing workers' participation in decision making.

Finally, the surveyed group has a mean score of 0.68 for the referent measure of organizational effectiveness (Y) with a standard deviation of 0.15 and a minimum score of 0.40 and a maximum score of 0.90. The mean score indicates that on average, a firm from the surveyed group, performed effectively in 68 percent of its past projects, within budgeted costs and/or within scheduled duration, and/or according to contractual specifications. In the group, the lowest score is for a firm that only performed in 40 percent of its past projects, within budgeted costs and/or within scheduled duration, and/or according to contractual

specifications. The highest rating was achieved by a firm that performed 90 percent of its past projects within budgeted costs and/or within scheduled duration, and/or according to contractual specifications.

6.2.2. Intercorrelations

The SAS procedure "PROC CORR" was used on the aggregated organizational scores to calculate Kendall (τ) Tau intercorrelations coefficients scores for all fourteen variables (X_i's) and (Y) the referent measure of organizational effectiveness. Table 6.4 summarizes the SAS output that gives intercorrelations values and the corresponding (p) values for each correlation below it. The (p) values are considered at the 0.05 level for significance testing. Use of Kendall (τ) Tau correlation coefficient in the analysis rather than using Pearson's (ρ) rho correlation coefficient, is chosen due to the ordinal nature of scales used in scoring and measuring the variables of the study. Kendall (τ) values give a better estimate of the covariance relationship when the variables under questions are rank or ordinal in nature.

As shown, *level of subcontracting* (X_1) has very low correlation with organizational effectiveness ((τ)= 0.0256) with no statistical significance which could be interpreted as no relationship. *Level of integration in services offered* (X_6), and *level of goal setting* (X_{14}), *level of using joint venturing, partnering, and alliances* (X_7) show low correlations with (τ) values of 0.2896, 0.2643, and 0.2648. However, their level of statistical significance is moderately

Table 6.4: Kendall Tau Correlation Coefficients (τ)

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	(Y)
1	level of subcontracting	1.0000 0.0000														
2	attitude toward change	-0.068 0.4037	1.0000 0.0000													
3	extent of rules and regulations	0.0045 0.5564	0.3219 0.0001	1.0000 0.0000												
4	level of adherence to rules and regulations	-0.147 0.0861	0.3105 0.0002	0.1309 0.1324	1.0000 0.0000											
5	level of control	0.0323 0.7158	0.3570 0.0001	0.1118 0.2156	0.2555 0.0046	1.0000 0.0000										
6	level of integration in services offered	0.1870 0.0267	0.1094 0.1833	0.2524 0.0033	-0.1590 0.0637	0.0251 0.7788	1.0000 0.0000									
7	level of joint-venturing partnering, alliances	-0.0560 0.5390	0.2770 0.0018	0.0662 0.4754	0.3669 0.0347	0.3734 0.0001	0.0420 0.6510	1.0000 0.0000								
8	level of multiple project handling ability	0.0778 0.3868	0.5409 0.0001	0.3098 0.0008	0.1945 0.0347	0.3657 0.0001	0.2913 0.0014	0.2362 0.0162	1.0000 0.0000							
9	strength of culture	0.0300 0.7202	0.7057 0.0001	0.4932 0.0001	0.2678 0.0017	0.2952 0.0008	0.3025 0.0003	0.2271 0.0125	0.5579 0.0001	1.0000 0.0000						
10	participation in decision-making	0.0705 0.3909	0.5005 0.0001	0.5485 0.0001	0.1934 0.0207	0.1943 0.0251	0.4616 0.0001	0.1755 0.0490	0.4688 0.0001	0.7076 0.0001	1.0000 0.0000					
11	level of coordination	0.0130 0.8743	0.1692 0.0350	0.3774 0.0001	0.2248 0.0074	0.0894 0.3040	0.0793 0.3390	0.0402 0.6531	0.1010 0.2553	0.2285 0.0004	0.3074 0.0001	1.0000 0.0000				
12	level of information flow	-0.0090 0.9174	0.2264 0.0099	0.2553 0.0054	0.2103 0.0220	0.1209 0.0257	0.2483 0.0062	0.1489 0.1285	0.2546 0.0088	0.3053 0.0007	0.3263 0.0002	0.2104 0.0175	1.0000 0.0000			
13	level of planning	0.0273 0.7414	0.5028 0.0001	0.3202 0.0001	0.1947 0.0206	0.3250 0.0077	0.2118 0.0109	0.1308 0.1446	0.3685 0.0001	0.6186 0.0001	0.5236 0.0001	0.3559 0.0001	0.2963 0.0001	1.0000 0.0000		
14	level of goal-setting	0.1510 0.0769	0.1251 0.1323	0.1202 0.1668	0.0608 0.4845	0.2331 0.0104	0.0516 0.5483	-0.0060 0.9460	0.1126 0.2211	0.2758 0.0012	0.2392 0.0042	0.3296 0.0001	0.1934 0.0346	0.2741 0.0011	1.0000 0.0000	
(Y)	organizational effectiveness	0.0256 0.7551	0.7332 0.0001	0.5002 0.0001	0.3445 0.0001	0.3345 0.0001	0.2896 0.0005	0.2648 0.0032	0.6076 0.0001	0.8223 0.0001	0.6921 0.0001	0.3630 0.0001	0.3350 0.0002	0.5542 0.0001	0.2643 0.0032	1.0000 0.0000

P values are listed under (τ) values. All $P < 0.05$ are significant

high with (p) values of 0.0005, 0.0017 and 0.0032. This indicates a very weak, significant relationship between these variables and level of performance in firms studied.

The *level of adherence to rules and regulations* (X_4), *level of coordination* (X_{11}), *information flow* (X_{12}), and *level of control* (X_5) have somewhat higher coefficients that range from 0.3345 to 0.3630. and a high level of statistical significance (all (p) values are less than 0.0002). This is an indication that these variables have a weak but significant relationship with the level of effectiveness (Y). Variables that include the *level of planning* (X_{13}) and *extent of rules and regulations* (X_3) have moderately strong and highly significant relationships with (Y) shown by (τ) values of 0.5542 and 0.5002 respectively (both (p) values <0.0001).

Values of (τ) of 0.7332, 0.6076, 0.8223, and 0.6921 and their respective (p) values (all p's < 0.0001) for the variables that include *attitude towards change* (X_2), *level of multiple project handling ability* (X_8), strength of organizational culture (X_9), and *level of workers' participation in decision making* (X_2), indicate that there are strong and highly significant relationships between these variables and the referent measure of effectiveness (Y).

Based on these findings, it is seen that in firms that were studied a high level of organizational effectiveness indicated by a high level of performance in past projects is associated with strong culture that promotes a high level of participation in decision-making processes by its workers, a high level of positive attitude toward change by management and workers, a high level of planning as a strategy to adapt to environmental risks, a high level of multiple projects handling ability, and a moderate level of using rules and regulations by the firm. These variables account for much of the variability in organizational effectiveness of the

firms studied. However the other variables that have weak but significant associations also contribute to high levels of effectiveness in the firms studied.

6.3. SUMMARY

The consistency method was used to test the reliability of the constructed scales in measuring the underlying variables. The results showed that the constructed scales were valid in measurement of those variables. Intercorrelations analysis showed that the level of subcontracting that the firm uses in delivering its projects has weak correlation with effectiveness as measured in this study. However, other variables that have weak correlations with effectiveness such as the level of integration in services offered, level of using joint venturing, partnering, and alliances, the relationships proved more significant.

Variables that include the level of adherence to rules and regulations, level of coordination, level of information flow, and level of control, have significant and somewhat higher correlations with effectiveness. Level of planning and extent of rules and regulations in the construction firm proved to have a moderately strong and highly significant relationship with effectiveness.

The results also showed very strong and highly significant correlations between effectiveness and variables that include the level of multiple project handling ability by the firm, the strength of organizational culture existing inside the firm, and the level of workers' participation in decision making allowed by the management of the construction firm.

It is concluded from the results seen in this chapter that in firms that were studied, a high level of organizational effectiveness is associated with the following: a strong organizational culture that promotes a high level of participation in decision-making processes by workers in the firm; a high level of positive attitude toward change by management and workers of the firm; a high level of planning used by the firm as a strategy to adapt to environmental risks; a high level of multiple project handling ability; a moderate level of using rules and regulations by the firm; a moderate level of coordination and information flow within the structural dimensions of the firm. These variables account for much of the variability in organizational effectiveness of the firms studied, as evident from the correlation analysis. However, in order to use these variables in the prediction of organizational effectiveness, multiple linear regression modeling techniques with least square-estimation method are used to fit and select a model that incorporate the most significant variables. This is the topic covered in the next chapter.

CHAPTER (7)- MODEL FITTING AND VALIDATION

7.0 INTRODUCTION

This chapter presents the process of fitting a multivariate linear model on the data collected, using statistical multiple regression methods available on the SAS computer package. In the first part, preliminary steps are presented regarding model fitting using dummy regression techniques. The second part deals with model fitting and selection using the various regression procedures. The third part deals with checking the adequacy and validation of the fitted model.

7.1. MODELING

Multiple regression procedures using least squares estimation of model's parameters are used to test the relationships between the fourteen hypothesized predictors and the constructed referent measure of organizational effectiveness of the construction firm (Y). An expose of the basics of model fitting and testing using multiple regression and least square estimation is given in appendix (C).

The general additive multiple regression model, which relates a dependent variable (Y) to k predictors variables X_1, X_2, ..., X_k, is given by

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots + \beta_k X_k + e \qquad \text{Eq. (7.1)}$$

where

α= vertical intercept
β_1 , β_2 ,....,β_k = partial slopes of regression line (regression coefficients)
e= random error

The principle of least squares is used in simple linear regression to estimate the coefficients. According to the principles of least squares, the fit of a particular estimated regression function ($a + b_1x_1 + \ldots\ldots + b_kx_k$) to the observed data is measured by the sum of squared deviations between the observed y values and the y values predicted by the estimated function or model:

$$\sum [y - (a + b_1x_1 + \cdots\cdots + b_kx_k)]^2$$

The least squares estimates of α, β_1, β_2,$\cdots\cdots$, β_k are those of a, b_1, b_2, ..., b_k that make this sum of squared deviations as small as possible. The utility of an estimated model can be assessed by examining the extent to which predicted y values based on the estimated regression function (model) are close to the y values actually observed. The first predicted value of (y) or ($\hat{y}_1$) is obtained by taking the values of the predictor variables x_1, x_2, . ., x_k for the first observation or data record and substituting these values into the estimated regression

model. Doing this successively for the remaining observations yields the predicted values $\hat{y}_2$ $\hat{y}_3, \ldots, \hat{y}_k$.

In developing the desired model, the eighty six data records were split randomly into two sets. The first set contained only seventy six records and was used in model development. The second set which contains the remaining ten records was reserved for model validation purposes.

7.1.1. Preliminary Steps

Typically, there are two goals of mathematical modeling. One is to obtain a valid estimate of a causal relationship and the other is to obtain a good predictive model. According to Retherford and Choe (1993) when the goal is "prediction" it is appropriate to develop linear models because of their simplicity of use. As the goal of this study was to obtain a prediction model based on the linear combination of the hypothesized variables, procedures of a statistical computer program (SAS) was used in developing, fitting, diagnosing, and checking the adequacy of the multivariate linear model. Various multiple regression procedures based on least square estimation of regression parameters are used to estimate model parameters. For further details on issues relating to the fundamentals of fitting the model using multiple regression and checking its adequacy, refer to appendix (C). It gives an exposé of fitting a multiple regression model using least squares estimation method, model

selection criteria, and the various selection procedures used by this research in fitting the desired model.

Suppose that a response variable Y can be predicted by a linear combination of a number of regressor variables X_1, X_2,....., X_k, you can fit the regression parameters as shown in Equation (7.1). A number of regression methods are used to select the best model with the highest R-square value based on analysis of variance and parameter estimates. These include all possible regression procedure, the maximum R^2 method, and the three sequential selection methods of forward, stepwise, and backward elimination. The criteria for inclusion of predictor variables in a model and selecting an appropriate model based on the output of the various multiple regression procedures used in the analysis are discussed in more details in appendix (C)

7.1.2 Dummy Regression

In developing the desired model, dummy variables were used to code the variables because of the ordinal nature of scales used in scoring the firms in the sample. Dummy variables or contrast variables' use is proposed as outlined by Retherford and Choe (1993). The prime function of dummy variables is to represent categorical and ordinal variables to gain a better realistic model than by modeling the ordinal variables as ratio or interval variables. According to Judd and McClelland (1989) m-1 contrast codes must be employed to code a categorical or ordinal variable with m levels.

Therefore, in coding the seven levels (7= very high to 1= very low) scales used in measurement, six dummy variables must be employed to represent each of the original variables. This would have resulted in dealing with a large number of variables in the model which would render it impractical. A solution was to crash down the 7 anchor-points ordinal scale to a three levels scale of high, moderate, and low for each of the variables. Two contrast codes were employed for each variable which made the possible total number of variables in the model more manageable. The three levels in the crashed scales were assumed between the values that mark the 33rd and 67th percentiles of the cumulative distribution for each variable obtained from scores on the 7 anchor-points Likert scales. Table 7.1 shows the 33rd and the 67th percentiles values for the fourteen variables. Scores below the value that marks the 33rd percentile on the cumulative distribution were classified as low scores, all scores that fall between the 33rd and 67th percentiles' values were classified as moderate and all scores above the 67th percentile were classified as high.

To illustrate the use of Table 7.1, an example is discussed. A firm was scored by its management and workers and an average aggregated score was calculated to equal 4.5 relating to the attitude toward change variable (X_2). To convert this score to a high, moderate, or low level rating, the table is used. A moderate level rating is indicated because the score falls between the 33rd percentile value of 4.3 and the 67th percentile value of 4.7. If the score is above 4.7, a high level rating is indicated, and if it is below 4.3 a low level rating is indicated.

Each X_i of the fourteen hypothesized variables is coded by two dummy variables (D_{i1}) and (D_{i2}.). As shown in Table 7.2, the two dummy variables can represent the three levels for each variable. When the level of X_i is determined to be high, the variable is represented by the situation D_{i1} = (0) and D_{i2} = (1). When the level of X_i is judged to be medium, X_i is represented by D_{i1} = (1) and D_{i2} = (0). Where the level is low, the variable is represented by D_{i1} = (0) and D_{i2} = (0).

Table 7.1: Percentiles of Variables' Scores

No.	variable	Value at the 33rd percentile	Value at the 67th percentile
1	level of subcontracting	4.7	4.9
2	attitude toward change	4.3	4.7
3	extent of rules and regulations	4.9	5.0
4	level of adherence to rules and regulations	4.5	4.9
5	level of control	5.8	6.0
6	level of integration in services offered	4.6	5.0
7	level of joint-venturing, partnering, and alliances	4.5	4.8
8	level of multiple projects handling ability	3.7	4.0
9	strength of culture	4.4	5.0
10	level of workers'participation in decision making	4.7	5.0
11	level of coordination	4.4	4.5
12	level of information flow	2.7	3.0
13	level of planning	4.5	4.8
14	level of goal setting	5.0	5.1

It should be noted that substitution for dummy variables should always be considered in pairs to indicate the proper level of the variable. For a low level rating, both dummy variables that represent that variable should be given the value of zero. For a moderate or high level rating, the value of one is assigned to the dummy variable that represents that proper level and the value of zero is given to the other dummy variable.

Table 7.2: Coding of Dummy Variables

Case	Variable's Level	Dummy variables Values
1	High	[$D_{i1} = 0$, $D_{i2} = 1$]
2	Moderate	[$D_{i1} = 1$, $D_{i2} = 0$]
3	Low	[$D_{i1} = 0$, $D_{i2} = 0$]

As shown in Equation (7.2), the regression model considers twenty eight dummy variables to represent the original fourteen variables. The intercept a is the low level or the reference level for construction organizations studied ($D_{i1} = 0$, $D_{i2} = 0$). The b coefficient is the effect of each variable on the level of organizational effectiveness.

$$Y = a + b_{11}D_{11} + b_{12}D_{12} + b_{21}D_{21} + b_{22}D_{22} + b_{31}D_{31} + b_{32}D_{32} + \ldots + b_{141}D_{141} + b_{142}D_{142} \qquad \text{Eq. (7.2)}$$

7.1.3. Model Fitting and Selection Methods

The methodology followed in fitting and checking the adequacy of a multiple regression model using the collected data records is shown in Figure 7.1. SAS was to fit various regression models based on the seventy six data records shown in appendix (B). Five multiple regression selection procedures or methods were used in model fitting. All possible regression models procedure or RSQUARE, the MAXR forward regression method, and the three sequential selection procedures of FORWARD, BACKWARD, and STEPWISE.

All possible regression procedure or RSQUARE finds a specified number of models with the highest adjusted R^2 and the lowest Mallows' (C_P)[1] statistic in a range of model sizes (see part (I) of appendix (D) for the results of the regression procedure RSQUARE as the selection method). The RSQUARE method is a useful tool for exploratory model building.

The MAXR procedure uses forward selection to fit the best one-variable model, the best two-variable model, the best three-variable model, and so on until it exhausts all possibilities. (see part (II) of appendix (D) which shows the results of SAS's MAXR regression procedure.

The sequential method of FORWARD selection starts with no variables in the model and adds variables until no significant improvement, in regard to a model Statistic, can be detected based on the assigned level of significance for inclusion of variables.

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[1] Mallows. C.L. (1973) Some comments on Cp. Technometrics. 15. pp. 661-675. Also see appendix (C) for explanation

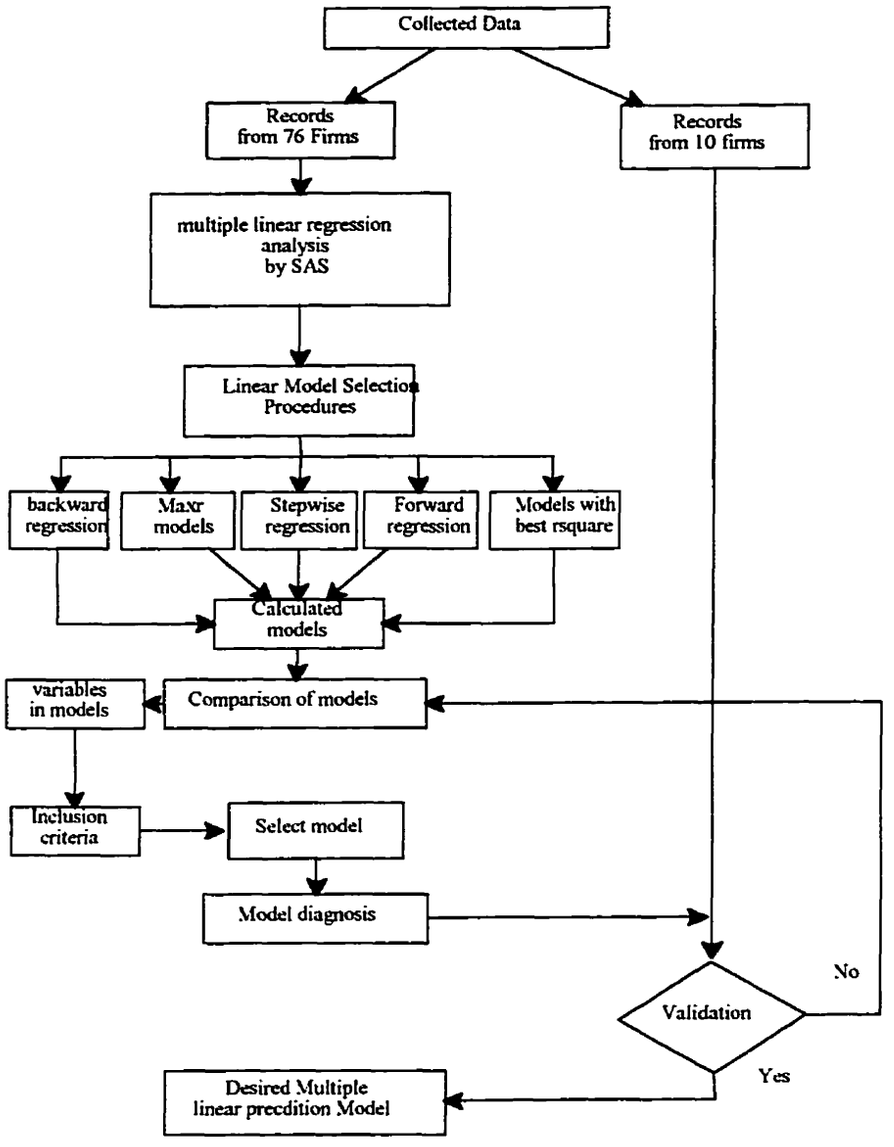


Figure 7.1: Model Fitting and Selection Methodology

Sequential STEPWISE regression method is a modification of the FORWARD procedure and differs in that variables already in the model do not necessarily stay there. BACKWARD sequential procedure starts with all the variables in the model and then go through a backward elimination process of variables in order to improve a model's statistic. Sequential procedures are discussed in more detail later in this chapter and in appendix (C). Parts (III), (IV), and (V) of appendix (D) give the results of SAS's regression procedure PROC REG with model selection FORWARD, STEPWISE, and BACKWARD respectively.

While, all these model selection methods are useful tools for model building, no statistical method can be relied on to identify the "true" model. Effective model building requires substantive theory to suggest relevant predictors and plausible functional forms for the model. However, the various selection procedures, still can be used as useful approaches to selecting a model with a subset of predictor variables. Stevens (1992) state the following two rules of thumb for the selection of predictor variables in models.

1. Choose variables that correlate highly with the criterion but that have low intercorrelations.
2. To these variables add other variables that have low correlations with the criterion but that have high correlations with the other predictors.

In addition, Cody and Smith (1991) recommended that it is best to be guided by the following two principles when choosing which predictors to include in a regression model:

1. Parismony-less is more in terms of regressors. Adding another regressor to the model will always explain a little bit more, but it often confuses our understanding of the issue and complicates measurement and use of the model.
2. Common Sense- the regressors must bear a logical relationship to the dependent variable in addition to a statistical one.

The different models resulting from the various model selection procedures will be compared, analyzed, and a model with an appropriate number of predictors, considering these criteria, will be selected as the model to be considered for diagnosis and validation.

7.1.3.1. Fitted Model Using SAS's RSQUARE Procedure

The procedure of all possible regression, as its name suggests, fits all possible regression of a given size. With m explanatory variables there are 2^m possible regression models, ranging from the simplest form, where only one of the predictors is included, to the most complex, in which all predictors are included. This approach generally relies on R^2 as the assessment criterion, and the process starts by computing the R^2 values for all the combinations of predictors of a give size, that is, ranging from 1 to m. For each subset of a given size the combination of predictors that yields the largest R^2 value is selected out and then compared, again in terms of R^2 , with the others "winners" from the other subsets of different size. The more recent algorithms such as the one used by SAS, employ the model's adjusted R^2 and Mallows' C_p statistic values as the selection criteria.

A good model, according to this, is the one that has a high adjusted R^2 value and a small C_p value (for accurate prediction) that converges with a value that approximates the value of (k+1) where k is the number of predictors in the model ($C_p \cong k+1$, for unbiasedness in estimating model coefficients). Applying this criteria to the set of multiple regression models that resulted from using the all possible regression procedure, it is seen that the C_p values and the expression (k+1) converge three times. The first occurs when there are nine dummy predictor variables in the model (which represent five of the original variables), and the second convergence occurs when the model includes as predictors, twenty six dummy variables (which represent thirteen of the original variables). In the third occurrence, the C_p value is exactly equal to (k+1). This takes place when there are twenty seven dummy variables in the model (which represent all the original fourteen variables).

Regarding the first occurrence, there are six models that fulfill the $C_p \cong (k+1)$ condition, each with 9 dummy variables. However, each containing a different set of variables. These are as follow:

(1) A model with C_p =10.11, adjusted R^2 of 0.92, and includes the following dummy variables as predictors: D_{12}, D_{21}, D_{22}, D_{81}, D_{82}, D_{101}, D_{102}, D_{112}, D_{131}.

(2) A model with C_p = 10.20, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{21}, D_{22}, D_{81}, D_{82}, D_{101}, D_{102}, D_{112}, D_{131}, D_{142}.

(3) A model with C_p = 10.28, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{21}, D_{22}, D_{81}, D_{82}, D_{92}, D_{101}, D_{102}, D_{131}, D_{142}.

(4) A model with C_p = 10.28, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{21}, D_{22}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{131}

(5) A model with C_p = 10.29, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{21}, D_{22}, D_{71}, D_{72}, D_{81}, D_{82}, D_{92}, D_{101}, D_{102}.

(6) A 9-variable model with C_p = 10.47, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{21}, D_{22}, D_{81}, D_{82}, D_{101}, D_{102}, D_{121}, D_{131}, D_{132}.

In the second convergence, there are three models that fulfill the $C_p \cong (k+1)$ condition, each with 26 dummy variables. However, each containing a different set of variables. These are as follow:

(1) A model with C_p = 26.9, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{11}, D_{12}, D_{21}, D_{22}, D_{31}, D_{32}, D_{41}, D_{42}, D_{51}, D_{61}, D_{62}, D_{71}, D_{72}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{111}, D_{112}, D_{121}, D_{131}, D_{132}, D_{141}, D_{142}.

(2) A model with C_p = 27.22, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{11}, D_{12}, D_{21}, D_{22}, D_{31}, D_{32}, D_{41}, D_{42}, D_{51}, D_{52}, D_{61}, D_{62}, D_{72}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{111}, D_{112}, D_{121}, D_{131}, D_{132}, D_{141}, D_{142}.

(3) A model with C_p = 27.40, adjusted R^2 of 0.92 and includes the following dummy variables as predictors: D_{11}, D_{12}, D_{21}, D_{22}, D_{31}, D_{32}, D_{41}, D_{42}, D_{51}, D_{52}, D_{61}, D_{62}, D_{71}, D_{72}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{111}, D_{112}, D_{121}, D_{131}, D_{132}, D_{141}.

The last convergence occurs when $C_p \cong (k+1) = 28$. Only one model fulfills the condition with twenty seven dummy variables. (1) A model with $C_p = 28$, adj. R^2 of 0.92 and includes the following 27 variables as predictors: D_{11}, D_{12}, D_{21}, D_{22}, D_{31}, D_{32}, D_{42}, D_{42}, D_{51}, D_{52}, D_{61}, D_{62}, D_{71}, D_{72}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{111}, D_{112}, D_{121}, D_{131}, D_{132}, D_{141}, D_{142}.

SAS's RSQUARE method selected one of the 26 variable models as the model of choice (see Table 7.3 for ANOVA and parameter estimates). The overall model has a root mean square error (RMSE) of 3.9%, F value of 35.538 and Prob> $F = 0.0001$ which indicates that the overall model is statistically significant.

By checking the null hypothesis T= H0: Parameter= 0, (the t test that the parameter is zero, this is computed as the Parameter Estimate divided by the Standard Error for each variable) concerning the parameter estimates, (Prob>$|T|$) of each variable included in the model and whether it true or not, many included predictors could be eliminated from the model. The (Prob>$|T|$) is the two-tailed significance probability that a t statistic would obtain a greater absolute value than that observed, given that the true parameter is zero. Thus, in the case the null hypothesis is true, based on the assigned level of significance of 95 % (this occur when Prob>$|T| = 0.05$), the Parameter estimate (partial coefficient) for the variable equals to zero. This is the case for sixteen dummy variables included in the original model: D_{11}, D_{12}, D_{31}, D_{32}, D_{41}, D_{42}, D_{51}, D_{52}, D_{61}, D_{62}, D_{71}, D_{72}, D_{111}, D_{112}, D_{121}, and D_{141}. This leaves ten dummy variables in the model that include D_{21}, D_{22}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{131}, D_{132}.

Table 7.3: ANOVA and Parameter Estimates For RSQUARE's Model

All Possible Regression Procedure's 26 variable model:
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	26	1.41632	0.05447	33.538	0.0001
Error	49	0.07511	0.00153		
C Total	75	1.49142			

Root MSE	0.03915	R-square	0.9496
Dep Mean	0.67899	Adj R-sq	0.9229
C.V.	5.76618		

Parameter Estimates

Var	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INT	1	0.397729	0.02389	16.944	0.0001
D_{11}	1	0.000093	0.01431	0.007	0.9948
D_{12}	1	0.011893	0.01361	0.874	0.3866
D_{21}	1	0.079782	0.02236	3.569	0.0008
D_{22}	1	0.080523	0.02685	2.999	0.0042
D_{31}	1	0.003185	0.01759	0.181	0.8571
D_{32}	1	-0.001317	0.01795	-0.073	0.9418
D_{41}	1	0.021504	0.01794	1.199	0.2365
D_{42}	1	0.019342	0.02169	0.892	0.3768
D_{51}	1	0.002989	0.01571	0.190	0.8499
D_{52}	1	0.015533	0.01588	0.978	0.3328
D_{61}	1	0.005938	0.02327	0.255	0.7996
D_{62}	1	-0.006416	0.02320	-0.277	0.7833
D_{71}	1	0.028977	0.02574	1.126	0.2657
D_{72}	1	0.021664	0.02522	0.859	0.3945
D_{81}	1	0.038300	0.01666	2.300	0.0258
D_{82}	1	0.075767	0.01985	3.816	0.0004
D_{91}	1	0.053599	0.02986	1.795	0.0488
D_{92}	1	0.108707	0.04302	2.527	0.0148
D_{101}	1	0.054594	0.02594	2.065	0.0405
D_{102}	1	0.080440	0.03284	2.450	0.0179
D_{111}	1	-0.001673	0.01248	-0.134	0.8939
D_{112}	1	0.011062	0.01332	0.831	0.4101
D_{121}	1	-0.005618	0.01326	-0.424	0.6736
D_{131}	1	0.045057	0.01667	2.703	0.0094
D_{132}	1	0.030383	0.01764	1.723	0.0091
D_{141}	1	-0.003112	0.01188	-0.262	0.7945

These ten dummy variables represent five of the original variables which include the attitude toward change (X_2) represented by D_{21} and D_{22}; level of multiple projects handling ability (X_8) represented by D_{81}, and D_{82},; strength of organizational culture (X_9) represented by D_{91} and D_{92}; level of workers' participation in decision making (X_{10}) represented by D_{101} and D_{102}; and level of planning (X_{13}) represented by D_{131} and D_{132}. The choice of including or excluding a predictor, based on the (Prob> | T |) criterion, is viable, however the original model with twenty six dummy predictors still can be used.

This finding suggests the suitability of inclusion of the 10 remaining variables in the desired prediction model. However, in order to make a final judgment, as to whether to retain these variables or not, it is determined that a sound decision can be made only after inspecting all the different variables which are retained in models fitted using the other selection procedures.

7.2.3.2 Fitted Model Using SAS's MAXR Method

The maximum R^2 improvement technique does not settle on a single model. Instead, it tries to find the "best one variable model, the "best" two variable model, and so forth. The MAXR method begins by finding the one-variable model producing the highest R^2. Then another variable, the one that yields the greatest increase in R^2, is added. Once the two-variable model is obtained, each of the variables in the model is compared to each variable not in the model. For each comparison, MAXR determines if removing one variable and replacing it with the other variable increases R^2. After comparing all possible switches, MAXR makes

the switch that produces the largest increase in R^2. Thus, the two-variable model achieved is considered the "best" two-variable model the technique can find. The process is repeated with adding a third variable to find the "best" three-variable model, and so forth[2].

Referring to part (II) appendix (D), the MAXR method yielded twenty eight models. The best-one variable model, the best-two variable model, the best-three variable model and so on. The maximum R^2 criteria is used by the procedure in selecting the best models. In similar fashion to the all possible procedure, the MAXR procedure selected the same model with twenty seven variables as the model of choice. This makes sense, since inclusion of a large number of predictors in the model gives a better prediction. However, the inclusion of a large number of variables in a model influence the ease and simplicity of using such a model. Again, checking the null hypothesis of the partial coefficients of the variables in the selected model leads to the same results of leaving only ten dummy variables in the model with Prob < 0.05. The variables left in the model are: D_{21}, D_{22}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{131}, D_{132}. It is interesting to note that these ten variables, left in the model, are the same variables selected for inclusion by the MAXR procedure in the best ten-variable model and they are also the same set of ten variables which resulted from the RSQUARE procedure.

Analysis of variance (ANOVA) for the best 10-variable model (Table 7.4), gives a large F value of 100.97 with Prob>F equals to 0.001 which indicates that the model is highly significant. Notice that the (Prob > | T |) values for the ten variables in the model are much

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[2] See SAS/STAT User's Guide, Volume 2, GLM-VARCOMP, SAS, Inc., Version 6, Fourth Edition, pp. 1398

lower (more significant) than the values when the variables were included in models with a larger number of variables. This indicates that the ten variables together give a more statistically significant prediction and explain variation in the dependent variable more reliably.

Table 7.4: ANOVA and Parameter Estimates of MAXR's Best-10 Variable Model

MAXR Procedure's Best 10-variable Model

(R-square = 0.939)
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F	Prob>F
Model	10	1.40122183	0.14012218	100.97	0.0001
Error	65	0.09020316	0.00138774		
Total	75	1.49142499			

Parameter Estimates

Var	DF	Parameter Estimate	Standard Error	T for H0: parameter=0	Prob> |T|
INT	1	0.430833	0.01241292	34.708	0.0001
D_{21}	1	0.082006	0.01558782	5.261	0.0001
D_{22}	1	0.087827	0.01742064	5.042	0.0001
D_{81}	1	0.046882	0.01292925	3.626	0.0006
D_{82}	1	0.086633	0.01718308	5.042	0.0001
D_{91}	1	0.050298	0.01896751	2.652	0.0100
D_{92}	1	0.092391	0.02651142	3.485	0.0009
D_{101}	1	0.064817	0.02014799	3.217	0.0020
D_{102}	1	0.099860	0.02413474	4.138	0.0001
D_{131}	1	0.050969	0.01245903	4.091	0.0001
D_{132}	1	0.043357	0.01390434	3.118	0.0027

7.1.3.3 Fitted Models Using SAS's Sequential Procedures

The sequential procedures can be viewed as a compromise with all possible regression approach. Three types of sequential methods are mainly utilized, namely, *forward selection*,

stepwise selection, and backward elimination. Essentially, these approaches differ with respect to the direction taken in model selection and the reversibility of a decision as to the worthiness of a candidate predictor.

Forward selection process begins with no variables having been included in the regression equation. The correlations of all the predictor variables with the dependent variable are calculated, and that predictor with the largest correlation is selected if its corresponding partial F-value is statistically significant at some predetermined level. The independent variable with the largest correlation is entered, and the regression equation is calculated. At each successive stage the independent variable with the largest *partial* correlation coefficient is selected. Based on the comparison of the corresponding partial F test value for the variable with a predetermined critical tabulated F-value, the process either, includes the variable which gave the highest partial corresponding coefficient, recalculate the regression equation, and return to select another variable, or the process adopts the regression equation as calculated.

The results of using the FORWARD procedure in fitting a model by SAS, is shown in part (III) of appendix (D). A summary is given in Table (7.5). The procedure went through a number of iterations to arrive at a model with seventeen dummy variables. The analysis of variance indicates a highly significant model with F value of 63.3 with Prob>F of 0.0001 Upon examining the (Prob > | T |) values for the partial coefficients of the seventeen dummy variables in the model, it is noticed that the values for partial coefficients of seven dummy variables exceeds the (α) level of 0.05. Therefore, the null hypothesis that the partial coefficient equals zero can be accepted and these variables can be excluded from the model.

This leaves D_{21}, D_{22}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{131}, and D_{132}, which are the same ones included in the MAXR's best-10 variable model. They are also the same variables that were retained in the RSQUARE 26-variable model, after the exclusion of insignificant variables.

Table 7.5: ANOVA and Parameter Estimates of Model By FORWARD Selection

Forward Selection Procedure Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F value	Prob>F
Model	17	1.41517	0.08325	63.314	0.0001
Error	58	0.07626	0.00131		
C Total	75	1.49142			

Root MSE	0.03626	R-square	0.9489
Dep Mean	0.67899	Adj R-sq	0.9339
C.V	5.34033		

Parameter Estimates

Var	DF	Prameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INT	1	0.393893	0.018418	21.386	0.0001
D_{12}	1	0.011602	0.009956	1.165	0.2487
D_{21}	1	0.077908	0.019098	4.079	0.0001
D_{22}	1	0.080794	0.022739	3.553	0.0008
D_{41}	1	0.023836	0.014106	1.690	0.0964
D_{42}	1	0.022038	0.015765	1.398	0.1675
D_{52}	1	0.013368	0.011079	1.207	0.2325
D_{71}	1	0.032116	0.022569	1.423	0.1601
D_{72}	1	0.021540	0.022087	0.975	0.3335
D_{81}	1	0.041766	0.013524	3.088	0.0031
D_{82}	1	0.079304	0.017127	4.630	0.0001
D_{91}	1	0.057326	0.024733	2.318	0.0240
D_{92}	1	0.107718	0.033752	3.191	0.0023
D_{101}	1	0.053830	0.021512	2.502	0.0152
D_{102}	1	0.079160	0.026067	3.037	0.0036
D_{112}	1	0.011115	0.009681	1.148	0.2557
D_{131}	1	0.043529	0.013195	3.299	0.0017
D_{132}	1	0.031780	0.014573	2.181	0.0333

Stepwise selection procedure works by calculating the correlations of all the predictor variables with the dependent variable. The method selects the first variable that is most highly correlated and enters it into the regression model. This variable is retained in the fitted model if the overall F-test shows that the regression equation is statistically significant. The partial correlation coefficients is calculated for all the variables not in the regression equation. The method selects the next variable with the highest partial correlation coefficient and enters it into the model. With both variables in the model, the method computes the regression equation and retains the new variable if its partial F-value is statistically significant as compared to critical tabulated $(1-\alpha)$-values under the F-distribution with 1 and n-2-1 degrees of freedom. The process then, selects the next variable with the highest correlation with the dependent variable and enters into the regression, given that the first two variables are already in the regression equation. The decision as to whether any of the three variables should be included in the regression given that the first two are already in is made on the basis of the partial F-values of the three variables. The stepwise procedure continues in similar fashion. Termination of the process occurs when no variable can be either entered or removed from the regression equation.

The results of using SAS's STEPWISE selection procedures in fitting a model is shown in part (IV) of appendix (D), a summary is given in Table 7.6. The procedure went through many iterations to arrive at a model with eleven dummy variables. The analysis of variance gives an F value of 93.7 with Prob>F of 0.0001 and root MSE of 3.7% and an adjusted R-square of 0.93. The model is highly significant and has a very good r-square value.

Looking at the (p) values for the partial coefficients, we notice, that D_{52} has a (p) value that exceeds the (α) of 0.05. Therefore, the dummy variable D_{52} can be excluded from the model, which leaves the same ten dummy variables that was retained in MAXR's best-10 variable model, the same ten variables that were retained after the exclusion of insignificant variables in RSQUARE and FORWARD selection models.

Table 7.6: ANOVA and Parameter Estimates of Model By STEPWISE Selection

STEPWISE Procedure Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	11	1.40423	0.12766	93.700	0.0001
Error	64	0.08719	0.00136		
C Total	75	1.49142			

Root MSE	0.03691	R-square	0.9415
Dep Mean	0.67899	Adj R-sq	0.9315
C.V.	5.43617		

Parameter Estimates

Var	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INT	1	0.427441	0.01250907	34.170	0.0001
D_{21}	1	0.080744	0.01546821	5.220	0.0001
D_{22}	1	0.084998	0.01736555	4.895	0.0001
D_{52}	1	0.015628	0.01051630	1.486	0.1422
D_{81}	1	0.048599	0.01286275	3.778	0.0003
D_{82}	1	0.081482	0.01737478	4.690	0.0001
D_{91}	1	0.050460	0.01879393	2.685	0.0092
D_{92}	1	0.097762	0.02651581	3.687	0.0005
D_{101}	1	0.059906	0.02023499	2.960	0.0043
D_{102}	1	0.092327	0.02444487	3.777	0.0004
D_{131}	1	0.052891	0.01241237	4.261	0.0001
D_{132}	1	0.043364	0.01377686	3.148	0.0025

BACKWARD elimination procedure works by starting with a regression model that includes all of the variables. The R^2 induced from deleting each variable, or equivalently the partial F test value for each predictor variable treated as though it were the last variable to enter the regression equation, is calculated. Based on the comparison of the lowest partial F test value with a predetermined critical tabulated F -value, the procedure either, removes that variable associated with the calculated R^2, recompute the regression with the remaining predictor variables and recompute a new R^2, and go through the cycle again by removing another variable, or adopt the regression equation as calculated.

Table 7.7: ANOVA and Parameter Estimates of Model By BACKWARD Selection

Backward Elimination Model
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	10	1.40122	0.14012	100.971	0.0001
Error	65	0.09020	0.00139		
C Total	75	1.49142			

Root MSE	0.03725	R-square	0.9395
Dep Mean	0.67899	Adj R-sq	0.9302
C.V.	5.48647		

Parameter Estimates

Var	DF	Parameter Estimate	Standard Error	T for H0 Parameter=0	Prob > |T|
INT	1	0.430833	0.01241292	34.708	0.0001
D_{21}	1	0.075606	0.01558782	5.261	0.0001
D_{22}	1	0.080827	0.01742064	5.042	0.0001
D_{81}	1	0.047882	0.01292925	3.626	0.0006
D_{82}	1	0.096633	0.01718308	5.042	0.0001
D_{91}	1	0.057698	0.01896751	2.652	0.0100
D_{92}	1	0.105391	0.02651142	3.485	0.0009
D_{101}	1	0.061817	0.02014799	3.217	0.0020
D_{102}	1	0.102060	0.02413474	4.138	0.0001
D_{131}	1	0.047969	0.01245903	4.091	0.0001
D_{132}	1	0.048357	0.01390434	3.118	0.0027

The results of using SAS's BACKWARD procedure in fitting a model is shown in part (V) of appendix (D), a summary is given in Table 7.7. The procedure retained ten dummy variables in its model of choice, D_{21}, D_{22}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{131}, and D_{132}. These are the same ten variables that were identified earlier. ANOVA gives an F value of 100.971 with Prob>F of 0.0001 and RMSE of 3.7% and an adjusted R-square of 0.93. The model is highly significant and has a very good r-square value.

7.2. FITTED MODEL

It is seen that one model stands out clearly as the best model based on multiple criteria of selection and all factors considered and discussed previously. A model with 10 dummy variables (D_{21}, D_{22}, D_{81}, D_{82}, D_{91}, D_{92}, D_{101}, D_{102}, D_{131}, D_{132}) that represent the medium and high levels of five original variables that include the *attitude toward change* (X_2), *level of multiple projects handling ability* (X_8), *strength of organizational culture* (X_9), *level of workers' participation in decision making* (X_{10}), and *level of planning* (X_{13}).

7.2.1. Model Diagnostic

Part (VI) of appendix (D) shows the fitted model with the ten dummy variables. The model is the same shown by Table 7.4 for MAXR's "best" 10-variable model, and Table 7.7 for model selected by the BACKWARD method. Model adequacy is checked by residual analysis, detecting influential outliers observation, and checking for multicollinearity.

7.2.1.1 Residual Analysis

Part (VI) of appendix (D) shows the plot of residuals versus the predicted value of (Y) which helps in diagnosing the level of variance for the residuals. It shows that the residual variances fall within a horizontal band around the mean line of 0.0. The points exhibit no particular pattern around the 0.0-line such as curvature or much greater spread in one part of the plot than in another, vertically or horizontally. This shows that the residuals have equal variance. Furthermore, the normal probability plot of the residuals shown in appendix (D), exhibits a linear pattern with minimal snaking at the ends. Both these findings indicate that the residuals have equal variance and are normally distributed which leads to the conclusion that linearity assumptions are upheld by the model.

7.2.1.2 Outliers

In order to detect any outliers, SAS provides a diagnostic statistic called Cook's distance which is a measure of the influence of deleting the specific observation on the estimated parameters. The plot of Cook's distance statistics against the observation number shows no influential outliers in the data observation (part (VI) appendix (D). This is evident by the range of values on the plot (< 0.3) which is well below the value of one that would require the investigation as recommended in appendix (C).

7.2.1.3 Multicollinearity

According to Schroeder *et al* (1986), multicollinearity is probably present in all regression models, since the predictor variables are unlikely to be totally uncorrelated. Thus whether or not multicollinearity is a problem depends on the degree of collinearity. They added that although there are many indicators of multicollinearity, the difficulty is that there is no statistical test that can determine whether or not it is a problem. They recommended to search for "high" correlation coefficients between variables included in the fitted model.

Multicollinearity among the predictor variables was assessed by examining the tolerance values among the predictors variables which is an indication of the degree of correlation between each variable in the model and the other variables included in the regression. The range for tolerance values is between 0 and 1, and high tolerance values for the variables (> 0.20) are preferred since they indicate low multicollinearity (see appendix (C)).

The range of values for the variables in the fitted model is between 0.10 to 0.5, which shows low tolerance values for the variables D_{92}, D_{101}, and D_{102} that might result in interpretation problems. However, the (τ) intercorrelations coefficients of the original variables, represented by the three dummy variables, with the original variables represented by the other dummy variables in the model, show no "high" correlation coefficients (Table 6.4). This indicates that including these variables in the fitted model, does not provide the model with redundant information.

7.2.2. Inferences Based on Parameters of Fitted Model

The fitted model is shown in Equation (7.3). The model is highly significant at α =0.05 and $P<$ =0.0001. Analysis of variance shows that the model has a root mean square error of 0.043 which means that the model has 4.3 % error in prediction. The model's R-square and adjusted R-square are 0.93 and 0.91 respectively.

The intercept (INT) and the dummy variables that represent the high and moderate levels of only five of the original fourteen hypothesized predictors were determined to be significant in predicting the level of effectiveness (Y) based on their (Prob > | T |) values. Most probability values for the parameter estimates in the model equal 0.0001, which indicates very high significance, except for D_{81}= 0.0006, D_{91}= 0.0100, D_{92}= 0.0009, D_{101}= 0.0020, and D_{132}= 0.0027. These values are still well below the (α) of 0.05.

The dummy variables are D_{21} and D_{22}, representing the levels of the variable, attitude toward change by management and workers of the construction firm (X_2); D_{71} and D_{72}, representing the levels of the variable, level of multiple projects handling ability (X_8); D_{91} and D_{92}, representing the levels of the variable, strength of organizational culture (X_9); D_{101} and D_{102}, representing the levels of the variable, level of workers' participation in decision making (X_{10}); and D_{131} and D_{132}, representing the levels of the variable, level of planning (X_{13}).

$$\boldsymbol{Y} = (0.431) + (0.082)\,\boldsymbol{D_{21}} + (0.088)\,\boldsymbol{D_{22}} + (0.047)\,\boldsymbol{D_{81}} + (0.087)\,\boldsymbol{D_{82}} + (0.050)\,\boldsymbol{D_{91}} + (0.092)\,\boldsymbol{D_{92}} + (0.065)\,\boldsymbol{D_{101}} + (0.100)\,\boldsymbol{D_{102}} + (0.051)\,\boldsymbol{D_{131}} + (0.043)\,\boldsymbol{D_{132}} \qquad \text{Eq. (7.3)}$$

The partial coefficients in the model, for any two dummy variables, represent the effect of being moderate or high level in any of the five variables. A value of 0.431 is shown as the intercept in the model above. This value represents the low level or the reference level for construction firms studied. It also represents the predicted level of organizational effectiveness in a firm with low ratings in all of the five variables. It is worth noting here that the actual level of effectiveness for such a firm may fall anywhere between 0.431 and zero. Similarly, because, the maximum predicted level of effectiveness that can be calculated by the model for a firm equals 0.869, the actual level of effectiveness for such a firm may fall anywhere between this value and 1.00.

It is noted that the value of (Y) is influenced very little by whether a firm is rated as having a moderate *level of attitude toward change* or having a high level as represented by the two coefficients of 0.082 and 0.087 for D_{21} and D_{22} respectively. This means that there is a slight gain in effectiveness associated with an increase from a moderate level to a high level of attitude toward change by the group of firms studied.

Rating the construction firm as having a high level of multiple projects handling ability contributes 0.087 (coefficient for D_{82}). While rating it as having a moderate ability, contributes only 0.047 (coefficient for D_{81}). This seems to indicate that a high level of multiple projects handling ability contributes about double that of a moderate level to an increase in the predicted level of organizational effectiveness.

There is also a difference in contribution to predicted level of effectiveness of a construction firm (Y) between a moderate strength of organizational culture (D_{91} coefficient = 0.050) and a high strength of culture (D_{92} coefficient = 0.92). This is in line with the expectation that a stronger culture leads to a higher level of organizational effectiveness.

A high level of *workers' participation in decision-making* in the construction firms studied, impacts the value of (Y) by 0.100 (coefficient for D_{102}) for a high level rating, and 0.065 (coefficient for D_{101}) for a moderate level rating. This indicates that an increase in the level of organizational effectiveness is associated with an increase in *the level of workers' participation in decision-making* in the firms studied.

For the variable, *level of planning*, the coefficient for a moderate level of planning (D_{131}) is 0.050, and 0.043 for a high level of planning (D_{122}.). This means that there is a slight decline in effectiveness with an increase from a moderate to a high level of planning in the group of firms studied. This could be explained by the limitation in organizational flexibility caused by the inherent rigidity of planning (Cummings and Worley, 1993).

7.2.3. Validation of Fitted Model

Predicting the level of organizational effectiveness by the model is based on the possible combination of high, moderate, and low ratings of the five variables for any firm. Table 7.8 shows the ratings of the ten firms whose records were not used in model development, the predicted level of effectiveness and the actual level calculated from

management response. The first record belongs to a firm with the following ratings of the five variables: highly favorable attitude toward change (D_{21}= 0, D_{22}= 1), a moderate level of multiple project-handling ability (D_{71}=1, D_{72}= 0), performs planning very regularly (D_{131}= 0, D_{122}= 1), has a strong culture (D_{91}= 0, D_{92}= 1), and a moderate level of participation in decision making by workers (D_{101}= 1, D_{102}= 0). The level of organizational effectiveness predicted by the model for the firm is equal to 0.76. Based on this value, the prediction can be made that this construction firm has a level of organizational effectiveness that would cause it to perform in 76 percent of its work projects on time and/or within budget and/or according to specifications and unsuccessfully in the rest 24 percent. The actual level for this firm is calculated by substituting into Eq. (4.1) the values given by firm's management for p_1= 80%, p_2= 80%, and p_3=75% which results in a level of approximately 78 percent.

The second record belongs to a firm that was rated as having an unfavorable (low) attitude toward change(D_{21}= 0, D_{22}= 0), a low level of multiple project handling ability (D_{71}= 0, D_{72} = 0), a moderate level of planning (D_{131}= 1, D_{122}= 0), a moderate strength of culture (D_{91}= 1, D_{92}= 0), and a low level of workers' participation in decision-making (D_{101}= 0, D_{102}= 0). The level of organizational effectiveness predicted, is approximately 53 percent. Whereas the actual level is 0.56, calculated from the three percentages of 60%, 60%, and 50% for percent of projects completed within scheduled duration (p_1), and percent of projects finished within budgeted costs (p_2), and percent of projects performed according to contractual specifications (p_3), respectively.

Comparing the predicted level with that of the actual level for the other firms listed in the table, leads to the conclusion that model's prediction is very reliable and valid. As seen in the table, predicted levels of effectiveness are very comparable with the actual levels of effectiveness calculated from data records, for the remaining eight firms. This indicates the robustness of the fitted model.

Table 7.8: Predicted and Actual Levels of Organizational Effectiveness

	Levels of variables					Level of organizational effectiveness	
No.	attitude toward change (1)	multiple projects handling (2)	strength of culture (3)	decision making participation (4)	level of Planning (5)	predicted	actual
1	H	M	H	M	H	0.76	0.78
2	L	L	M	L	M	0.53	0.55
3	H	H	H	M	M	0.80	0.80
4	M	H	M	M	L	0.71	0.70
5	L	M	L	L	L	0.48	0.50
6	M	M	M	L	M	0.66	0.67
7	H	H	H	M	H	0.81	0.80
8	M	H	L	M	M	0.62	0.60
9	M	M	M	L	M	0.65	0.67
10	M	M	M	H	L	0.71	0.70

* levels is shown by L, M, and H to indicate low, moderate, and high level.

It should be noted that the model is intended as a tool that gives management an idea about how organizational characteristics measured by the variables in the model influence the overall performance and not specifically rate performance on a project by project basis.

According to the (Y) value predicted, the conclusion could be made that a firm would perform within scheduled time, and/or within costs, and/or according to specs in some projects and that it would fail to achieve performance in all other cases ($1-Y$).

7.3. SUMMARY

Analysis of data using dummy regression techniques, the various multiple regression procedures of the SAS computer package yielded a model with ten dummy variables that represent only five of the original fourteen variables. These variables are proven significant in predicting the level of organizational effectiveness of the construction firm as operationalized by this research. These variables include firms' attitude toward change, its level of multiple project-handling ability, its level of planning, its strength of culture, and the level of workers' participation in decision-making in the firm.

The developed model is a practical tool. By rating the five variables in the model using the scales developed by this methodology, it is very simple to calculate the level of organizational effectiveness of the ICI construction firm.

CHAPTER (8)-CONCLUSIONS AND RECOMMENDATIONS

8.0 INTRODUCTION

In the first part of the chapter, conclusions are given regarding the use of the fitted model as the backbone of the assessment methodology. In the second part, implications of the findings of the research are discussed and a number of recommendations are outlined regarding the application and improvement of the assessment methodology.

8.1. CONCLUSIONS

The model developed by the research methodology is quantitative and identify "good" and "bad" states for certain variables or criteria identified by the research. However the model does not tell us what types of organizational dynamics are needed to create these "good" or "bad" states. ICI construction firms can deduce from the model the type of dynamics or changes that might lead toward or away from these states. By simply following the checklist shown in Figure 8.1, a firm can achieve a prediction of its level of organizational effectiveness.

-Checklist-

1. Randomly, select five raters from the firms' workforce: two management-level workers (preferably from two different locations, i.e. one from office and one from site; and three site level workers from different units or trades.

2. Distribute questionnaires forms that, only include measurement scales that relate to the five variables included in the model: attitude toward change, multiple projects handling ability, strength of organizational culture, level of workers' participation in decision making, and level of planning .

3. Collect Variables' responses, aggregate and average them to arrive at variables' scores (assume equal weight for each response) for the firm.

4. By using Table 6.3, convert aggregated firm-level scores for the five variables, from scores on 7 anchor-points Likert scales' to ratings on a three levels scale of low, medium, and high.

5. Depending on the achieved variables' levels, assign values of 0 or 1 in pairs, to the ten dummy variables representing the five original variables.

6. Use Table 7.2 and the assigned values of dummy variables to substitute in pairs for each of the five original variables in the model.

7. Calculate the firm's predicted level of organizational effectiveness.

Figure 8.1: Management Checklist For Calculating A Prediction

ICI construction firms that are operating at that particular stage of life cycle as the surveyed group of firms (at least more than 10 years of operation in the ICI sector), can use the model to assess their organizational effectiveness and calculate a predicted level. Based on the predictive model, two of the five variables with the largest partial coefficients: the level of workers' participation in decision making and the strength of organizational culture, are most significant in predicting the level of organizational effectiveness in the construction firm. This highlights the importance of human resources and workers-oriented processes in explaining and promoting effectiveness.

Although these findings support previous organizational effectiveness models and research, the precise explanation for the present results is unknown. Organizational theorists have proposed that the effort workers are willing to put forth on behalf of an organization (firm) depends largely on the way the workers feel about the job, co-workers, and supervisors. A positive internal environment, participation, and mutual trust are likely to promote worker satisfaction and positive attitudes, which may result in workers producing up to potential, thereby increasing organizational effectiveness.

The inclusion of the variables attitude toward change and the level of multiple projects handling ability in the model underscores the importance of these significant structural attributes in achieving flexibility and adaptability and hence promoting and achieving organizational effectiveness. A high level of attitude toward change is deemed necessary for the firm, in order to be flexible and adaptable to the unstable environment of the construction market. A high level of multiple project handling ability implies that the construction firm

structure is suitable to handle the added requirements brought on by operating in multiple sites. This, in turn, would lead to an increase in the firm's volume of business and more profits, which keeps all constituents of the firm satisfied.

Although the impact of the other variable in the model, the level of planning, is lower than that of the other variables, and the difference in contribution between having a low and high level of planning is minimal, its inclusion alludes to the importance of using planning as an important strategic factor in achieving effectiveness.

Finally, it can be concluded that this research has contributed to the on-going efforts to improve the existing methodology of assessing organizational effectiveness of the construction firm.

8.2. IMPLICATIONS AND RECOMMENDATIONS

In order to discuss the implications of the findings of the study for future research and make meaningful recommendations on that basis, an important issue must be first addressed. This issue relates to the other hypothesized variables not included in the prediction model. As seen from the correlation analysis, except for the level of subcontracting, the remaining variables not included in the model, correlated with the level of effectiveness in a highly significant manner, which proved that these variables are related to effectiveness in some significant way. For the variables: extent of rules and regulations; level of adherence to rules and regulations; and level of control variables, the correlations are moderate. The correlations are low for the variables: level of integration in services offered; level of using joint-venturing,

partnering, and alliances; and level of coordination, and level of information flow. Their exclusion from the model could be explained from a statistical point of view as having strong relationships with variables already in the model. However the low and moderate correlations of these variables could be explained by the influence of the particular life cycle's stage in which the group of firms surveyed are operating which makes them pursue the criteria that proved to be highly correlated and are included in the model.

The influence of the particular stage of life cycle on the types and levels of criteria that are pursued by the firm is well explained by the fact, and as proposed by the competing values approach, that firms pursue different levels of criteria or even different criteria altogether at the different stages of their life cycle. For the majority of firms studied in this research, the stage of life cycle in which they are operating, determined the type of criteria (the five variables with high correlations with (Y) and their levels (partial coefficients) to be most important in prediction of organizational effectiveness. The correlations of the variables not include in the model could be higher if firms surveyed were selected from a group in which the majority prove to be operating at a different stage of life cycle, and that which deems the pursuit of variables, not include in the model, as more relevant for examining and predicting effectiveness than the ones included in the developed model.

A simple plan of action then would be, using the four main stages of life cycle alluded to in chapter (2) of entrepreneurial, formalization, collectivity, and elaboration of structure stage, classify the construction firm according to the stage of life cycle in which it operates, identify the effectiveness criteria and levels that are pursued for each particular stage through

empirical research, and finally, compare the levels of these criteria in the firm to the levels that should be present at that particular stage of life cycle. However a major difficulty faced, is the classification of the firm according to the stage of life cycle in which it operates. Although the research alluded to four main stages (there could be more), there is no concrete method to classify the firm into one of them. One recommendation to resolve this problem is to use the firm's age measured by years of operations as a variable in determining the particular stage of life cycle. However this criteria can not be used in classification as different firms take different time periods to span the same stages. What is needed to be done? In light of the preceding, the following recommendations are given to make the developed methodology apply in a more generalized manner:

1. In order make the methodology sensitive to the stage in which the construction firm operates, a classification scheme according the stage of life cycle must be devised and levels of the various criteria, that possibly could be pursued by firms during each of the four main stages (or a determined number of stages), must be identified empirically. One way that future research can handle this issue is to concentrate on the identification of easily recognized organizational markers, signals, and characteristics that accompany each of the four main stages or the determined number of stages.
2. Given that the impact of the levels and type of criteria used to assess effectiveness change with a change in the stage of firm's life cycle and since the methodology

developed, only considered a particular group of construction firms, future research should also consider different types of construction firms. Different types of firms must be considered in order to make the methodology more generalized and sensitive to the various types and to identify the proper levels for effectiveness criteria for each stage and for each type of firm. Although all construction firms share many characteristics, there are differences. Therefore, for other types of construction firms, different levels of different groups of variables may become more significant as discussed earlier. The four main stages could represent an initial starting point. These stages could be broken down into mini stages depending on the level of accuracy desired.

3. Given the importance of human resources, internal processes, and organizational culture, future research should focus more directly on the assessment of these linkages. For example, an area that can be considered is the types of scales used to assess the linkages of the underlying attributes of variables in these crucial areas. In this study, scales used in the measurement of the variables relating to these areas are very reliable, however, the type of scales that are needed are of a different nature and detail. Development of such scales needs to focus on linkages of persons-oriented processes' variables to organizational effectiveness in such a way that would give more insight of the influence of their underlying attributes on organizational effectiveness.

APPENDIX (A)
QUESTIONNAIRES

ORGANIZATIONAL EFFECTIVENESS QUESTIONNAIRE
TYPE (1)

PART (a)

Please note when providing information in this part of the questionnaire the term "average" should be related to the all the work performed during the last five years of operations in your firm.

1.Age in years of operation _____

2.Average number of annual work contracts. _____

3.Percentage of work contracts (projects) that were finished on or before scheduled time in the last five years to the nearest 5 percent) _____

4.Percentage of work contracts (projects) that were finished with no costs overruns in the last five years to the nearest 5 percent. _____

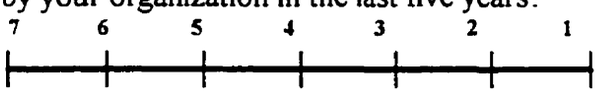
5.Percentage of work contracts (projects) that were finished without litigation or clients' claims or major rework due to inferior quality of performance in the last five years to the nearest 5 percent.

_____

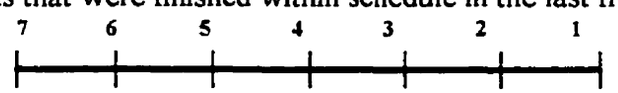
Part 2

Please respond by rating your organization according to Likert scale (very high (7), high (6), above average (5), average (4), below average (3), low (2) , and very low (1))

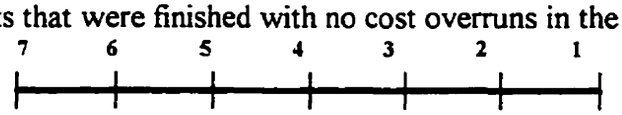
1. Level of profits made by your organization in the last five years?



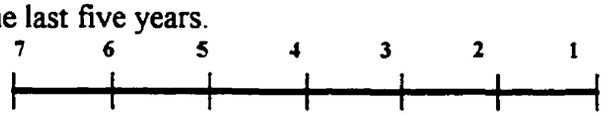
2. Percentage of projects that were finished within schedule in the last five years.



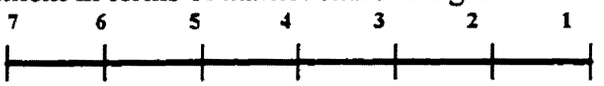
3. Percentage of projects that were finished with no cost overruns in the last five years.



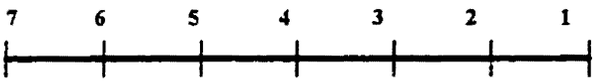
4. Percentage of projects that were finished with no clients complaints or claims filed because of quality problems in the last five years.



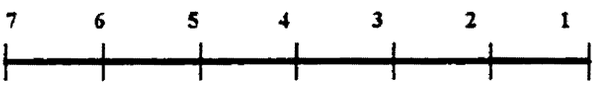
5. Level of goals achievement in terms of market share and growth in the last five years.



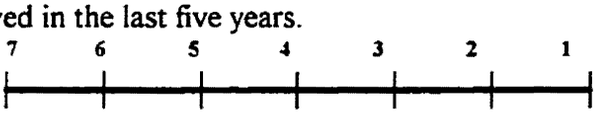
6. Level of goals achievement in terms of quality of output and productivity levels in the last five years.



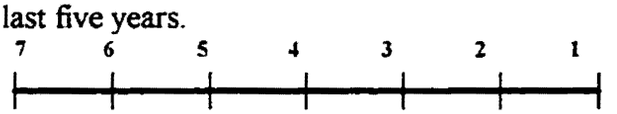
7. Level of meeting and satisfying specified clients' goals in terms of products' quality achieved in the last five years.



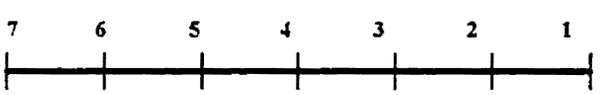
8. Level of meeting and satisfying specified clients' goals in terms of products' price and execution time, achieved in the last five years.



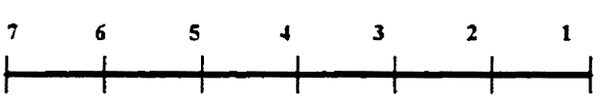
9. Level of meeting and satisfying contractual obligations and expectations of suppliers and subcontractors in the last five years.



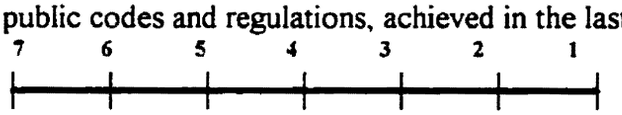
10. Level of satisfying workers' goals in terms of wages' increases, job security, and other benefits in the last five years.



11. Level of satisfying workers' goals in terms of training and enhancing of skills in the last five years.



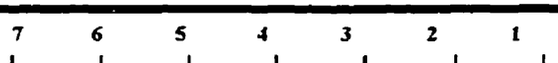
12. Level of adherence to public codes and regulations, achieved in the last five years.

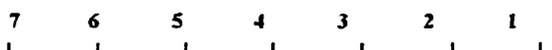


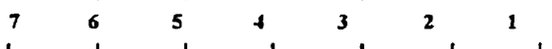
ORGANIZATIONAL EFFECTIVENESS QUESTIONNAIRE TYPE (1)

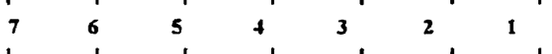
PART -3

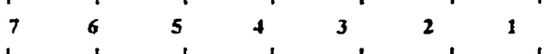
Rate the extent to which the following activities in an average project are entrusted out to other organizations by the firm on a scale that ranges from "almost always" (7), to "almost never" (1).

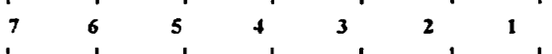
a.Design & Planning 

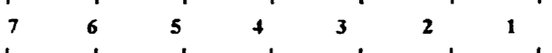
b.Site work 

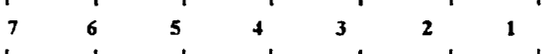
c.Substructure 

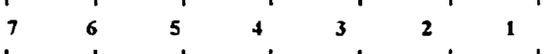
d.Superstructure (Skeleton) 

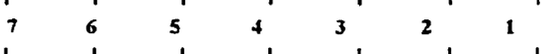
e.Floor systems 

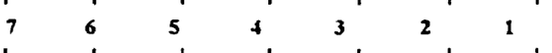
f.Exterior wall systems 

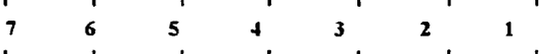
g.Interior wall systems 

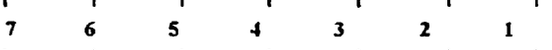
h.Roof systems 

i.Masonry work 

j.Metal work 

kMechanical systems 

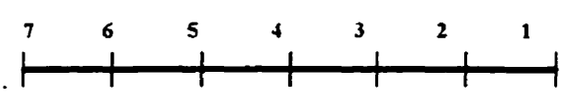
l.Electrical systems 

m.Finish work 

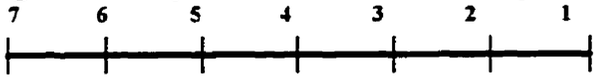
(Rate the following statements as they relate to the firm according to the scale that ranges from "strongly agree" 7 to "strongly disagree" 1).

(2)

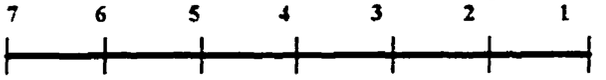
a.Workers accept changes in organizational processes readily and their resistance to it is very minimal



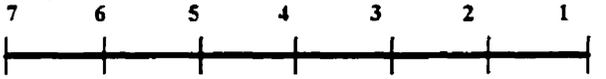
b. Workers view changes in organization's processes as an effort to improve operation.



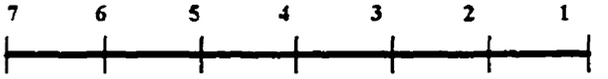
c. Workers are eager to volunteer time to understand changes in organizational processes.



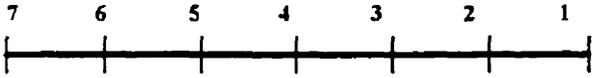
d. Workers are always critical of processes in use and look for other alternatives.



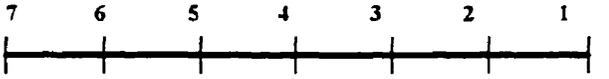
e. Management views changes in organizational processes favorably and actually encourages it when it is needed.



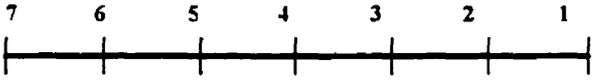
f. Management always reviews organizational processes so it could introduce change wherever it is needed.



g. Rate at which changes are introduced into organizational processes tries to keeps pace with improvements in the field.



h. Once changes are introduced in organizational processes, smooth operations are usually resumed in a very quick period.

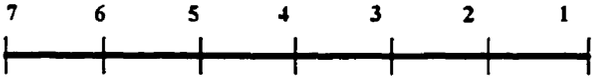


Please rate the extent of rules and regulation used in the firm to regulate activities described below on the scale that ranges from "very extensive regulation" (7) to "very little regulation" (1)

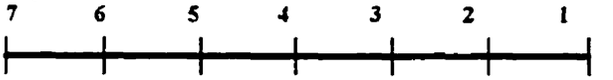
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(3)

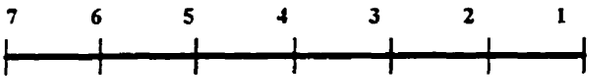
a. All organizational work processes.



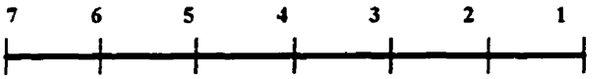
b. Instructions & procedures to perform work tasks.



c. Approaches to evaluate work tasks.



d. Management and workers actions

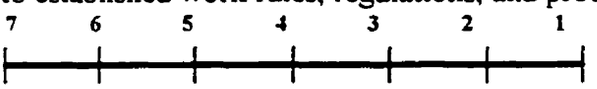


Please rate the following activities in the firm according to the statements below on the scale that ranges from "very strict adherence" (7) to "very little adherence" (1)

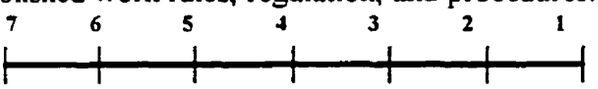
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(4)

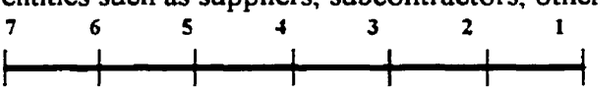
a. Adherence of management to established work rules, regulations, and procedures.



b. Workers' adherence to established work rules, regulation, and procedures.



c. Adherence by the firm to established rules, regulations, and procedures that govern relationships with external entities such as suppliers, subcontractors, other partners or allies.

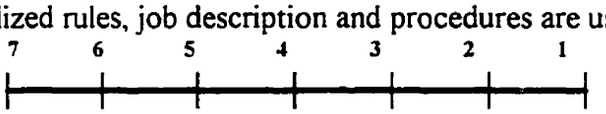


Please rate the level of activities in the firm described in the following statements according to scale ranging from " very high" (7) to " very low" (1))

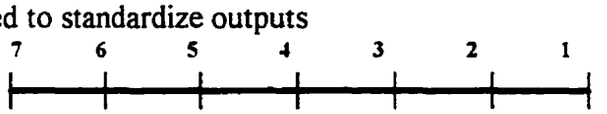
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(5)

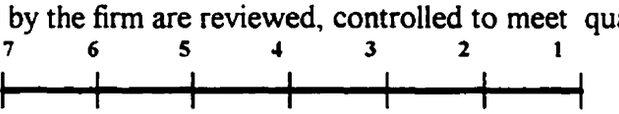
a.Documented and formalized rules, job description and procedures are used in the firm.



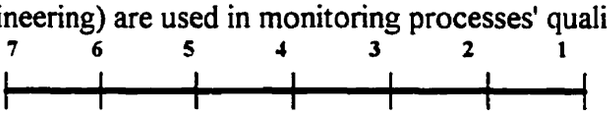
b.Control systems are used to standardize outputs



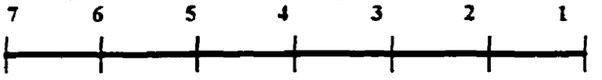
c.All work processes used by the firm are reviewed, controlled to meet quality standards.



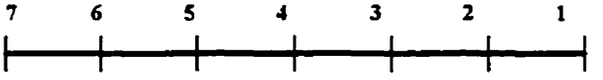
d. Process control tools & methods (i.e. Pareto charts, benchmarking, statistical process control (SPC), concurrent engineering) are used in monitoring processes' quality.



e. Various methods are used to check, monitor, and update progress all work activities to ensure that production is within target schedule and budgeted costs.



f. A sense of order, continuity, and smooth operations is maintained in all organizational processes.

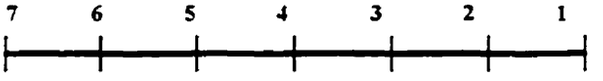


Rate the level of activities in the firm according to the scale that ranges from "very high" (7) to "very low" (1).

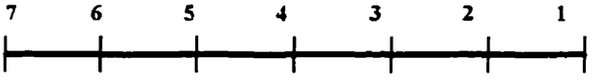
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(6)

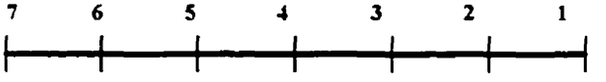
a.The level that the firmprovides an in -house A/E consultants service to clients.



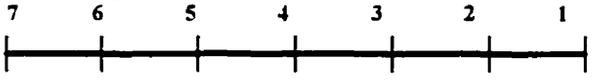
b.The level that the firm provides its own materials supply.



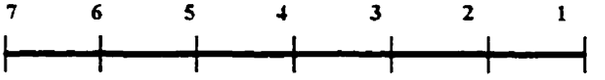
c.The level that the firm provides financing services to clients.



d.The level that the firm provides operating and maintenance services to its clients.



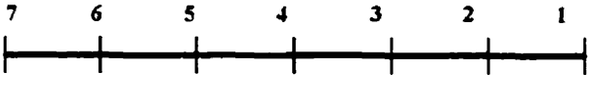
e. The extent of providing construction management services by the firm



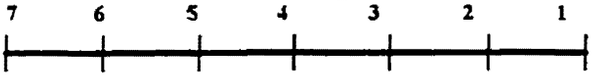
Rate the level of activities in the firm according to the scale below that ranges from "very high" (7) to "very low" (1).

((7)

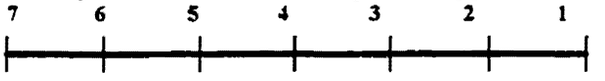
a. The level that the firm partners with other organizations i.e. suppliers, subcontractors, general contractors, A/E consultants or other related fields.



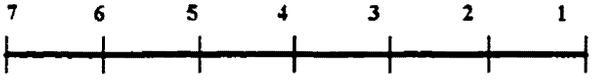
b. The level that the firm joint venture with other organizations.



c. The level that the firm develop alliances to handle specific types of work.



d. Level of developing and maintaining the quality of these types of contractual relationships with other organizations if any in a positive manner.

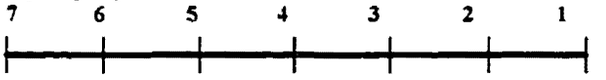


Rate activities of the firm described in the following statements according to the scale below that ranges from "strongly agree" (7) to "strongly disagree" (1).

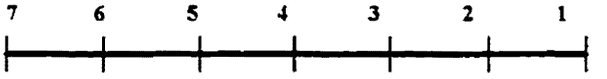
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(8)

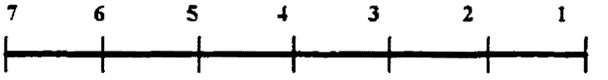
a. No noticeable negative change is detected in quality output of organizational processes when the firm is handling multiple projects.



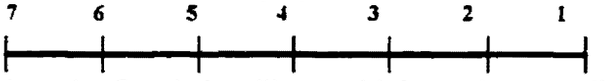
b. The firm's structure is suited to handle simultaneous projects at different sites.



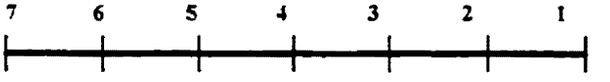
c. In general, the firm can in a reasonable time acquire all the resources it needs for handling multiple projects.



d.Handling multiple average size construction projects is the norm for the firm.



e. More often than not, when the firm is handling multiple projects at different sites, the level of satisfaction of the various projects' constituents is acceptable.



Please distribute 100 points among the four statements in each of the six parts depending on how similar the situation in the firm to that described in each statement. For example in part (A) , if the situation in your organization seems similar to that described in statement (I) and somewhat to that in (II), then you could give 75 points to (I) and 25 points to (II).

(9)

(A)

I.The organization can be characterized as a place of high morale, cohesion, and sharing among its workers. _____

II.The organization can be characterized as a dynamic place where emphasis is on acquiring new processes, innovating, and taking risks. _____

III.The organization can be characterized as a formalized and structured place where bureaucratic procedures control all processes. _____

IV.The organization can be characterized as a place where workers are goal oriented and emphasis is put on efficient production. _____

(B)

I.The climate inside the organization is comfortable. High trust and openness prevails. _____

II.The climate inside the organization encourages dynamism, learning, and readiness to adapt to the new. _____

III.The climate inside the organization emphasizes stability. Work procedures are clear and enforced. _____

IV.The climate inside the organization is competitive and emphasis is on beating the competition. _____

(C)

I.Success is defined on the basis of sensitivity to clients, suppliers, the public, and concern for workers. _____

II.Success is defined on the basis of being the first in having or using newest processes and innovating . _____

III.Success is defined on the basis of having a smooth operation Within schedule execution, low costs production. _____

IV.Success is defined on the basis of achieving maximum production while offering the most competitive pricing. _____

(D)

I The glue that holds the organization together is loyalty and tradition. Commitment to the organization runs high. _____

II.The glue that holds the organization together is a commitment to innovation and development. _____

III.The glue that holds the organization together is formalized policies. _____

IV.The glue that holds the organization together is emphasis on market success and increased production. _____

(E)

I.The head of the organization is generally considered to be a mentor, a sage, or a parent figure. _____

II.The head of the organization is generally considered to be an innovator, or a risk taker. _____

III.The head of the organization is generally considered to be a coordinator, an organizer, or an efficiency expert. _____

IV.The head of the organization is generally considered to be a hard-driver, a producer, or a competitor. _____

(F)

I.The management style is characterized by team work , consensus, and participation. _____

II.The management style is characterized by individual initiative, innovation, freedom, and uniqueness. _____

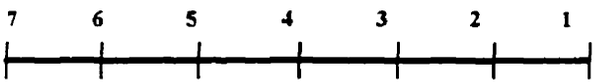
III.The management style is characterized by security of employment, longevity in position, and predictability. _____

IV.The management style is characterized by competitiveness, production, and achievement. _____

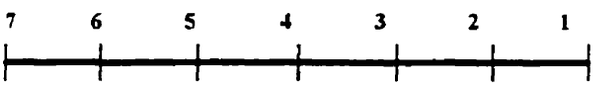
Please rate activities in the firm described by the following statements according to the scale below ranging from " Strongly agree" (7) to " Strongly disagree" (1))

(10)

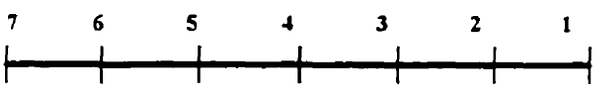
a. In general, decision making responsibilities is based on sharing and participating among all workers in each organizational unit and across all units.



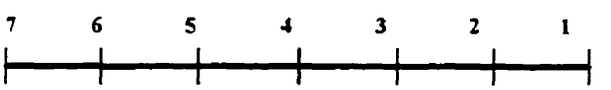
b. In general, management encourages workers to initiate and take decisions concerning work processes.



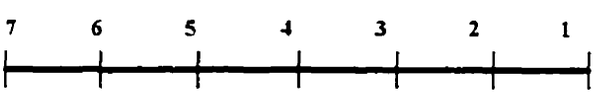
c. Management encourages workers to participate in decisions making by soliciting their input and ideas regarding all organizational processes.



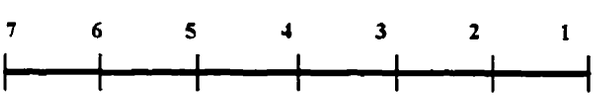
d. Management consults with workers before making decisions concerning work processes.



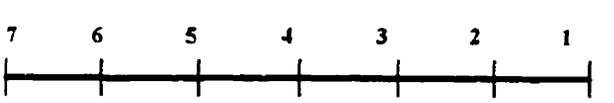
e. Decisions making within organizational units is actually based on consensus of almost all workers or their teams.



f. Workers in the firm are not penalized for wrong decisions but are encouraged to take responsibilities for their actions in a constructive manner.



g. A positive workers' attitude exist in the firm towards participation in decisions making responsibilities as evident by their volunteering of opinions in decisions making.



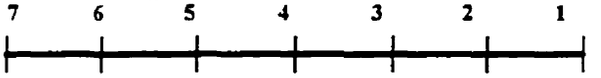
Please rate level of coordination in organizational activities described in the following statements according to the scale below that ranges from "very highly coordinated" (7) to " very little coordination" (1).

(11)

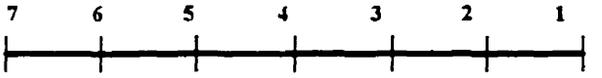
a.Activities that govern work flow and progress among organizational units.



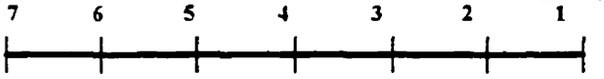
b.Problems resolution activities among organizational units.



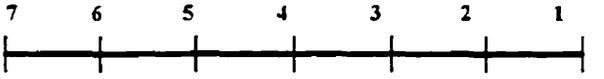
c. Work relationships between organization and its subcontractors, suppliers, and partners.



d. Activities concerning problem and conflict resolution in and among organizational units



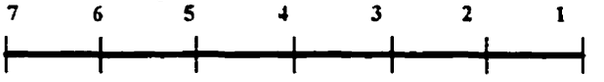
e. Work relationships' activities between the construction firm and its subcontractors, suppliers, allies, and partners.



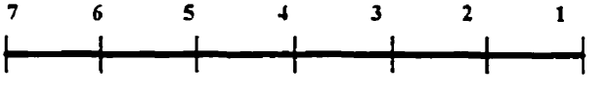
Please rate the activities in the firm described in the following statements according to the scale below ranging from " Strongly agree" (7) to " Strongly disagree" (1))

(12)

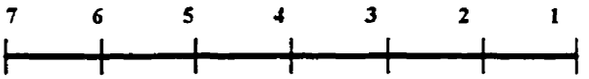
a. The flow of information, both vertically within the organizational hierarchy and laterally across the organizational units is uninterrupted.



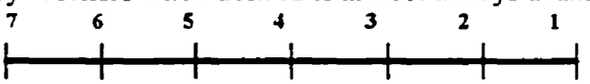
b. Communication flow inside the organization could be best described as very accurate with very little distortion in information communicated.



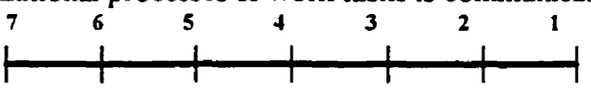
c. Information communicated inside the organization is almost always sufficient in quality and quantity.



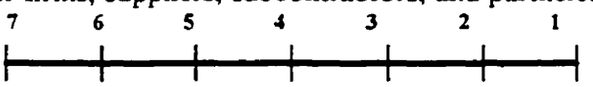
d. Access to information by workers when desired is almost always available in the organization.



e. Feed back about organizational processes & work tasks is communicated regularly and timely.



f. Quality & quantity of information flow is acceptable with external entities sharing in work relationships. i.e. , other firms, suppliers, subcontractors, and partners.

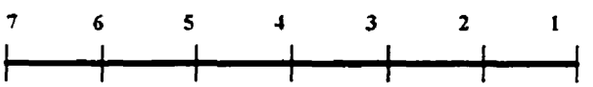


Please rate the level of activities in the firm described in the following statements according to the scale below ranging from " very high" (7) to " very low" (1))

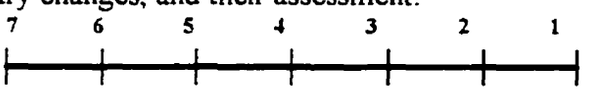
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(13)

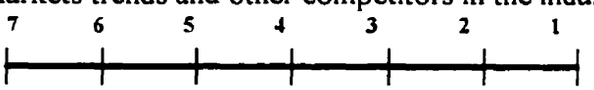
a.The level that planning is used to develop strategies to achieve organizational goals and objectives.



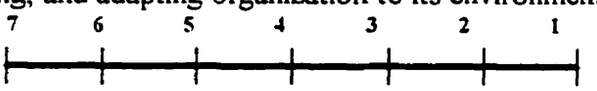
b.The level that operational planning is used in identification of problems in quality of operations, implementation of necessary changes, and their assessment.



c.The level that frequent and multiple environmental scanning functions is used by the organization to monitor markets trends and other competitors in the industry.



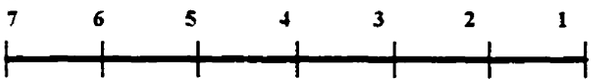
d.The level that strength, weakness, opportunities and threats (SWOT) analysis is used in strategic planning, changing, and adapting organization to its environment.



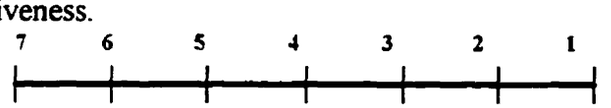
Rate the level of importance in the firm for setting goals described in the statements below according to the scale that ranges from " of primary importance" (7), to "of no importance" (1).

(14)

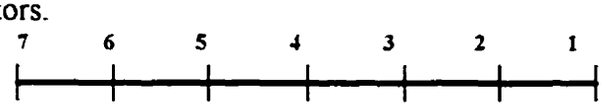
a. Increasing profits levels.



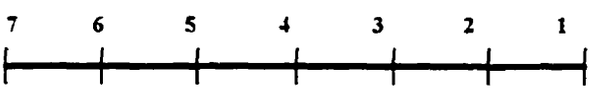
b. Increasing costs effectiveness.



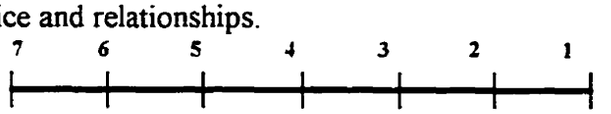
c. Growth into other sectors.



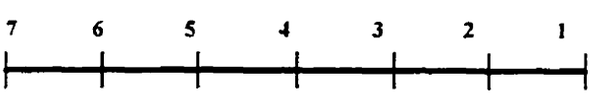
d. Improving quality.



e. Improving clients' service and relationships.



. Increasing workers' participation in descision making

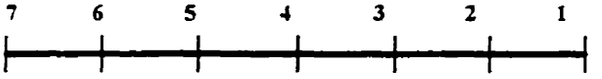


ORGANIZATIONAL EFFECTIVENESS QUESTIONNAIRE TYPE (2)

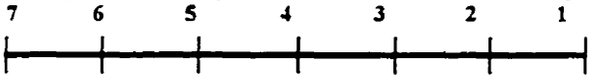
(Rate the following statements as they relate to the firm according to the scale that ranges from "strongly agree" 7 to "strongly disagree" 1).

(1)

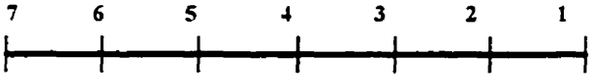
a. Workers accept changes in organizational processes readily and their resistance to it is very minimal.



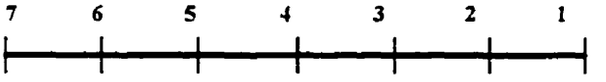
b. Workers view changes in organization's processes as an effort to improve operation.



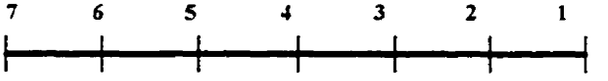
c. Workers are eager to volunteer time to understand changes in organizational processes.



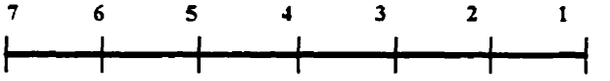
d. Workers are always critical of processes in use and look for other alternatives.



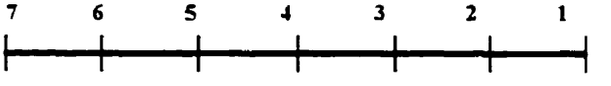
e. Management views changes in organizational processes favorably and actually encourages it when it is needed.



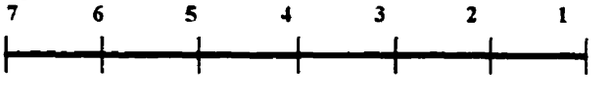
f. Management always reviews organizational processes so it could introduce change wherever it is needed.



g. Rate at which changes are introduced into organizational processes tries to keeps pace with improvements in the field.



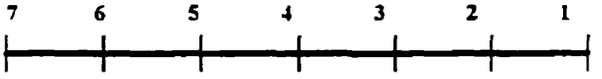
h. Once changes are introduced in organizational processes, smooth operations are usually resumed in a very quick period.



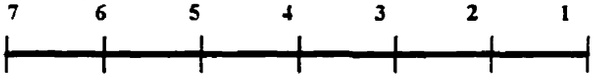
Please rate the extent of rules and regulation used in the firm to regulate activities described below on the scale that ranges from "very extensive regulation" (7) to "very little regulation" (1)

(2)

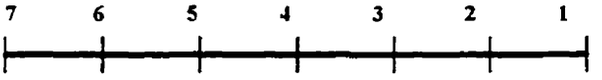
a. All organizational work processes.



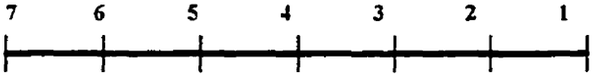
b. Instructions & procedures to perform work tasks.



c. Approaches to evaluate work tasks.



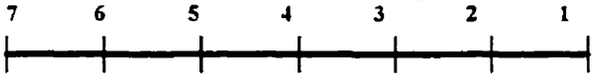
d. Management and workers actions



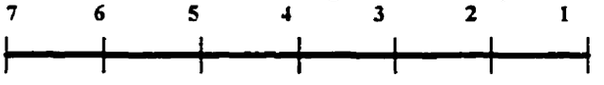
Please rate the following activities in the firm according to the statements below on the scale that ranges from "very strict adherence" (7) to "very little adherence" (1)

(3)

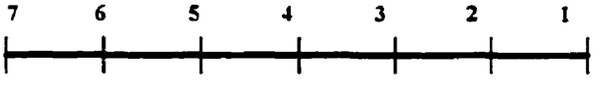
a. Adherence of management to established work rules, regulations, and procedures.



b. Workers' adherence to established work rules, regulation, and procedures.



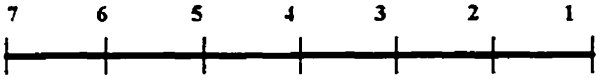
c. Adherence by the firm to established rules, regulations, and procedures that govern relationships with external entities such as suppliers, subcontractors, other partners or allies.



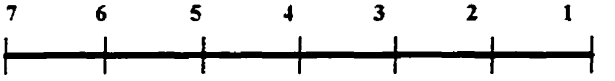
Please rate the level of activities in the firm described in the following statements according to scale ranging from " very high" (7) to " very low" (1))

(4)

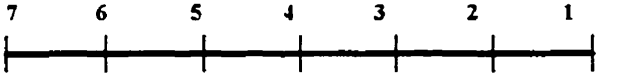
a.Documented and formalized rules, job description and procedures are used in the organization.



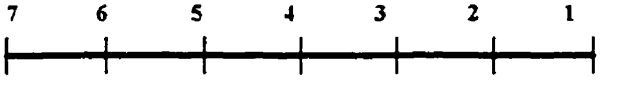
b.Control systems are used to standardize outputs



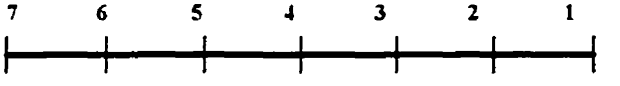
c.All work processes used by the organization are reviewed, controlled to meet quality standards.



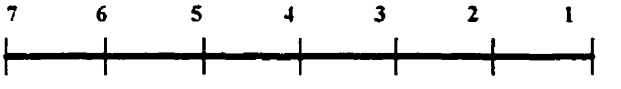
d. Process control tools & methods (i.e. Pareto charts, benchmarking, statistical process control (SPC), concurrent engineering) are used in monitoring processes' quality.



e. Various methods are used to check, monitor, and update progress all work activities to ensure that production is within target schedule and budgeted costs.



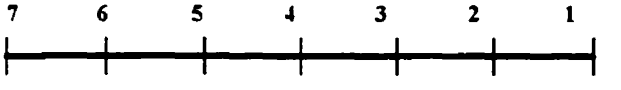
f. A sense of order, continuity, and smooth operations is maintained in all organizational processes.



Rate activities of the firm described in the following statements according to the scale below that ranges from "strongly agree" (7) to "strongly disagree" (1).

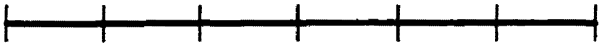
(5)

a. No noticeable negative change is detected in quality output of organizational processes when the organization is handling multiple projects.



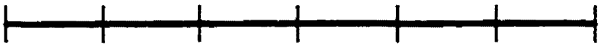
b. The organization structure is suited to handle simultaneous projects at different sites.

7 6 5 4 3 2 1



c. In general, the organization can in a reasonable time acquire all the resources it needs for handling multiple projects contract.

7 6 5 4 3 2 1



d.Handling multiple average size construction projects is the norm for the organization.

7 6 5 4 3 2 1

e. More often than not, when the firm is handling multiple projects at different sites, the level of satisfaction of the various projects' constituents is acceptable.

7 6 5 4 3 2 1



Please distribute 100 points among the four statements in each of the six parts depending on how similar the situation in your organization to that described in each statement. For example in part (A) , if the situation in your organization seems similar to that described in statement (I) and somewhat to that in (II), then you could give 75 points to (I) and 25 points to (II).

---

(6)

(A)

I.The organization can be characterized as a place of high morale, cohesion, and sharing among its workers. _____

II.The organization can be characterized as a dynamic place where emphasis is on acquiring new processes, innovating, and taking risks. _____

III.The organization can be characterized as a formalized and structured place where bureaucratic procedures control all processes. _____

IV.The organization can be characterized as a place where workers are goal oriented and emphasis is put on efficient production. _____

(B)

I.The climate inside the organization is comfortable. High trust and openness prevails. _____

II.The climate inside the organization encourages dynamism, learning, and readiness to adapt to the new. _____

III.The climate inside the organization emphasizes stability. Work procedures are clear and enforced. _____

IV.The climate inside the organization is competitive and emphasis is on beating the competition. _____

(C)

I.Success is defined on the basis of sensitivity to clients, suppliers, the public, and concern for workers. _____

II.Success is defined on the basis of being the first in having or using newest processes and innovating . _____

III.Success is defined on the basis of having a smooth operation Within schedule execution, low costs production. _____

IV.Success is defined on the basis of achieving maximum production while offering the most competitive pricing. _____

(D)

I The glue that holds the organization together is loyalty and tradition. Commitment to the organization runs high. _____

II.The glue that holds the organization together is a commitment to innovation and development. _____

III.The glue that holds the organization together is formalized policies. _____

IV.The glue that holds the organization together is emphasis on market success and increased production. _____

(E)

I.The head of the organization is generally considered to be a mentor, a sage, or a parent figure. _____

II.The head of the organization is generally considered to be an innovator, or a risk taker. _____

III.The head of the organization is generally considered to be

a coordinator, an organizer, or an efficiency expert. _____

IV.The head of the organization is generally considered to be a hard-driver, a producer, or a competitor. _____

(F)

I.The management style is characterized by team work , consensus, and participation. _____

II.The management style is characterized by individual initiative, innovation, freedom, and uniqueness. _____

III.The management style is characterized by security of employment, longevity in position, and predictability. _____

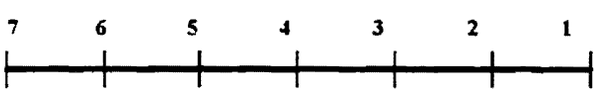
IV.The management style is characterized by competitiveness, production, and achievement. _____

Please rate activities in the firm described by the following statements according to the scale below ranging from " Strongly agree" (7) to " Strongly disagree" (1))

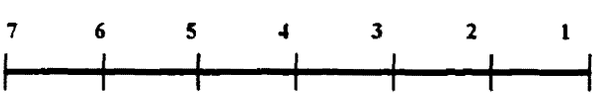
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(7)

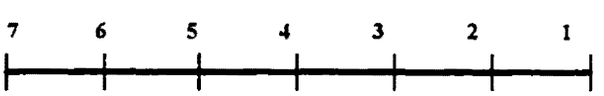
a. In general, decision making responsibilities is based on sharing and participating among all workers in each organizational unit and across all units.



b. In general, management encourages workers to initiate and take decisions concerning work processes.



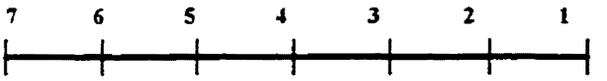
c. Management encourages workers to participate in decisions making by soliciting their input and ideas regarding all organizational processes.



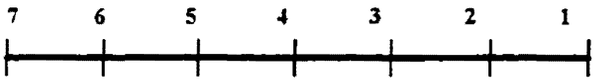
d. Management consults with workers before making decisions concerning work processes.



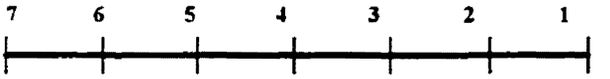
e. Decisions making within organizational units is actually based on consensus of almost all workers or their teams.



f. Workers in the firm are not penalized for wrong decisions but are encouraged to take responsibilities for their actions in a constructive manner.



g. A positive workers' attitude exist in the firm towards participation in decisions making responsibilities as evident by their volunteering of opinions in decisions making.

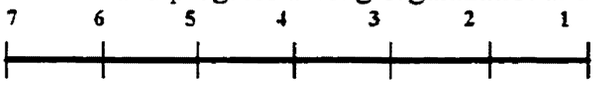


Please rate level of coordination in organizational activities described in the following statements according to the scale below that ranges from "very highly coordinated" (7) to " very little coordination" (1).

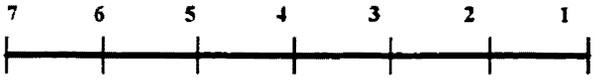
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(8)

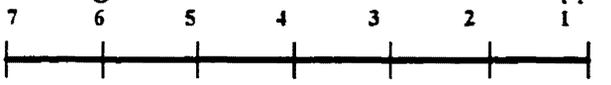
a.Activities that govern work flow and progress among organizational units.



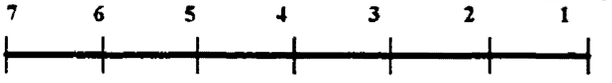
b.Problems resolution activities among organizational units.



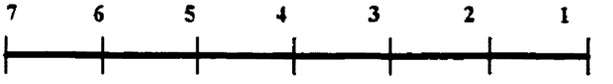
c. Work relationships between organization and its subcontractors, suppliers, and partners.



d. Activities concerning problem and conflict resolution in and among organizational units



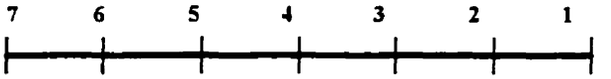
e. Work relationships' activities between the construction firm and its subcontractors, suppliers, allies, and partners.



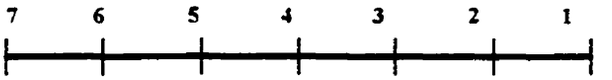
Please rate the activities in the firm described in the following statements according to the scale below ranging from " Strongly agree" (7) to " Strongly disagree" (1))

(9)

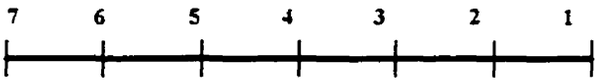
a. The flow of information, both vertically within the organizational hierarchy and laterally across the organizational units is uninterrupted.



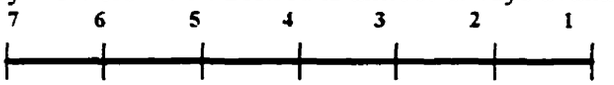
b. Communication flow inside the organization could be best described as very accurate with very little distortion in information communicated.



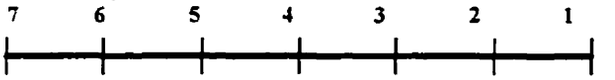
c. Information communicated inside the organization is almost always sufficient in quality and quantity.



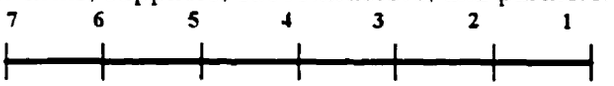
d. Access to information by workers when desired is almost always available in the organization.



e. Feed back about organizational processes & work tasks is communicated regularly and timely.



f. Quality & quantity of information flow is acceptable with external entities sharing in work relationships. i.e. , other firms, suppliers, subcontractors, and partners.



APPENDIX (B)

Averaged Aggregated
variables' scores for the 76 ICI construction firms

obs	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	Y
1	5.077	5.344	4.917	5.125	6.167	4.250	5.875	4.667	6.548	5.071	4.771	3.333	5.00	5.15	0.900
2	4.846	5.125	5.083	4.875	6.167	4.250	5.813	4.333	6.190	5.179	4.542	3.333	4.75	5.10	0.867
3	5.077	5.063	5.083	5.000	6.167	4.167	5.688	4.333	5.952	5.107	4.438	3.000	4.75	5.15	0.833
4	4.077	5.031	5.167	5.125	6.000	4.250	5.313	4.000	5.833	5.071	4.396	3.000	4.75	5.00	0.800
5	4.308	4.813	5.250	4.875	6.000	4.167	5.250	4.000	5.714	5.000	4.354	3.333	4.75	4.95	0.750
6	4.154	5.125	4.917	5.000	6.167	4.250	5.938	4.333	5.833	5.071	4.542	3.667	5.00	5.20	0.867
7	4.769	5.031	5.000	5.000	6.167	4.167	5.813	4.000	5.833	4.964	4.479	3.000	5.00	5.15	0.800
8	5.077	4.938	5.083	4.750	6.000	4.250	5.375	4.000	5.476	5.036	4.417	2.667	5.25	5.05	0.733
9	3.923	4.844	5.167	5.000	6.000	4.000	5.688	4.000	5.238	5.143	4.354	3.333	5.00	4.95	0.717
10	4.154	5.031	5.000	5.000	6.000	4.083	5.750	4.000	5.833	5.179	4.396	3.333	5.00	5.15	0.800
11	4.615	5.063	4.917	4.750	6.167	4.083	5.188	3.667	5.476	5.143	4.375	2.000	4.75	5.25	0.783
12	5.077	4.969	5.000	5.000	6.000	4.167	5.563	4.000	5.833	5.107	4.396	4.000	5.00	5.10	0.800
13	4.462	5.000	5.167	5.250	6.000	4.250	5.625	4.667	5.714	5.179	4.979	4.000	4.75	5.10	0.867
14	4.462	4.969	5.167	5.125	6.167	4.250	5.563	4.333	5.714	5.143	4.896	3.000	5.25	5.15	0.850
15	4.692	5.000	5.083	5.125	6.333	4.167	5.438	4.333	5.714	5.107	4.875	3.333	5.00	5.10	0.817
16	4.462	4.688	5.250	5.000	6.000	4.083	5.313	4.000	5.595	5.071	4.729	3.667	5.00	5.15	0.817
17	4.923	4.969	5.167	5.000	5.833	4.167	5.250	4.000	5.595	5.036	4.625	3.333	4.75	5.05	0.800
18	4.615	4.781	5.000	5.000	6.333	4.250	5.313	4.000	5.357	5.000	4.729	3.333	5.00	5.10	0.800
19	4.769	4.875	5.167	5.000	6.167	4.000	5.125	4.000	5.357	5.000	4.667	2.667	5.00	5.05	0.800
20	5.000	4.719	5.167	4.875	6.000	4.083	5.125	4.000	5.119	4.964	4.563	3.667	4.75	5.10	0.783
21	4.923	4.813	5.083	4.875	6.000	4.083	5.063	4.000	5.119	4.929	4.542	2.667	4.75	5.05	0.783
22	5.000	4.750	5.000	4.750	6.000	4.167	5.000	4.000	5.357	4.893	4.521	2.667	5.00	5.15	0.783
23	4.615	5.188	4.917	4.875	5.833	4.083	5.000	4.000	5.119	4.857	4.500	2.000	4.75	5.05	0.767
24	4.538	4.594	5.000	4.875	6.000	4.167	4.938	4.333	5.119	4.821	4.375	2.667	5.00	4.95	0.767
25	4.692	4.406	4.917	4.750	6.167	4.167	4.938	4.667	5.000	4.786	4.396	3.000	5.00	4.90	0.750
26	4.846	4.625	4.917	4.875	6.167	4.250	4.938	4.333	4.762	4.714	4.271	3.333	5.00	4.95	0.733
27	5.000	4.469	4.833	5.000	6.167	4.083	4.813	4.000	4.762	4.714	4.292	3.000	4.75	5.15	0.717
28	4.846	4.781	5.000	4.875	6.000	4.000	4.938	4.000	4.762	4.750	4.271	3.000	4.75	5.00	0.717

obs	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	Y
29	4.692	4.813	4.917	4.750	5.833	4.167	5.000	4.000	4.524	4.679	4.250	3.333	4.75	4.95	0.700
30	4.692	4.875	4.750	4.500	6.167	4.167	5.125	3.667	4.524	4.750	4.292	3.333	5.00	5.00	0.700
31	5.077	4.531	4.833	4.750	6.167	4.167	5.000	4.000	4.405	4.607	4.271	2.667	5.00	4.85	0.683
32	4.769	4.594	4.667	4.750	5.833	4.083	4.875	3.667	4.405	4.607	4.417	2.667	4.75	4.90	0.667
33	5.615	4.563	5.250	5.125	6.000	4.250	5.750	4.000	5.476	5.250	5.188	3.333	4.75	5.30	0.833
34	5.462	4.500	5.167	4.875	6.000	5.167	5.563	4.000	5.476	5.500	5.042	3.333	4.75	5.25	0.833
35	5.000	4.438	5.083	5.000	5.667	5.083	5.250	4.000	5.357	5.393	4.958	3.333	4.75	5.20	0.800
36	4.846	4.500	5.250	4.625	6.000	5.167	5.063	4.000	5.238	5.357	4.938	3.333	5.00	5.15	0.800
37	4.923	4.688	5.167	4.250	6.167	5.250	5.125	4.000	5.119	5.286	4.917	3.667	4.75	5.15	0.767
38	4.923	4.250	5.167	4.125	5.500	5.083	5.313	4.000	5.119	5.179	4.813	3.333	4.75	5.20	0.767
39	5.000	4.469	5.083	4.375	6.167	5.083	5.688	3.667	5.119	5.107	4.688	3.000	4.75	5.05	0.750
40	4.615	4.531	5.083	4.375	6.000	5.167	5.313	3.667	5.119	5.036	4.438	3.333	4.75	5.15	0.750
41	4.846	4.500	5.000	4.750	5.833	5.083	5.250	4.000	5.238	5.107	4.375	3.333	4.50	5.10	0.733
42	5.154	4.531	5.000	5.000	6.167	4.917	5.688	4.000	5.119	5.071	4.479	3.333	4.50	5.20	0.733
43	4.615	4.563	5.167	4.375	6.167	5.083	5.688	4.000	5.357	5.071	4.604	3.333	4.50	5.10	0.733
44	5.308	4.469	5.083	4.375	5.833	5.000	5.250	4.000	5.119	4.857	4.479	3.000	4.50	5.00	0.717
45	4.692	4.406	5.083	4.250	5.167	5.083	5.375	4.000	5.119	4.821	4.604	3.333	4.75	5.05	0.717
46	5.077	4.375	5.000	4.000	6.000	5.000	5.313	4.000	5.357	4.929	4.271	2.667	4.75	5.10	0.717
47	5.000	4.375	5.000	3.875	5.667	5.000	5.438	4.000	5.119	4.964	4.479	2.000	4.50	5.00	0.717
48	4.846	4.344	4.917	4.750	6.000	5.083	5.188	3.667	5.000	4.857	4.396	3.333	5.00	4.95	0.700
49	4.923	4.344	5.000	4.875	5.000	5.000	5.313	3.667	5.119	5.179	4.458	3.000	5.25	4.85	0.700
50	4.923	4.313	4.917	4.500	5.667	4.917	5.250	4.000	5.000	4.786	4.354	3.000	4.50	5.00	0.683
51	4.923	4.281	5.083	4.500	6.167	4.833	5.063	3.667	5.000	4.750	4.479	3.000	4.75	5.05	0.667
52	4.692	4.281	4.833	4.125	5.667	4.750	4.938	3.333	5.000	4.714	4.271	3.000	4.75	5.05	0.667
53	4.923	4.250	4.750	4.250	5.833	4.750	4.563	4.000	5.000	4.786	4.250	2.667	4.75	5.15	0.650
54	4.923	4.156	4.833	4.375	6.167	4.667	4.875	4.333	5.000	4.857	4.229	3.333	5.00	5.20	0.650
55	5.308	4.156	4.583	4.250	6.167	4.667	4.750	4.000	4.762	4.750	4.271	2.667	4.50	5.15	0.633
56	5.385	4.094	4.833	4.250	5.833	4.583	4.875	4.000	4.643	4.679	4.292	3.000	4.75	5.10	0.600

obs	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	Y
57	4.692	4.125	4.667	4.375	5.833	4.583	4.625	4.000	4.524	4.643	4.292	3.333	4.25	5.10	0.567
58	4.769	4.781	4.750	4.250	6.000	3.917	5.750	4.000	4.524	4.500	4.479	2.667	4.75	5.15	0.517
59	5.231	3.938	4.667	4.125	5.667	3.917	5.188	3.333	4.524	4.607	4.417	3.333	4.50	5.10	0.500
60	4.692	3.938	5.000	4.000	5.667	4.000	5.000	3.333	4.524	4.429	4.458	2.667	4.25	5.15	0.500
61	4.769	3.969	5.167	4.250	6.167	3.917	4.813	3.667	4.524	4.179	4.604	2.667	4.25	5.25	0.500
62	4.923	3.938	5.083	4.875	5.667	3.917	4.625	3.000	4.405	4.464	4.625	3.000	4.75	5.20	0.500
63	4.846	3.875	4.583	5.000	6.167	3.833	5.688	3.667	4.405	4.036	4.708	3.000	4.75	5.15	0.483
64	4.462	4.000	4.500	5.000	5.667	3.583	5.313	3.333	4.405	4.143	4.542	3.000	4.75	5.15	0.483
65	4.769	3.875	4.583	4.500	5.833	3.750	5.250	3.333	4.405	4.036	4.667	3.000	4.75	5.15	0.467
66	4.846	3.844	4.833	4.750	6.000	3.667	4.625	3.000	4.405	4.000	4.396	3.333	5.00	5.20	0.467
67	4.846	3.844	4.583	5.125	6.167	4.000	4.750	3.333	4.405	4.179	4.375	2.667	5.00	5.15	0.467
68	4.000	3.875	4.750	5.000	5.833	4.000	4.438	3.333	4.286	4.321	4.500	3.000	4.75	5.10	0.467
69	5.077	3.844	4.750	5.125	6.000	4.167	4.500	3.667	4.286	4.393	4.375	3.333	5.25	4.95	0.467
70	4.846	3.844	4.833	4.375	6.000	3.917	4.625	3.667	4.048	4.464	4.438	2.667	5.00	4.90	0.450
71	4.077	3.813	4.750	4.500	5.667	4.167	4.500	3.667	4.048	4.286	4.396	3.000	4.50	4.60	0.433
72	4.538	3.813	5.000	5.000	6.000	4.000	4.375	3.667	4.048	4.429	4.271	2.667	5.00	4.75	0.433
73	4.846	3.813	4.833	4.500	5.500	4.083	4.250	3.333	4.048	4.429	4.063	3.000	4.50	4.85	0.417
74	4.692	3.781	4.750	5.000	5.333	4.167	4.313	3.000	4.048	4.500	4.583	2.667	4.25	4.80	0.417
75	4.846	3.781	5.083	4.000	5.333	3.917	4.313	3.667	3.929	4.429	4.292	2.667	4.50	4.55	0.400
76	4.462	3.719	4.750	4.750	5.333	4.167	4.813	3.333	3.810	4.500	4.292	2.667	4.50	4.50	0.400

APPENDIX (C)

AN EXPOSÉ ON MULTIPLE REGRESSION

C.0. INTRODUCTION

The general additive multiple regression model, which relates a dependent variable y to k predictors variables x_1, x_2, ...,x_k, is given by the model equation

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots\cdots + \beta_k x_k + e$$

The model assumes that there is a line with a vertical intercept α and partial slopes of β_1 , β_2 ,....,β_k called the true or population regression line. The random deviation e is assumed to be normally distributed with mean value 0 ($\mu_e = 0$) and variance σ^2 for any values of x_1, ...x_k. This implies that for fixed x_1, x_2, ..., x_k values, y has a normal distribution with variance σ^2 and mean y value that equals the expression

$$\begin{pmatrix}\text{mean y value for fixed} \\ x_1,\cdots,x_k \text{ values}\end{pmatrix} = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots\cdots + \beta_k x_k$$

The β_i's are called population regression coefficients and $\alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots\cdots + \beta_k x_k$ is referred to as the population regression function.

C.1. FITTING A MODEL AND ASSESSING ITS UTILITY

The principle of least squares is used in simple linear regression to estimate the coefficients. According to the principles of least squares, the fit of a particular estimated regression function $a + b_1 x_1 + \ldots\ldots + b_k x_k$ to the observed data is measured by the sum of squared deviations between the observed y values and the y values predicted by the estimated function or model:

$$\sum \left[y - (a + b_1 x_1 + \cdots\cdots + b_k x_k) \right]^2$$

The least squares estimates of α, β_1, β_2,·····, β_k are those of a, b_1, b_2, ..., b_k that make this sum of squared deviations as small as possible. The utility of an estimated model can be assessed by examining the extent to which predicted y values based on the estimated regression function (model) are close to the y values actually observed. The first predicted value of y or $\hat{y}_1$ is obtained by taking the values of the predictor variables x_1, x_2, ..., x_k for the first observation or data record and substituting these values into the estimated regression model. Doing this successively for the remaining observations yields the predicted values $\hat{y}_2$ $\hat{y}_3$, ... , $\hat{y}_k$.

The residuals are then the differences y_1 - $\hat{y}_1$, y_2 - $\hat{y}_2$, . . . y_k - $\hat{y}_k$ between the observed and predicted values. The residual (or error) sum of squares, SSResid, and the total sum of squares, SSTo, are given by

$$\text{SSResid} = \sum\left(y-\hat{y}\right)^2 \qquad \text{SSTo} = \sum(y-\bar{y})^2$$

where $\bar{y}$ is the mean of the y observations in the sample. SSResid measures the amount of total variation that has not been explained by the fitted model. SSTo is a measure of total variation in the sample data

The number of degrees of freedom associated with SSResid is n-(k+1). An estimate of the random deviation variance σ^2 is given by:

$$S_e^2 = \frac{\text{SSResid}}{\text{n -(k + 1)}}$$

and S_e^2 is the estimate of σ. The coefficient of multiple determination, R^2, interpreted as the proportion of variation in observed y values that is explained by the fitted model, is given by:

$$R^2 = 1 - \frac{\text{SSResid}}{\text{SSTo}}$$

Generally, a desirable model is one that results in both a large R^2 value and a small S_e value. However, there is a catch: These two conditions can be achieved by fitting a model that contains a large number of predictors. Such a model may be successful in explaining all the dependent variable y variation, but it almost always specifies a relationship that is unrealistic and difficult to interpret. What is wanted really is a simple model, one with relatively few predictors whose roles are easily interpreted, which also does a good job of explaining variation in y.

The SAS procedures used in the analysis to calculate a multiple regression linear model using the fourteen hypothesized predictors includes R^2 and S_e values in its output, and give SSResid. In addition it computes a quantity called adjusted R^2, which involves a downward adjustment of R^2. If a large R^2 has been achieved through using just a few predictors in the model, adjusted R^2 will differ little from R^2. However, the adjustment can be substantial when either a great many predictors (relative to the number of observations) have been used or when R^2 itself is small to moderate.

C.1.1. The *F* Test for Model Utility

In the simple linear model with regression function $\alpha + \beta x$, if $\beta = 0$, there is no useful linear relationship between y and the single predictor variable x. Similarly, if all k coefficients $\beta_1, \beta_2, \ldots, \beta_k$ are zero in the general k- predictor multiple regression model, there is no useful linear relationship between y and any of the predictor variables $x_1, x_2, \ldots\ldots, x_k$ included in the model. Before using an estimated model in further inferences (for example prediction), it is desirable to confirm the model's utility through formal ,test procedure. This test is called the F test. From the preceding section, we know that SSTo is a measure of total variation in the sample data and that SSResid measures the amount of total variation that has not been explained by the fitted model. The difference between total and error sums of squares is itself a sum of squares, called regression model sum of squares (SSRegr) and equals SSTo - SSResid.

SSRegr is interpreted as the amount of total variation that has been explained by the model. The model should be judged useful if SSRegr is large relative to SSResid, and this achieved by using small number of predictors relative to sample size. The number of degrees of freedom associated with SSRegr is k, the number of model predictors, and df for SSResid is n - (k+1). The model utility F test is based on the following distributional result. When all the k β_i's are zero in the model $Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots\cdots + \beta_k x_k + e$, the statistic $F = \dfrac{\text{SSRegr/k}}{\text{SSResid}/[n-(k+1)]}$ has an F probability distribution based on k numerator df and n-(k+1) denominator df. The value of F tends to be larger when at least one β_i is not zero than

when all the β_i's are zero, since more variation is typically explained by the model in the former case than in the latter. An F statistic value far out in the upper tail of the associated F distribution can be more attributed to at least one nonzero β_i rather than when all β_i's are zero. This is why the model utility F test is upper tailed.

Therefore the F test for utility of the multiple regression linear model

$$Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots\cdots + \beta_k x_k + e$$

Null hypothesis:

H_o: $\beta_1 = \beta_2 = \beta_3 = \cdots\cdots = \beta_k = 0$ (There is no linear relationship between y and any of the hypothesized predictors x_1, x_2, ..., x_k)

Alternative hypothesis:

H_a: At least one among β_i's is not zero. (there is a useful linear relationship between y and at least one of the predictors)

$$\text{Test Statistic: } F = \frac{\text{SSRegr/k}}{\text{SSResid}/[n-(k+1)]}$$

where SSRegr = SSTo - SSResid. An equivalent formula is

$$\frac{R^2/k}{(1-R^2)/[n-(k+1)]}$$

Rejection region:

The null hypothesis is rejected when $F > F$ critical value. The F critical value (level of significance)

C.2. VARIABLE SELECTION (HOW MANY PREDICTORS TO RETAIN IN THE MODEL)

By checking the null hypothesis T= H0: Parameter= 0, (the *t* test that the parameter is zero, this is computed as the Parameter Estimate divided by the Standard Error for each variable) concerning the parameter estimates, (Prob>|T|) of each variable included in the model and whether it true or not, the decision can be made as to how many variables to retain in the model. The (Prob>|T|) is the two-tailed significance probability that a *t* statistic would obtain a greater absolute value than that observed, given that the true parameter is zero.

Assessing the statistical significance of sets of the coefficients β_i's by model comparison tests provides a useful and flexible way for guiding the variable selection process. The *t* test values and their probabilities (T:H0=0, Prob> |T|) that are calculated or given by SAS computer package for the "significance" of the parameter estimate of the intercept and each predictor included the model is generally used as the test for including the predictor or excluding it from the model. The (Prob> |T|) value represents the probability of rejecting the null hypothesis that the particular coefficient equals to zero. Depending on the chosen level of significance for including variables in the model, the lower the (Prob> |T|) value, the better chance for including the variable in the model. The resulting (Prob> |T|) values for the hypothesized variables depends on the model selection procedures used in model building. The (T:H0=0, Prob> |T|) values given by the various model selection procedures should be treated carefully especially for stepwise and forward selection procedures, especially if the initial pool of predictors is moderate (15) or large (30) (Stevens, 1992).

C.2.1. Model Selection Procedures

Model selection methods can be divided into two types. There are those based on fitting every possible model, computing one or more summary quantities from each fit, and computing these quantities to identify the most satisfactory models. Several of the most powerful statistical computer packages have an all-subsets option such as SAS and SPSS. Methods of the second type are often referred to as automatic selection, or stepwise, procedures. The general idea is to either begin with m predictor model and delete variables one by one until all remaining predictors are judged important, or begin with no predictors and add predictors until no predictor not in the model seems important.

What characteristic(s) of the estimated models should be examined in the search for a best model? Devore and Peck (1993) discussed the use of R^2 which measures the proportion of observed y variation explained by the model. A model with a large R^2 value is preferable to another model containing the same number of predictors but which has a much smaller R^2 value. However they argued that using R^2 to choose between models containing different numbers of predictors is not so straightforward because adding a predictor to a model can never decrease the value of R^2. In particular, the model containing all candidate predictors is guaranteed to have R^2 value at least as large as for any model that includes some but not all of these predictors. A small increase R^2 in resulting from the addition of a predictor to a model may be offset by the increased complexity of the new model and the reduction of degrees of freedom associated with SSResid. This is why adjusted R^2 was introduced. Adjusted R^2 formalizes the notion of diminishing returns as more predictors are added-small increases in

are outweighed by corresponding decreases in degrees of freedom associated with SSResid. Therefore a reasonable strategy in model selection is to identify the model with the largest value of adjusted R^2 (the corresponding number of predictors k is often much smaller than their total number) and then consider only the model and any others whose adjusted R^2 values are nearly as large.

In the following section several sequential selection procedures that have been used in regression analysis (Dillon and Goldstein, 1984) are presented.

C.2.1.1. All Possible Regression Subsets

This procedure, as its name suggests, fits all possible regression of a given size. With (m) explanatory variables there (2^m) possible regression models, ranging from the simplest form, where only one of the predictors is included, to the most complex, in which all predictors are included (see later in the appendix the results yielded by all possible regression procedure performed by SAS computer on data used by this study). This approach generally relies on R^2 as the assessment criterion, and the process starts by computing the R^2 values for all the combinations of predictors of a give size, that is, ranging from 1 to m. For each subset of a given size the combination of predictors that yields the largest R^2 value is selected out and then compared, again in terms of R^2, with the others "winners" from the other subsets of different size. The more recent algorithms allow different selection criteria to be used such as adjusted R^2 which is discussed in the preceding paragraph and C_p. statistic. C_p was proposed

by Mallows (1973) as a criterion for selecting a model. It is a measure of total squared error. The value for the C_p statistic is defined by:

$$C_p = (SSE_p/S^2) - (N-2*p)$$

where SSE_p is the error sum of squares for a model with p parameters including the intercept, if any, and S^2 is the mean square error (MSE) for the model. A good model according to this criterion is one that has small C_p (for accurate prediction) and $C_p \cong k + 1$ (for unbiasedness in estimating model coefficients) where k is the number of predictors in the model.

C.2.1.2. Sequential Selection

The sequential procedures can be viewed as a compromise with all possible regression approach. Three types of sequential methods are mainly utilized. Namely, *backward selection*, *forward selection, and stepwise selection*. Essentially, these approaches differ with respect to the direction taken in model selection and the reversibility of a decision as to the worthiness of a candidate predictor.

backward selection works in the following way:

1. A regression equation (model) that includes all of the p independent variables is obtained.
2. The R^2 induced from deleting each independent variable, or equivalently the partial F test value for each independent variable treated as though it were the last variable to enter the regression equation, is calculated

3. The lowest partial F test value, denoted by F_L , is compared with a predetermined critical tabulated F -value denoted by F_C.. If

   a. $F_L < F_C$ remove that variable associated with this , recompute the regression equation in the remaining independent variables and return to stage 2;

   b. $F_L > F_C$ adopt the regression equation as calculated

Forward selection works in the following way:

1. The process begins with no variables having been included in the regression equation.
2. The correlations of all the predictor variables with the dependent variable are calculated, and that predictor with the largest correlation is selected if its corresponding partial F-value is statistically significant at some predetermined level.
3. The independent variable selected at stage 2 is entered, and the regression equation is calculated.
4. At each successive stage the independent variable with the largest *partial* correlation coefficient is selected.
5. The corresponding partial F test value for this variable, denoted by F_H , is compared with a predetermined critical tabulated F-value, denoted by F_C. If:

   a. $F_H < F_C$, include that variable which gave the highest partial corresponding coefficient, recalculate the regression equation, and return to stage 4;

b. $F_H > F_C$ adopt the regression equation as calculated.

Stepwise selection works in the following way:

1. Calculate the correlations of all the predictor variables with the dependent variable. As the first variable to enter the regression, select the one most highly correlated with the criterion. Let X_i denote the selected predictor variable.
2. Regress Y on X_i . Retain in the fitted model if the overall F-test shows that the regression equation is statistically significant.
3. Calculate the partial correlation coefficients of all the variables not in the regression equation with the criterion. Select as the next variable to enter the one with the highest partial correlation coefficient. Denote the selected variable by X_j.
4. With both X_i and X_j in the model, compute the regression equation. Retain the new variable X_j in the regression equation if its partial F-value is statistically significant as compared to critical tabulated $(1-\alpha)$-values under the F-distribution with 1 and n-2-1 df.
5. Select as the next variable to enter the one most highly correlated with the dependent variable, given that the variables X_i and X_j are already in the regression equation. Denote this variable by X_k.
6. Enter the new variable X_k into the model, and compute the regression equation including X_i , X_j , and X_k. The decision as to whether (1) X_k should be included in the regression given that X_i and X_j are already in, (2) X_i warrants retention in the model given that X_j and X_k have been already included, and (3) X_j warrants retention in the model given that X_i and

X_k have been already included can be made on the basis of the partial F-values of the three variables.

7. The stepwise procedure continues in similar fashion. Termination occurs when no variable can be either entered or removed from the regression equation.

The various selection procedures can be viewed as useful approaches to selecting "good" subsets of predictor variables. Stevens (1992) state the following two rules of thumb for the selection of predictor variables in models.

1. Choose variables that correlate highly with the criterion but that have low intercorrelations.
2. To these variables add other variables that have low correlations with the criterion but that have high correlations with the other predictors.

C.3. DIAGNOSIS AND CHECKING MODEL ADEQUACY

In order to make reliable inferences from the chosen regression model the key assumptions that (1) the error (e) has a normal distribution, (2) the standard deviation of (e) is σ, which does not depend on observation x, have to hold. Inferences based on the regression model continue to be reliable when model assumptions are slightly violated (mild nonnormality of the random deviation distribution). However, use of an estimated model in the face of grossly violated assumptions can result in very misleading conclusions being drawn. Therefore it is desirable to check for model adequacy by inspecting that the model holds these

assumptions. This is done by a number of steps which include residual analysis, and mutlicollinearity analysis.

C.3.1. Residual Analysis

Residual analysis is handled by plotting the computed standardized residuals resulting from the fit of the chosen model. Plots of the standardized residuals against each predictor variable in the model called standardized residual plots, are helpful in identifying unusual or highly influential observations and in checking for violations of model assumptions. That is, a plot of (X_1, standardized residual) pairs, another of (X_2, standardized residual) pairs, and so on. A desirable plot is one that exhibits no particular pattern (such as curvature or much greater spread in one part of the plot than in another), and one that has no point that is far removed from all the others. A point falling far above or below the horizontal line at height zero (an outlier) corresponds to a large standardized residual, which may indicate some kind of unusual behavior, such as recording error, a non standard experimental condition, or an atypical experimental subject. A point that has an x value that differs greatly from others in the data set could have exerted excessive influence in determining the fitted line (an influential). In case an observation is suspected, deleting the observation and refitting the model will reveal the extent of actual influence.

A good check that is performed in residual analysis is the normal probability plot of the standardized residuals. A normal probability plot of the standardized residuals that departs

too much from a straight line casts doubt on the assumption that the random deviation (e) has a normal distribution.

C.3.1.1. Outliers

An outlier among a set of residuals is one that is much larger than the rest in absolute value, perhaps lying as many as three or more standard deviations from the mean of the residuals. Clearly, the presence of such an extreme value can significantly affect the least-squares fitting of a model, and so it is important to determine if the analysis should be modified in some way (such as by deleting the observation). An outlier in the data may indicate special circumstances warranting further investigation (e.g., such as the presence of an unanticipated interaction effect among the variables). Therefore, deleting the observation is not recommended immediately unless there is strong evidence that it resulted from a mistake (e.g., an error in data recording).

There are a number of statistical methods for detecting outliers that include jackknife residuals method, leverages method, and Cook's distance method. SAS provides all. Here the emphasis is on Cook's distance statistic which measures the level of the change to the parameter estimates that result from deleting the outlier observation. As a rule of thumb when the value of Cook's distance equals one for any observation that calls for checking and scrutinizing that observation.

C.3.2. Multicollinearity

Generally, when the fitted model includes k predictors X_1, X_2 , X_3 , ..., X_k there is said to be multicollinearity if there is a strong linear relationship between values of the predictors. Severe multicollinearity leads to instability of estimated coefficients. In order to identify such relationships, R^2 values for regressions in which the dependent variable is taken to be one of the k X's and the predictors remaining (k -1) X's, have to computed. Each regression yields an R^2 value. In general, there are k such regressions and, therefore, kR^2 resulting values. If one or more of these R^2 values is large (close to one), multicollinearity is present.

SAS procedure allows an options (TOL) in its model statement that when executed, prints tolerance values for the predictor variables included in the fitted model. Tolerance for a variable is defined as (1- R^2), where R^2 is obtained from the regression of the variable on all other regressors (predictors) in the model. Therefore a high tolerance value for a predictor variable given by SAS output indicates low multicollinearity and appropriateness of including the variable in the fitted model. As a rule of thumb, when the TOL is 0, it means that the variables are related, when TOL <0.01, this indicates severe multicollinearity. In both of these cases, the SAS will automatically remove such variables. When the TOL <0.2, it causes interpretation and variable selection problems. In order to resolve the problem, variables intercorrelations must investigated and remove variables with high correlation.

C.4. INFERENCES BASED ON THE ESTIMATED MODEL

In the previous sections, a discussion was presented how to estimate the coefficients in the model $Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \cdots\cdots + \beta_k x_k + e$ using the principle of least squares and then how the utility of the model could be confirmed by the application of the model utility F test. If the null hypothesis $H_o : \beta_1 = \beta_2 = \beta_3 = \cdots\cdots = \beta_k = 0$ can not be rejected at a reasonably small level of significance, it must be concluded that the model does not specify a useful relationship between Y and any of the predictor variables x_1, x_2, ..., x_k.. The investigator must search further for a model that does describe a useful relationship, perhaps by introducing different predictors or making variable transformations. Only if H_o can be rejected is it appropriate to proceed further with the chosen model and make inferences based on the estimated coefficients, a, b_1, b_2, ..., b_k and the estimated regression model $a - b_1 x_1 -$ . . . . . $- b_k x_k$.

Appendix (D)-SAS Output

Part (I)

Results of 'RSQUARE' Model Selection Procedure

all possible regression procedure (RSQUARE)

N = 76 Regression Models for Dependent Variable: Y

In	R-square	Adj Rsq	C(p)	Variables in Model
1	0.621719	0.616607	288.6	D92
1	0.460869	0.452482	461.8	D72
1	0.336435	0.327671	560.4	D102
1	0.265280	0.255351	620.4	D22
1	0.181123	0.170057	708.6	D81
1	0.150723	0.147344	730.0	D32
1	0.146177	0.136639	742.8	D82
1	0.109530	0.097697	776.9	D71
1	0.098771	0.086592	787.2	D21
1	0.088138	0.075888	797.3	D11
1	0.078552	0.066108	806.4	D101
1	0.068413	0.055826	816.1	D52
1	0.067556	0.054955	816.9	D112
1	0.067032	0.054425	817.4	D31
1	0.057511	0.044774	826.5	D62
1	0.047100	0.034223	836.4	D12
1	0.042663	0.029725	840.6	D141
1	0.032771	0.019700	850.1	D42
1	0.032406	0.019610	850.3	D132
1	0.026710	0.013550	855.9	D131
1	0.026669	0.013293	856.1	D91
1	0.025331	0.012160	857.2	D121
1	0.007334	-.006089	874.3	D51
1	0.005752	-.007686	875.8	D61
1	0.005363	-.008098	876.2	D102
1	0.002465	-.011036	879.0	D111
1	0.000312	-.013398	881.1	D41
2	0.799075	0.793571	121.5	D101 D102
2	0.781569	0.775566	138.3	D91 D92
2	0.739293	0.731076	180.1	D21 D22
2	0.717892	0.710163	198.9	D72 D92
2	0.686900	0.678322	228.5	D82 D92
2	0.672976	0.664016	241.8	D92 D101
2	0.672169	0.663167	242.5	D52 D92
2	0.656010	0.647007	257.2	D32 D92
2	0.651560	0.641994	262.2	D61 D92
2	0.645166	0.635465	268.3	D31 D92
2	0.638561	0.628859	274.6	D11 D92
2	0.634314	0.624298	278.6	D81 D92
2	0.632337	0.622266	280.5	D92 D132
2	0.632267	0.622192	280.6	D91 D92
2	0.630819	0.620704	281.9	D92 D131
2	0.630591	0.620470	282.2	D92 D102
2	0.629163	0.619003	283.5	D42 D92
2	0.628607	0.618227	284.2	D12 D92
2	0.628663	0.618433	285.9	D71 D92
2	0.628065	0.617818	286.5	D92 D111
2	0.623043	0.612716	289.4	D92 D112
2	0.622620	0.612281	289.8	D92 D121
2	0.622206	0.611856	290.2	D51 D92
2	0.622189	0.611838	290.2	D92 D142

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
2	0.622173	0.611822	290.2	D32 D92
2	0.622030	0.611675	290.3	D11 D92
2	0.621787	0.611425	290.6	D42 D92
2	0.621736	0.611373	290.6	D92 D141
3	0.839618	0.832727	85.0849	D22 D101 D102
3	0.839151	0.832248	85.5399	D72 D101 D102
3	0.823298	0.815935	100.5	D92 D101 D102
3	0.819651	0.812137	103.9	D82 D91 D92
3	0.812042	0.805044	110.4	D21 D22 D92
3	0.811176	0.803309	112.0	D82 D101 D102
3	0.810127	0.802216	113.0	D81 D101 D102
3	0.808788	0.800828	114.3	D61 D101 D102
3	0.808587	0.800528	114.6	D51 D101 D102
3	0.807920	0.799817	115.1	D101 D102 D131
3	0.807805	0.799901	115.1	D42 D101 D102
3	0.805726	0.797631	117.2	D52 D91 D92
3	0.804863	0.796711	118.0	D71 D101 D102
3	0.803949	0.795700	118.9	D101 D102 D121
3	0.803809	0.795635	119.0	D101 D102 D112
3	0.803658	0.795269	119.4	D101 D102 D141
3	0.801660	0.793396	121.1	D42 D101 D102
3	0.801609	0.793343	121.1	D41 D101 D102
3	0.801494	0.793223	121.2	D31 D101 D102
3	0.801237	0.792955	121.5	D101 D102 D132
3	0.800726	0.792433	122.0	D62 D101 D102
3	0.800637	0.792122	122.2	D32 D101 D102
3	0.799784	0.791410	122.9	D91 D101 D102
3	0.799321	0.790970	123.3	D21 D101 D102
3	0.799237	0.790872	123.4	D11 D101 D102
3	0.799160	0.790771	123.5	D101 D102 D111
3	0.799133	0.790766	123.5	D101 D102 D142
3	0.799076	0.790706	123.5	D12 D101 D102
4	0.886263	0.877762	66.3360	D21 D22 D101 D102
4	0.867972	0.860536	59.8642	D32 D72 D101 D102
4	0.863702	0.856023	63.9367	D21 D22 D91 D92
4	0.855341	0.847191	71.8036	D81 D82 D101 D102
4	0.855027	0.846860	72.2045	D72 D92 D101 D102
4	0.850570	0.842160	76.4466	D21 D22 D82 D92
4	0.850431	0.842005	76.5861	D22 D92 D101 D102
4	0.850269	0.841833	76.7411	D61 D72 D101 D102
4	0.849884	0.841426	77.1081	D62 D72 D101 D102
4	0.849766	0.841300	77.2219	D72 D82 D101 D102
4	0.847622	0.839037	79.2601	D22 D81 D101 D102
4	0.847258	0.838653	79.6114	D72 D81 D101 D102
4	0.846956	0.838328	79.9043	D22 D101 D102 D131
4	0.845624	0.836927	81.1405	D72 D101 D102 D121
4	0.845499	0.836795	81.2601	D41 D42 D91 D92
4	0.845305	0.836590	81.4730	D91 D92 D131 D132
4	0.845204	0.836483	81.5695	D22 D82 D101 D102
4	0.844769	0.836016	81.9930	D21 D22 D61 D92
4	0.844191	0.835425	82.3439	D42 D72 D101 D102
4	0.843973	0.835183	82.7425	D71 D72 D101 D102
4	0.843842	0.835045	82.8675	D22 D51 D101 D102

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
4	0.843760	0.834958	82.9458	D12 D101 D102 D132
4	0.843695	0.834889	83.0081	D91 D92 D101 D102
4	0.843512	0.834695	83.1826	D22 D101 D102 D112
4	0.842702	0.833840	83.9550	D12 D22 D101 D102
4	0.842412	0.833745	84.0404	D61 D72 D101 D102
4	0.842451	0.833575	84.1942	D02 D92 D101 D102
4	0.842166	0.833272	84.4670	D72 D101 D102 D131
5	0.893902	0.886326	37.1445	D21 D12 D82 D101 D102
5	0.893065	0.885408	37.9213	D21 D22 D02 D91 D92
5	0.890858	0.883056	40.0541	D21 D22 D101 D102 D112
5	0.890040	0.882194	40.8192	D12 D21 D22 D101 D102
5	0.889849	0.881981	41.0008	D21 D22 D72 D101 D102
5	0.889495	0.881616	41.3556	D21 D22 D101 D102 D142
5	0.889058	0.881130	41.7625	D21 D22 D92 D101 D102
5	0.888215	0.880230	42.5666	D21 D22 D101 D102 D131
5	0.888189	0.880202	42.5912	D21 D22 D101 D102 D111
5	0.887697	0.879675	43.0606	D21 D22 D91 D101 D102
5	0.887466	0.878999	43.4617	D21 D22 D101 D102 D121
5	0.885787	0.877542	44.9577	D12 D21 D22 D101 D102
5	0.885456	0.877480	45.0061	D21 D22 D51 D101 D102
5	0.885569	0.877395	45.0880	D21 D22 D71 D101 D102
5	0.885376	0.877188	45.2731	D21 D22 D52 D101 D102
5	0.885361	0.877173	45.2869	D21 D22 D32 D101 D102
5	0.885252	0.877164	45.2962	D21 D22 D101 D102 D161
5	0.885139	0.876935	45.4986	D21 D22 D62 D101 D102
5	0.885048	0.876837	45.5858	D72 D81 D82 D101 D102
5	0.884818	0.876591	45.8044	D21 D22 D41 D101 D102
5	0.884758	0.876522	45.8661	D21 D22 D61 D101 D102
5	0.884505	0.876255	46.1035	D21 D22 D31 D101 D102
5	0.884472	0.876220	46.1346	D21 D22 D42 D101 D102
5	0.884362	0.876089	46.2589	D21 D22 D101 D102 D132
5	0.884333	0.876078	46.2681	D21 D22 D91 D101 D102
5	0.881171	0.872683	49.2817	D21 D22 D81 D82 D92
5	0.879422	0.870810	50.9605	D21 D22 D61 D82 D92
5	0.877061	0.868280	53.1993	D21 D22 D52 D91 D92
6	0.916065	0.908745	18.0352	D21 D22 D81 D82 D101 D102
6	0.902918	0.894467	30.5577	D21 D22 D81 D82 D91 D92
6	0.902481	0.894001	30.9662	D21 D22 D81 D92 D101 D102
6	0.903426	0.893941	31.0191	D12 D21 D22 D82 D101 D102
6	0.901709	0.893240	31.6266	D21 D22 D82 D91 D92 D142
6	0.901312	0.892621	32.1763	D12 D21 D22 D82 D91 D92
6	0.900362	0.891676	33.0056	D21 D22 D82 D101 D102 D131
6	0.900067	0.891377	33.2680	D21 D22 D82 D101 D102 D112
6	0.900016	0.891322	33.3150	D21 D22 D82 D91 D92 D111
6	0.899619	0.890898	33.6949	D21 D22 D82 D101 D102 D142
6	0.899414	0.890667	33.8905	D21 D22 D82 D91 D92 D131
6	0.899151	0.890382	34.1408	D21 D22 D71 D82 D91 D92
6	0.899011	0.890230	34.2739	D22 D72 D81 D82 D101 D102
6	0.898598	0.889788	34.6684	D21 D22 D72 D82 D101 D102
6	0.898535	0.889712	34.7279	D21 D22 D71 D72 D101 D102
6	0.898335	0.889498	34.9188	D21 D22 D91 D92 D101 D102
6	0.898086	0.889224	35.1559	D21 D22 D51 D82 D101 D102
6	0.898066	0.889202	35.1755	D21 D22 D61 D82 D91 D92

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
6	0.897894	0.889015	35.1392	D12 D21 D22 D82 D101 D102 D112
6	0.897810	0.888926	35.4193	D21 D22 D82 D91 D92 D102
6	0.897289	0.888358	35.9156	D21 D22 D82 D101 D102 D121
6	0.897051	0.888098	36.1432	D21 D22 D42 D82 D91 D92
6	0.896967	0.888007	36.2232	D21 D22 D101 D102 D141 D142
6	0.896725	0.887745	36.4531	D11 D21 D22 D82 D91 D92
6	0.896725	0.887745	36.4535	D21 D22 D82 D91 D92 D112
6	0.896691	0.887698	36.4957	D21 D22 D82 D101 D102 D111
6	0.896656	0.887670	36.5190	D11 D21 D22 D82 D101 D102
6	0.896062	0.887024	37.0856	D72 D81 D82 D92 D101 D102
7	0.922761	0.914810	13.6331	D21 D22 D81 D82 D101 D102 D131
7	0.921615	0.913566	14.7253	D21 D22 D81 D82 D101 D102 D112
7	0.920461	0.912376	15.8252	D21 D22 D81 D82 D92 D101 D102
7	0.920338	0.912238	15.9429	D21 D22 D81 D82 D101 D102 D142
7	0.920065	0.911936	16.2035	D21 D22 D72 D81 D82 D101 D102
7	0.919139	0.910915	17.0869	D12 D21 D22 D81 D82 D101 D102
7	0.917544	0.909056	18.6060	D21 D22 D32 D81 D82 D101 D102
7	0.917181	0.908655	18.9530	D11 D21 D22 D81 D82 D101 D102
7	0.917059	0.908520	19.0693	D21 D22 D61 D82 D101 D102 D141
7	0.916868	0.908310	19.2513	D21 D22 D81 D82 D101 D102 D131
7	0.916841	0.908280	19.2760	D21 D22 D51 D81 D82 D101 D102
7	0.916596	0.908010	19.5107	D21 D22 D81 D82 D101 D102 D111
7	0.916568	0.907957	19.5565	D21 D22 D71 D81 D82 D101 D102
7	0.916460	0.907860	19.6402	D21 D22 D31 D81 D82 D101 D102
7	0.916367	0.907735	19.7481	D21 D22 D81 D82 D91 D101 D102
7	0.916330	0.907717	19.7636	D21 D22 D41 D81 D82 D101 D102
7	0.916168	0.907516	19.9376	D21 D22 D61 D81 D82 D101 D102
7	0.916006	0.907465	19.9980	D21 D22 D62 D81 D82 D101 D102
7	0.916079	0.907460	20.0031	D21 D22 D42 D81 D82 D101 D102
7	0.916059	0.907419	20.0317	D21 D22 D82 D91 D101 D102 D132
7	0.916046	0.907403	20.0360	D21 D22 D41 D81 D82 D101 D102
7	0.913507	0.903589	23.3310	D21 D22 D82 D91 D92 D101 D102
7	0.913397	0.903179	23.5134	D21 D22 D82 D91 D92 D131 D132
7	0.911346	0.902210	24.5169	D21 D22 D81 D82 D91 D92 D142
7	0.910015	0.900752	25.7840	D12 D21 D22 D82 D101 D102 D112
7	0.909897	0.900622	25.8963	D12 D21 D22 D82 D92 D101 D102
7	0.909577	0.900269	26.2010	D21 D22 D81 D82 D91 D92 D131
7	0.909360	0.900029	26.4088	D21 D22 D81 D82 D91 D92 D102
8	0.928149	0.919569	10.4971	D21 D22 D81 D82 D101 D102 D131 D132
8	0.928077	0.919489	10.5655	D21 D22 D81 D82 D101 D102 D112 D131
8	0.927307	0.918627	11.2993	D21 D22 D81 D82 D92 D101 D102 D131
8	0.926738	0.917991	11.8413	D21 D22 D81 D82 D101 D102 D141 D142
8	0.925632	0.916752	12.8965	D12 D21 D22 D81 D82 D101 D102 D112
8	0.925627	0.916747	12.9008	D21 D22 D81 D82 D101 D102 D131 D142
8	0.925450	0.916549	13.0693	D21 D22 D81 D82 D101 D102 D131 D131
8	0.925396	0.916488	13.1216	D21 D22 D81 D82 D101 D102 D112 D142
8	0.925217	0.916288	13.2918	D21 D22 D72 D81 D82 D101 D102 D131
8	0.925130	0.916190	13.3748	D21 D22 D81 D82 D92 D101 D102 D142
8	0.925004	0.916049	13.4949	D21 D22 D23 D71 D72 D81 D82 D101 D102
8	0.924903	0.915935	13.5919	D21 D22 D81 D82 D92 D101 D102 D112
8	0.924602	0.915599	13.8781	D12 D21 D22 D82 D81 D82 D101 D102 D131
8	0.924202	0.915151	14.2596	D21 D22 D72 D81 D82 D101 D102 D112
8	0.924111	0.915049	14.3463	D21 D22 D72 D81 D82 D92 D101 D102

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
8	0.923845	0.914752	14.5999	D21 D22 D81 D82 D91 D92 D101 D102
8	0.923818	0.914722	14.6355	D11 D21 D22 D81 D82 D101 D102 D112
8	0.923581	0.914456	14.9513	D21 D22 D52 D81 D82 D101 D102 D131
8	0.923429	0.914286	14.9964	D21 D22 D71 D81 D82 D101 D102 D131
8	0.923390	0.914243	15.0330	D12 D21 D22 D81 D82 D92 D101 D102
8	0.923261	0.914098	15.1566	D11 D21 D22 D81 D82 D101 D102 D131
8	0.923239	0.914074	15.1769	D21 D22 D81 D82 D91 D92 D131 D132
8	0.923133	0.913955	15.2786	D21 D22 D81 D82 D91 D101 D102 D131
8	0.923075	0.913890	15.3337	D21 D22 D72 D81 D82 D101 D102 D142
8	0.923073	0.913888	15.3356	D21 D22 D81 D82 D101 D102 D131 D141
8	0.923007	0.913814	15.3984	D21 D22 D32 D81 D82 D101 D102 D131
8	0.922996	0.913802	15.4089	D21 D22 D51 D81 D82 D101 D102 D131
8	0.922972	0.913774	15.4322	D21 D22 D61 D81 D82 D101 D102 D131
9	0.932916	0.921836	7.0953	D21 D22 D81 D82 D92 D101 D102 D131 D132
9	0.932306	0.921166	8.6575	D21 D22 D81 D82 D101 D102 D112 D131 D132
9	0.931501	0.922160	9.3015	D21 D22 D81 D82 D92 D101 D102 D112 D131
9	0.931227	0.921869	9.5622	D21 D22 D72 D81 D82 D101 D102 D131 D132
9	0.930650	0.921202	10.1050	D12 D21 D22 D81 D82 D101 D102 D112 D131
9	0.930553	0.921093	10.2048	D21 D22 D81 D82 D101 D102 D112 D131 D142
9	0.930474	0.920993	10.2800	D21 D22 D81 D82 D92 D101 D102 D131 D142
9	0.930472	0.920990	10.2825	D21 D22 D81 D82 D91 D92 D101 D102 D131
9	0.930459	0.920976	10.2947	D21 D22 D71 D72 D81 D82 D92 D101 D102
9	0.930278	0.920771	10.4668	D21 D22 D81 D82 D101 D102 D121 D131 D132
9	0.929889	0.920328	10.8388	D21 D22 D81 D82 D91 D92 D102 D131 D132
9	0.929823	0.920256	10.9005	D12 D21 D22 D81 D82 D101 D102 D131 D132
9	0.929686	0.920097	11.0317	D21 D22 D81 D82 D101 D102 D131 D132 D142
9	0.929595	0.919996	11.1186	D21 D22 D81 D82 D101 D102 D112 D141 D142
9	0.929474	0.919857	11.2330	D21 D22 D71 D72 D81 D82 D101 D102 D131
9	0.929458	0.919838	11.2490	D21 D22 D72 D81 D82 D101 D102 D112 D131
9	0.929452	0.919832	11.2540	D21 D22 D72 D81 D82 D92 D101 D102 D131
9	0.929383	0.919753	11.3206	D21 D22 D81 D82 D92 D101 D102 D141 D142
9	0.929338	0.919703	11.3629	D11 D21 D22 D81 D82 D101 D102 D112 D131
9	0.929291	0.919649	11.4076	D21 D22 D52 D81 D82 D92 D101 D102 D131
9	0.929266	0.919618	11.4340	D21 D22 D81 D82 D101 D102 D131 D141 D142
9	0.929065	0.919378	11.6428	D21 D22 D81 D82 D92 D101 D102 D112 D142
9	0.929007	0.919326	11.6787	D12 D21 D22 D81 D82 D92 D101 D102 D131
9	0.928946	0.919256	11.7372	D21 D22 D71 D81 D82 D101 D102 D112 D131
9	0.928938	0.919248	11.7445	D21 D22 D52 D81 D82 D101 D102 D131 D132
9	0.928938	0.919239	11.7517	D21 D22 D81 D82 D101 D102 D131 D132 D141
9	0.928852	0.919149	11.8269	D12 D21 D22 D81 D82 D101 D102 D112 D142
9	0.928838	0.919135	11.8475	D21 D22 D81 D82 D101 D102 D112 D131 D131
10	0.939519	0.930214	3.6576	D21 D22 D81 D82 D91 D92 D101 D102 D131 D132
10	0.936152	0.926338	6.8669	D21 D22 D81 D82 D92 D101 D102 D112 D131 D132
10	0.935718	0.925819	7.2888	D21 D22 D72 D81 D82 D92 D101 D102 D131 D132
10	0.935035	0.925041	7.9320	D21 D22 D71 D72 D81 D82 D92 D101 D102 D131
10	0.934953	0.924944	8.0130	D21 D22 D52 D81 D82 D92 D101 D102 D131 D132
10	0.934715	0.924671	8.2375	D12 D21 D22 D81 D82 D101 D102 D112 D131 D132
10	0.934712	0.924668	8.2399	D21 D22 D81 D82 D92 D101 D102 D131 D132 D142
10	0.934580	0.924532	8.4345	D12 D21 D22 D81 D82 D92 D101 D102 D131 D132
10	0.934321	0.924217	8.6138	D21 D22 D72 D81 D82 D101 D102 D112 D131 D132
10	0.934266	0.924153	8.6652	D21 D22 D81 D82 D92 D101 D102 D112 D131 D142
10	0.934235	0.924117	8.6950	D21 D22 D61 D81 D82 D92 D101 D102 D131 D132
10	0.933992	0.923837	8.9260	D21 D22 D81 D82 D92 D101 D102 D121 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
10	0.933942	0.923779	8.9746	D21 D22 D81 D82 D91 D92 D101 D102 D112 D131
10	0.933901	0.923732	9.0128	D21 D22 D71 D72 D81 D82 D101 D102 D131 D132
10	0.933858	0.923683	9.0539	D12 D21 D22 D81 D82 D92 D101 D102 D112 D131
10	0.933773	0.923585	9.1349	D21 D22 D81 D82 D101 D102 D112 D131 D132 D142
10	0.933530	0.923304	9.3670	D21 D22 D52 D81 D82 D91 D92 D102 D131 D132
10	0.933526	0.923297	9.3722	D21 D22 D72 D81 D82 D101 D102 D121 D131 D132
10	0.933490	0.923258	9.4069	D11 D21 D22 D81 D82 D101 D102 D112 D131 D132
10	0.933479	0.923245	9.4155	D21 D22 D81 D82 D101 D102 D131 D112 D141 D142
10	0.933426	0.923184	9.4658	D21 D22 D71 D81 D82 D92 D101 D102 D131 D132
10	0.933407	0.923162	9.4843	D21 D22 D62 D81 D82 D92 D101 D102 D131 D132
10	0.933288	0.923024	9.5978	D21 D22 D61 D81 D82 D92 D101 D102 D131 D132
10	0.933273	0.923007	9.6123	D21 D22 D81 D82 D91 D92 D101 D102 D131 D142
10	0.933210	0.922935	9.6717	D21 D22 D71 D72 D81 D82 D101 D102 D112 D131
10	0.933166	0.922885	9.7149	D21 D22 D31 D81 D82 D92 D101 D102 D131 D132
10	0.933128	0.922840	9.7508	D21 D22 D81 D82 D91 D101 D102 D131 D132 D141
10	0.933111	0.922820	9.7665	D21 D22 D52 D81 D82 D92 D101 D102 D112 D131
11	0.941536	0.931488	3.7344	D21 D22 D52 D81 D82 D91 D92 D101 D102 D131 D132
11	0.941516	0.931464	3.7515	D21 D22 D81 D82 D91 D92 D101 D102 D112 D131 D132
11	0.940756	0.930573	4.4786	D12 D21 D22 D81 D82 D91 D92 D101 D102 D131 D132
11	0.940718	0.930529	4.5163	D21 D22 D62 D81 D82 D91 D92 D101 D102 D131 D132
11	0.940518	0.930295	4.7059	D21 D22 D81 D82 D91 D92 D101 D102 D131 D132 D142
11	0.940227	0.929954	4.9835	D21 D22 D41 D81 D82 D91 D92 D101 D102 D131 D132
11	0.940187	0.929872	5.0200	D21 D22 D71 D81 D82 D91 D92 D101 D102 D131 D132
11	0.940039	0.929733	5.1618	D21 D22 D51 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939980	0.929664	5.2179	D21 D22 D81 D82 D91 D92 D101 D102 D111 D131 D132
11	0.939952	0.929631	5.2445	D21 D22 D72 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939891	0.929559	5.3032	D21 D22 D81 D82 D91 D92 D101 D102 D121 D131 D132
11	0.939851	0.929513	5.3408	D21 D22 D61 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939693	0.929327	5.4919	D11 D21 D22 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939639	0.929265	5.5430	D21 D22 D42 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939537	0.929145	5.6404	D21 D22 D32 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939531	0.929138	5.6462	D21 D22 D81 D82 D91 D92 D101 D102 D131 D132 D141
11	0.939527	0.929133	5.6500	D21 D22 D31 D81 D82 D91 D92 D101 D102 D131 D132
11	0.939449	0.929042	5.7239	D21 D22 D71 D72 D81 D82 D92 D101 D102 D131 D132
11	0.938249	0.927636	6.8679	D12 D21 D22 D81 D82 D92 D101 D102 D112 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
11	0.937970	0.927308	7.1346	D21 D22 D72 D81 D82 D92 D101 D102 D112 D131 D132
11	0.937824	0.927157	7.2736	D21 D22 D61 D81 D82 D92 D101 D102 D112 D131 D132
11	0.937800	0.927110	7.2957	D21 D22 D52 D81 D82 D92 D101 D102 D112 D131 D132
11	0.937739	0.927026	7.3642	D21 D22 D81 D82 D92 D101 D102 D112 D131 D132 D142
11	0.937709	0.927003	7.3829	D21 D22 D71 D72 D81 D82 D92 D101 D102 D112 D131
11	0.937223	0.926633	7.8667	D21 D22 D52 D72 D81 D82 D92 D101 D102 D131 D132
11	0.937120	0.926312	7.9644	D12 D21 D22 D72 D81 D82 D92 D101 D102 D131 D132
11	0.937113	0.926303	7.9510	D21 D22 D61 D72 D81 D82 D92 D101 D102 D131 D132
11	0.936808	0.926041	8.1654	D21 D22 D62 D81 D82 D92 D101 D102 D112 D131 D132
12	0.943265	0.932458	4.0866	D21 D22 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.943190	0.932369	4.1577	D12 D21 D22 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.943026	0.932176	4.3140	D21 D22 D61 D52 D81 D82 D91 D92 D101 D102 D131 D132
12	0.943012	0.932157	4.3275	D21 D22 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.942517	0.931568	4.7990	D21 D22 D52 D62 D81 D82 D91 D92 D101 D102 D131 D132
12	0.942504	0.931552	4.8122	D12 D21 D22 D52 D81 D82 D91 D92 D101 D102 D131 D132
12	0.942470	0.931513	4.8445	D21 D22 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
12	0.942273	0.931370	5.0310	D21 D22 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.942215	0.931209	5.0868	D21 D22 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.942165	0.931126	5.1336	D21 D22 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132
12	0.942105	0.931077	5.1926	D21 D22 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.942043	0.931004	5.2510	D21 D22 D52 D71 D81 D82 D91 D92 D101 D102 D131 D132
12	0.942036	0.930995	5.2579	D21 D22 D52 D81 D82 D91 D92 D101 D102 D131 D133 D132
12	0.942035	0.930994	5.2587	D11 D21 D22 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.942001	0.930954	5.2911	D21 D22 D51 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.941973	0.930920	5.3181	D21 D22 D61 D62 D81 D82 D91 D92 D101 D102 D131 D132
12	0.941896	0.930828	5.3919	D21 D22 D52 D81 D82 D91 D92 D101 D102 D131 D132 D142
12	0.941787	0.930699	5.4955	D21 D22 D32 D81 D82 D91 D92 D101 D102 D112 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
12	0.941777	0.930687	5.5048	D12 D21 D22 D62 D81 D82 D91 D92 D101 D102 D131 D132
12	0.941772	0.930681	5.5095	D21 D22 D52 D72 D81 D82 D91 D92 D101 D102 D131 D132
12	0.941770	0.930679	5.5111	D11 D21 D22 D52 D81 D82 D91 D92 D101 D102 D131 D132
12	0.941747	0.930651	5.5335	D21 D22 D52 D61 D81 D82 D91 D92 D101 D102 D131 D132
12	0.941738	0.930640	5.5423	D21 D22 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.941707	0.930603	5.5720	D21 D22 D52 D81 D82 D91 D92 D101 D102 D111 D131 D132
12	0.941697	0.930591	5.5816	D21 D22 D11 D81 D82 D91 D92 D101 D102 D112 D131 D132
12	0.941673	0.930564	5.6035	D12 D21 D22 D81 D82 D91 D92 D101 D102 D131 D132 D142
12	0.941638	0.930521	5.6377	D21 D22 D51 D52 D81 D82 D91 D92 D101 D102 D131 D132
12	0.941627	0.930508	5.6480	D21 D22 D31 D52 D81 D82 D91 D92 D101 D102 D131 D132
13	0.944791	0.933215	4.6317	D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D131 D132
13	0.944686	0.933088	4.7314	D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.944618	0.933006	4.7962	D12 D21 D22 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.944514	0.932880	4.8952	D21 D22 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.944482	0.932841	4.9262	D12 D21 D22 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.944046	0.932316	5.3419	D12 D21 D22 D81 D82 D91 D92 D101 D102 D113 D131 D132 D142
13	0.944023	0.932285	5.3641	D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D131 D132
13	0.943979	0.932232	5.4058	D12 D21 D22 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943926	0.932166	5.4581	D12 D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D131 D132
13	0.943888	0.932113	5.5000	D21 D22 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943875	0.932107	5.5046	D12 D21 D22 D41 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943849	0.932076	5.5295	D11 D21 D22 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943782	0.931994	5.5939	D21 D22 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943762	0.931970	5.6126	D21 D22 D41 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943753	0.931960	5.6209	D21 D22 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
13	0.943723	0.931923	5.6500	D21 D22 D42 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.943681	0.931872	5.6895	D21 D22 D52 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
13	0.963634	0.931815	5.7344	D21 D22 D31 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963633	0.931814	5.7359	D21 D22 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
13	0.963610	0.931786	5.7570	D21 D22 D32 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963551	0.931714	5.8140	D21 D22 D51 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963499	0.931652	5.8632	D12 D21 D22 D32 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963499	0.931652	5.8636	D12 D21 D22 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963473	0.931620	5.8884	D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D121 D131 D132
13	0.963469	0.931591	5.9113	D12 D21 D22 D31 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963436	0.931576	5.9232	D21 D22 D41 D52 D71 D81 D82 D91 D92 D101 D102 D131 D132
13	0.963432	0.931571	5.9276	D12 D21 D22 D51 D81 D82 D91 D92 D101 D102 D112 D131 D132
13	0.963427	0.931565	5.9320	D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D131 D132 D142
14	0.965951	0.933567	5.5253	D12 D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965947	0.933562	5.5292	D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965903	0.933487	5.5718	D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965718	0.933260	5.7476	D12 D21 D22 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965687	0.933222	5.7772	D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D131 D132
14	0.965671	0.933202	5.7930	D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D131 D131 D132
14	0.965653	0.933180	5.8099	D12 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D131 D132
14	0.965609	0.933880	6.0426	D12 D21 D22 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965608	0.933878	6.0438	D11 D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965272	0.933712	6.1726	D12 D21 D22 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965226	0.932655	6.2165	D21 D22 D41 D52 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965225	0.932653	6.2181	D12 D21 D22 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965216	0.932640	6.2281	D12 D21 D22 D61 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965195	0.932616	6.2460	D21 D22 D41 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965155	0.932568	6.2845	D12 D21 D22 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
14	0.965142	0.932552	6.2969	D21 D22 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
14	0.965108	0.932510	6.3296	D21 D22 D41 D42 D52 D61 D81 D82 D91 D92 D101 D102 D131 D132
14	0.965102	0.932502	6.3355	D21 D22 D41 D42 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132
14	0.965100	0.932501	6.3365	D21 D22 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965095	0.932496	6.3410	D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
14	0.965064	0.932456	6.3713	D12 D21 D22 D31 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.965023	0.932406	6.4100	D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D131 D132 D142
14	0.965010	0.932390	6.4225	D21 D22 D32 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.964998	0.932375	6.4342	D21 D22 D41 D42 D52 D62 D81 D82 D91 D92 D101 D102 D131 D132
14	0.964994	0.932370	6.4376	D12 D21 D22 D32 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.964973	0.932343	6.4586	D12 D21 D22 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
14	0.964966	0.932333	6.4666	D21 D22 D31 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
14	0.964944	0.932308	6.4861	D11 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D131 D132
15	0.967012	0.933839	6.4575	D12 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.967007	0.933834	6.4620	D12 D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966870	0.933538	6.6076	D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966790	0.933487	6.7260	D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132
15	0.966693	0.933366	6.8104	D12 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D121 D131 D132
15	0.966579	0.933223	6.9274	D12 D21 D22 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966572	0.933215	6.9340	D12 D21 D22 D61 D62 D52 D71 D81 D82 D91 D92 D101 D102 D131 D132
15	0.966497	0.933122	7.0060	D12 D21 D22 D41 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966420	0.933036	7.0705	D21 D22 D41 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966413	0.933016	7.0857	D21 D22 D41 D42 D52 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966373	0.932966	7.1237	D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D121 D131 D132
15	0.966368	0.932961	7.1278	D21 D22 D41 D42 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966345	0.932931	7.1501	D12 D21 D22 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
15	0.966342	0.932928	7.1527	D12 D21 D22 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.966332	0.932915	7.1621	D11 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
15	0.946311	0.932889	7.1826	D11 D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946305	0.932882	7.1879	D12 D21 D22 D32 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946298	0.932860	7.2065	D21 D22 D32 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946273	0.932841	7.2187	D12 D21 D22 D41 D42 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132
15	0.946265	0.932831	7.2263	D12 D21 D22 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946262	0.932828	7.2292	D12 D21 D22 D41 D52 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946255	0.932819	7.2359	D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D132 D142
15	0.946244	0.932805	7.2466	D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
15	0.946242	0.932803	7.2483	D12 D21 D22 D31 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946215	0.932769	7.2740	D12 D21 D22 D31 D41 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946210	0.932763	7.2787	D21 D22 D31 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
15	0.946164	0.932706	7.3223	D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
15	0.946133	0.932666	7.3520	D11 D21 D22 D41 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.948030	0.933937	7.5033	D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947707	0.933526	7.8518	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132
16	0.947672	0.933481	7.8852	D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947585	0.933371	7.9676	D12 D21 D22 D41 D42 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947584	0.933370	7.9687	D12 D21 D22 D41 D52 D42 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947539	0.933313	8.0115	D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
16	0.947470	0.933225	8.0772	D12 D21 D22 D41 D42 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947461	0.933213	8.0866	D12 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
16	0.947435	0.933181	8.1106	D12 D21 D22 D32 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947430	0.933174	8.1159	D11 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947399	0.933134	8.1456	D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D121 D131 D132
16	0.947391	0.933124	8.1532	D12 D21 D22 D31 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947368	0.933094	8.1752	D12 D21 D22 D41 D42 D52 D61 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947368	0.933094	8.1753	D12 D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
16	0.947327	0.933043	8.2141	D12 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
16	0.947304	0.933013	8.2363	D12 D21 D22 D52 D42 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947277	0.932979	8.2618	D12 D21 D22 D32 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947248	0.932942	8.2895	D12 D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
16	0.947181	0.932859	8.3515	D12 D21 D22 D41 D42 D51 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947168	0.932841	8.3656	D12 D21 D22 D41 D52 D62 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
16	0.947159	0.932829	8.3745	D12 D21 D22 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
16	0.947155	0.932824	8.3778	D12 D21 D22 D31 D41 D42 D52 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947146	0.932813	8.3863	D12 D21 D22 D41 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947142	0.932808	8.3903	D21 D22 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947108	0.932764	8.4220	D12 D21 D22 D41 D51 D52 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947102	0.932757	8.4286	D12 D21 D22 D41 D52 D61 D62 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947102	0.932756	8.4288	D21 D22 D41 D42 D52 D61 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
16	0.947097	0.932750	8.4332	D12 D21 D22 D41 D52 D62 D72 D81 D82 D91 D92 D101 D102 D113 D131 D132
17	0.948869	0.933882	8.7441	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948609	0.933546	8.9922	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
17	0.948285	0.933127	9.3011	D12 D21 D22 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948273	0.933112	9.3116	D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
17	0.948240	0.933095	9.3245	D12 D21 D22 D32 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948243	0.933073	9.3497	D11 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948205	0.933026	9.3771	D12 D21 D22 D41 D52 D42 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948163	0.932969	9.4174	D12 D71 D22 D31 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948159	0.932964	9.4207	D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
17	0.948145	0.932948	9.4341	D12 D21 D22 D41 D42 D52 D61 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948133	0.932929	9.4444	D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
17	0.948065	0.932842	9.5107	D11 D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.948053	0.932827	9.5222	D12 D21 D22 D41 D42 D51 D52 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
17	0.968046	0.932815	9.5307	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D131 D132
17	0.968036	0.932802	9.5400	D12 D21 D22 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D111 D112 D131 D132
17	0.968016	0.932779	9.5573	D12 D21 D22 D11 D41 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.968003	0.932762	9.5697	D12 D21 D22 D12 D41 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.967967	0.932715	9.6042	D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
17	0.967967	0.932690	9.6233	D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.967919	0.932654	9.6493	D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.967904	0.932635	9.6635	D12 D21 D22 D31 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.967878	0.932600	9.6890	D11 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
17	0.967853	0.932568	9.7127	D12 D21 D22 D41 D42 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.967868	0.932562	9.7176	D12 D21 D22 D41 D42 D51 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
17	0.967826	0.932534	9.7379	D12 D21 D22 D41 D42 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
17	0.967816	0.932520	9.7481	D12 D21 D22 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132
17	0.967798	0.932498	9.7648	D12 D21 D22 D41 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
17	0.967788	0.932484	9.7748	D21 D22 D41 D42 D53 D61 D71 D72 D81 D82 D91 D92 D101 D102 D131 D132 D142
18	0.969206	0.933166	10.4222	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
18	0.969065	0.932980	10.5570	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968996	0.932887	10.6246	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968986	0.932876	10.6327	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968983	0.932872	10.6356	D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968948	0.932826	10.6686	D12 D21 D22 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968906	0.932772	10.7083	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D113 D131 D132 D141
18	0.968896	0.932758	10.7186	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D131 D132
18	0.968895	0.932757	10.7187	D11 D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968883	0.932741	10.7306	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
18	0.968722	0.932529	10.8841	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D121 D131 D132
18	0.968710	0.932514	10.8951	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
18	0.968648	0.932631	10.9550	D12 D21 D22 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
18	0.968639	0.932619	10.9637	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
18	0.968625	0.932601	10.9769	D12 D21 D22 D31 D41 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968610	0.932581	10.9909	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132 D141
18	0.968610	0.932581	10.9910	D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
18	0.968609	0.932580	10.9919	D11 D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
18	0.968609	0.932580	10.9920	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132
18	0.968609	0.932580	10.9920	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D121 D131 D132 D142
18	0.968559	0.932515	11.0394	D12 D21 D22 D32 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968526	0.932471	11.0710	D11 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
18	0.968509	0.932448	11.0870	D12 D21 D22 D32 D41 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968494	0.932428	11.1019	D12 D21 D22 D31 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132
18	0.968471	0.932398	11.1237	D12 D21 D22 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
18	0.968454	0.932376	11.1399	D12 D21 D22 D32 D41 D42 D52 D71 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
18	0.968408	0.932143	11.1839	D12 D21 D22 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
18	0.968412	0.932131	11.1793	D12 D21 D22 D41 D42 D52 D62 D71 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
19	0.969352	0.932168	12.2833	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
19	0.969341	0.932153	12.2938	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D113 D121 D131 D132
19	0.969285	0.932078	12.3476	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
19	0.969283	0.932075	12.3497	D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
19	0.969249	0.932029	12.3821	D12 D21 D22 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D113 D121 D131 D132
19	0.969243	0.932021	12.3878	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969235	0.932011	12.3954	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
19	0.969226	0.931999	12.4038	D11 D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
19	0.969224	0.931996	12.4058	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969216	0.931985	12.4134	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
19	0.969213	0.931981	12.4162	D12 D21 D22 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
19	0.969128	0.931868	12.4966	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
19	0.969116	0.931852	12.5086	D12 D21 D22 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969111	0.931845	12.5130	D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969099	0.931829	12.5247	D12 D21 D22 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969085	0.931810	12.5381	D12 D21 D22 D32 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D133
19	0.969083	0.931807	12.5403	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D131 D132
19	0.969081	0.931805	12.5418	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
19	0.969073	0.931794	12.5496	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
19	0.969071	0.931792	12.5510	D11 D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969070	0.931790	12.5522	D12 D21 D22 D31 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969066	0.931785	12.5560	D12 D21 D22 D32 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D133
19	0.969050	0.931763	12.5715	D12 D21 D22 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969032	0.931739	12.5884	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D131 D132
19	0.969032	0.931739	12.5885	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132 D141
19	0.969018	0.931720	12.6023	D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D131 D132
19	0.969016	0.931717	12.6042	D11 D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132
19	0.969012	0.931712	12.6080	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D131 D132 D142
20	0.969466	0.931090	14.1749	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969447	0.931063	14.1934	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D133
20	0.969437	0.931051	14.2021	D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969429	0.931040	14.2096	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
20	0.969407	0.931009	14.2315	D12 D21 D22 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D133
20	0.969406	0.931008	14.2321	D12 D21 D22 D32 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969389	0.930985	14.2482	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
20	0.969381	0.930974	14.2559	D12 D21 D22 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969368	0.930957	14.2681	D12 D21 D22 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969368	0.930956	14.2686	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
20	0.969360	0.930965	14.2759	D11 D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969357	0.930961	14.2792	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
20	0.969349	0.930951	14.2862	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
20	0.969346	0.930927	14.2890	D11 D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969345	0.930926	14.2898	D12 D21 D22 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D133
20	0.969332	0.930907	14.3030	D12 D21 D22 D31 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969325	0.930897	14.3096	D12 D21 D22 D32 D41 D42 D51 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969314	0.930882	14.3206	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
20	0.969302	0.930866	14.3315	D11 D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969301	0.930865	14.3323	D11 D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969301	0.930865	14.3323	D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
20	0.969298	0.930861	14.3350	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
20	0.969298	0.930860	14.3354	D12 D21 D22 D31 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969297	0.930860	14.3359	D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
20	0.969296	0.930856	14.3386	D12 D21 D22 D31 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
20	0.969290	0.930850	14.3425	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
20	0.969288	0.930848	14.3442	D12 D21 D22 D32 D41 D42 D52 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
20	0.969286	0.930846	14.3465	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.969524	0.929895	16.1193	D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.969500	0.929861	16.1433	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.969498	0.929858	16.1443	D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.969498	0.929858	16.1444	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.969497	0.929857	16.1451	D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.969488	0.929844	16.1539	D12 D21 D22 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.969485	0.929840	16.1560	D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D133

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
21	0.949480	0.929833	16.1617	D12 D21 D22 D32 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.949478	0.929831	16.1630	D12 D21 D22 D31 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949474	0.929825	16.1670	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
21	0.949472	0.929822	16.1693	D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949470	0.929819	16.1710	D12 D21 D22 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949469	0.929818	16.1719	D11 D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949469	0.929818	16.1720	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
21	0.949463	0.929809	16.1778	D12 D21 D22 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.949456	0.929800	16.1843	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
21	0.949451	0.929793	16.1891	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
21	0.949449	0.929790	16.1910	D11 D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949447	0.929787	16.1932	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
21	0.949445	0.929785	16.1946	D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
21	0.949445	0.929784	16.1951	D11 D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949439	0.929776	16.2009	D12 D21 D22 D31 D32 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949438	0.929775	16.2018	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
21	0.949436	0.929772	16.2038	D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
21	0.949434	0.929769	16.2053	D12 D21 D22 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949434	0.929769	16.2057	D11 D12 D21 D22 D41 D42 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
21	0.949429	0.929763	16.2099	D12 D21 D22 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
21	0.949421	0.929751	16.2180	D12 D21 D22 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
22	0.949586	0.928660	18.0603	D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949563	0.928627	18.0824	D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949551	0.928610	18.0938	D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
22	0.949536	0.928589	18.1079	D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949535	0.928587	18.1091	D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949531	0.928582	18.1126	D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
22	0.949531	0.928582	18.1128	D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
22	0.949527	0.928577	18.1163	D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
22	0.949526	0.928576	18.1177	D11 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132
22	0.949525	0.928574	18.1182	D12 D21 D22 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949519	0.928564	18.1246	D12 D21 D22 D31 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949515	0.928558	18.1285	D12 D21 D22 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949514	0.928558	18.1289	D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
22	0.949513	0.928557	18.1295	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
22	0.949512	0.928555	18.1306	D12 D21 D22 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
22	0.949510	0.928552	18.1330	D12 D21 D22 D32 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
22	0.949510	0.928552	18.1331	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
22	0.949510	0.928552	18.1331	D12 D21 D22 D31 D41 D42 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
22	0.949508	0.928549	18.1351	D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81

all possible regression procedure (RSQUARE)

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                                D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
22 0.949507 0.928548  18.1356 D12 D21 D22 D31 D41 D42 D52 D61 D71 D72 D81
                                D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
22 0.949507 0.928547  18.1360 D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132
22 0.949506 0.928546  18.1371 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132
22 0.949502 0.928541  18.1404 D11 D12 D21 D22 D31 D41 D42 D52 D61 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141
22 0.949502 0.928540  18.1405 D11 D12 D21 D22 D31 D41 D42 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141
22 0.949501 0.928539  18.1414 D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D142
22 0.949501 0.928539  18 1414 D12 D21 D22 D31 D32 D41 D42 D52 D61 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141
22 0.949499 0.928536  18.1434 D12 D21 D22 D41 D42 D52 D61 D62 D71 D72 D01
                                D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
22 0.949499 0.928536  18.1434 D11 D12 D21 D22 D32 D41 D42 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141
-------------------------------------------------------------------------------
23 0.949616 0.927331  20.0315 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949600 0.927307  20.0473 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
23 0.949595 0 927300  20.0523 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
23 0.949592 0.927296  20.0547 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949587 0.927289  20 0591 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949587 0.927288  20.0599 D11 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949581 0 927281  20.0650 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
23 0.949573 0.927268  20.0731 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
23 0.949565 0 927258  20.0801 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D111 D112 D121
                                D131 D132
23 0.949563 0.927256  20.0823 D11 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71
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all possible regression procedure (RSQUARE)

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                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949559 0.927249  20.0860 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D142
23 0.949556 0.927245  20.0886 D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
23 0.949555 0.927242  20.0902 D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
23 0.949553 0.927240  20.0918 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62
                                D71 D72 D01 D02 D01 D02 D101 D102 D112 D121
                                D131 D132
23 0.949552 0.927238  20.0932 D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62
                                D71 D72 D01 D02 D01 D02 D101 D102 D112 D121
                                D131 D132
23 0.949550 0.927236  20.0948 D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949547 0.927231  20.0979 D12 D21 D22 D32 D41 D42 D51 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
23 0.949545 0.927229  20.0992 D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
23 0.949544 0.927227  20.1002 D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
23 0.949541 0.927222  20.1026 D12 D21 D02 D31 D41 D42 D52 D61 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D142
23 0.949540 0.927222  20.1040 D12 D21 D22 D32 D41 D42 D51 D52 D62 D71 D72
                                D01 D02 D01 D02 D101 D102 D112 D121 D131 D132
                                D141 D142
23 0.949538 0.927218  20.1061 D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949538 0.927218  20.1061 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D133 D141
23 0.949535 0.927215  20.1086 D11 D12 D21 D22 D31 D41 D42 D51 D52 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D141
23 0.949535 0.927214  20.1089 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D111 D112 D121
                                D131 D132
23 0.949534 0.927213  20.1097 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D121 D131
                                D132 D142
23 0.949533 0.927211  20.1108 D11 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71
                                D72 D01 D02 D01 D02 D101 D102 D112 D131 D132
                                D142
23 0.949533 0.927211  20.1110 D12 D21 D22 D32 D41 D42 D51 D52 D61 D71 D72
                                D01 D02 D01 D02 D101 D102 D111 D112 D121 D131
                                D132 D141
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24 0.949633 0.925933  22.0151 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71
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all possible regression procedure (RSQUARE)

			D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949629	0.925926	22.0190 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
24	0.949621	0.925913	22.0275 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
24	0.949618	0.925906	22.0315 D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
24	0.949608	0.925894	22.0396 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
24	0.949605	0.925890	22.0420 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949605	0.925890	22.0423 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
24	0.949605	0.925890	22.0423 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
24	0.949602	0.925885	22.0455 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949600	0.925882	22.0473 D11 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
24	0.949595	0.925875	22.0520 D11 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949592	0.925871	22.0546 D11 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
24	0.949587	0.925864	22.0591 D11 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
24	0.949587	0.925864	22.0593 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
24	0.949581	0.925855	22.0649 D11 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
24	0.949578	0.925850	22.0681 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D142
24	0.949573	0.925842	22.0730 D11 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949572	0.925841	22.0738 D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949568	0.925836	22.0774 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D133
24	0.949566	0.925832	22.0797 D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	D121 D131 D132 Variables in Model
24	0.949563	0.925828	22.0826	D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
24	0.949561	0.925826	22.0839	D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D131 D132 D141 D142
24	0.949561	0.925825	22.0843	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D133 D142
24	0.949560	0.925823	22.0852	D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
24	0.949560	0.925823	22.0853	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
24	0.949559	0.925822	22.0860	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949558	0.925820	22.0873	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
24	0.949556	0.925818	22.0887	D12 D21 D22 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949642	0.924663	24.0071	D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949639	0.924658	24.0099	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
25	0.949636	0.924653	24.0131	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
25	0.949634	0.924650	24.0151	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
25	0.949630	0.924644	24.0189	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
25	0.949621	0.924631	24.0275	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141
25	0.949618	0.924626	24.0303	D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949614	0.924621	24.0337	D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949608	0.924612	24.0396	D11 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
25	0.949605	0.924608	24.0420	D11 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
25	0.949605	0.926408	26.0621	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
25	0.949605	0.926407	26.0623	D11 D12 D21 D22 D31 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949602	0.926403	26.0653	D11 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
25	0.949587	0.926381	26.0593	D11 D12 D21 D22 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949580	0.926371	26.0658	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D142
25	0.949580	0.926370	26.0663	D11 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949578	0.926367	26.0678	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D142
25	0.949572	0.926358	26.0737	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
25	0.949569	0.926353	26.0770	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132
25	0.949565	0.926348	26.0806	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949563	0.926346	26.0826	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
25	0.949562	0.926343	26.0830	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949562	0.926342	26.0836	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D142
25	0.949560	0.926341	26.0848	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
25	0.949560	0.926340	26.0851	D11 D12 D21 D22 D31 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949556	0.926335	26.0887	D11 D12 D21 D22 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
25	0.949549	0.926324	26.0955	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
25	0.949546	0.926319	26.0985	D11 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D142

all possible regression procedure (RSQUARE)

In	R-square	Adj Rsq	C(p)	Variables in Model
26	0.949649	0.922932	26.0007	D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949642	0.922922	26.0069	D11 D12 D21 D22 D31 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949639	0.922917	26.0099	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949636	0.922912	26.0129	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D112 D121 D131 D132 D141 D142
26	0.949618	0.922885	26.0299	D11 D12 D21 D22 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949614	0.922879	26.0337	D11 D12 D21 D22 D31 D32 D41 D42 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949581	0.922828	26.0656	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D142
26	0.949580	0.922826	26.0663	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949566	0.922805	26.0796	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.949560	0.922643	26.1004	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.948930	0.921831	26.6860	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D121 D131 D132 D141 D142
26	0.948885	0.921763	26.7287	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.948857	0.921721	26.7550	D11 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.948822	0.921666	26.7889	D12 D12 D21 D22 D31 D32 D41 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.948685	0.921457	26.9194	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141
26	0.948373	0.920979	27.2170	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.948167	0.920664	27.4129	D11 D12 D21 D22 D31 D32 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.946607	0.918276	28.9006	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D141 D142

all possible regression procedure (RSQUARE)

n	R-square	Adj Rsq	C(p)	Variables in Model
26	0.944416	0.917980	39.0846	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.945177	0.916088	30.2632	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D102 D111 D112 D121 D131 D132 D141 D142
26	0.944209	0.916606	31.1873	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.943616	0.913698	31.7510	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.943499	0.913520	31.8620	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D111 D112 D121 D131 D132 D141 D142
26	0.943074	0.912868	32.2664	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D83 D91 D92 D101 D102 D111 D112 D121 D132 D141 D142
26	0.942318	0.911559	33.0841	D11 D12 D21 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.938697	0.906168	36.6436	D11 D12 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
26	0.936963	0.900453	40.0009	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142
27	0.969649	0.921327	28.0000	D11 D12 D21 D22 D31 D32 D41 D42 D51 D52 D61 D62 D71 D72 D81 D82 D91 D92 D101 D102 D111 D112 D121 D131 D132 D141 D142

all possible regression procedure (RSQUARE)

Model: MODEL1
Dependent Variable: Y

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	26	1.41632	0.05447	35.538	0.0001
Error	49	0.07511	0.00153		
C Total	75	1.49142			

Root MSE	0.03915	R-square	0.9496
Dep Mean	0.67899	Adj R-sq	0.9229
C.V.	5.76618		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.397997	0.02240805	16.966	0.0001
D11	1	0.0000993619	0.01431486	0.007	0.9948
D12	1	0.011693	0.013612348	0.874	0.3866
D21	1	0.079782	0.03225603	3.569	0.0008
D22	1	0.080523	0.03684818	2.999	0.0062
D31	1	0.003185	0.01759844	0.181	0.8571
D32	1	-0.001317	0.01795088	-0.073	0.9418
D41	1	0.021506	0.01796163	1.199	0.2365
D42	1	0.019141	0.02168698	0.882	0.3768
D51	1	0.002989	0.01570836	0.190	0.8499
D52	1	0.015533	0.01588135	0.978	0.3330
D61	1	0.005930	0.02326817	0.255	0.7990
D62	1	-0.006416	0.02330313	-0.277	0.7833
D71	1	0.020977	0.02873888	1.136	0.2657
D72	1	0.021664	0.03521918	0.859	0.3945
D81	1	0.030300	0.01865520	2.300	0.0258
D82	1	0.075767	0.01985356	3.816	0.0004
D91	1	0.053599	0.01986152	1.795	0.0708
D92	1	0.100707	0.04301776	2.527	0.0148
D101	1	0.056596	0.02583717	2.191	0.0005
D102	1	0.089440	0.03303615	2.650	0.0170
D111	1	-0.001673	0.01307673	-0.134	0.8939
D112	1	0.011062	0.01231547	0.831	0.4101
D121	1	-0.005610	0.01325612	-0.424	0.6736
D131	1	0.045857	0.01667201	2.783	0.0094
D132	1	0.030303	0.01763700	1.721	0.0913
D141	1	-0.003112	0.01100049	-0.362	0.7965

Appendix (D) SAS Output

Part (II)

Results of 'MAXR' Model Selection Method

MAXR Procedure

Maximum R-square Improvement for Dependent Variable Y

Step 1 Variable D92 Entered R-square = 0.62171891 C(p) =288.62093006

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	1	0.92726712	0.92726712	121.62	0.0001
Error	74	0.56417786	0.00762403		
Total	75	1.49143499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.56255556	0.01455261	11.39287511	1494.36	0.0001
D92	0.23121944	0.02095939	0.92726712	121.62	0.0001

Bounds on condition number: 1, 1

The above model is the best 1-variable model found.

Step 2 Variable D91 Entered R-square = 0.78154855 C(p) =130.25298181

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	2	1.16562188	0.58281052	130.59	0.0001
Error	73	0.32580395	0.00446307		
Total	75	1.49143499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.47652941	0.01620180	3.86036476	864.96	0.0001
D91	0.18299698	0.02230118	0.23037392	51.61	0.0001
D92	0.30724559	0.01934193	1.12617367	252.33	0.0001

Bounds on condition number: 1.588235, 6.352941

The above model is the best 2-variable model found.

Step 3 Variable D82 Entered R-square = 0.81965137 C(p) =103.92918001

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	3	1.22246838	0.40748279	109.08	0.0001
Error	72	0.26897660	0.00373579		
Total	75	1.49143499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.47652941	0.01402886	3.86036476	1033.35	0.0001
D82	0.07978892	0.02048761	0.05682735	15.21	0.0002
D91	0.15039865	0.02065929	0.19798889	53.00	0.0001
D92	0.29128781	0.01816288	0.95886191	256.70	0.0001

Bounds on condition number: 1.673141, 13.06538

MAXR Procedure

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above model is the best 3-variable model found

Step 4 Variable D01 Entered R-square = 0.83566735 C(p) = 90.85139559

	DF	Sum of Squares	Mean Square	F	Prob>F
gression	4	1.24603689	0.31150922	90.13	0.0001
ror	71	0.24538810	0.00345617		
tal	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
TERCEP	0.47364070	0.01630761	3.78446372	1096.99	0.0001
1	0.05250805	0.02009095	0.02350850	6.83	0.0110
2	0.12108947	0.02524108	0.07956118	23.01	0.0001
1	0.12209399	0.02263284	0.10057864	29.10	0.0001
2	0.24936077	0.02372254	0.38188198	110.49	0.0001

nds on condition number: 3.085148, 36.6088

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above model is the best 4-variable model found.

Step 5 Variable D41 Entered R-square = 0.85157397 C(p) = 77.49672140

	DF	Sum of Squares	Mean Square	F	Prob>F
gression	5	1.27005070	0.25401174	80.32	0.0001
ror	70	0.22136629	0.00316238		
tal	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
TERCEP	0.45600707	0.01507688	3.09289965	978.19	0.0001
1	0.03691036	0.01339220	0.02403181	7.60	0.0075
1	0.05359707	0.01922977	0.02456673	7.77	0.0068
2	0.12138028	0.02414467	0.07992207	25.27	0.0001
1	0.13362667	0.02165490	0.10273187	32.49	0.0001
2	0.25397808	0.02275363	0.39400763	124.59	0.0001

nds on condition number: 3.101964, 50.96079

Step 6 Variable D01 Removed R-square = 0.86624283 C(p) = 63.51267532
Variable D42 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
gression	5	1.29193631	0.25838726	90.67	0.0001
ror	70	0.19948878	0.00284984		
tal	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
riable					

MAXR Procedure

INTERCEP	0.41201119	0.01849096	1.41488032	496.48	0.0001
D41	0.07485616	0.01592223	0.06298944	22.10	0.0001
D42	0.07113723	0.01762143	0.04644424	16.30	0.0001
D02	0.06077316	0.01866490	0.03093794	10.86	0.0015
D91	0.18265692	0.01956166	0.24847420	87.19	0.0001
D92	0.30326918	0.01605939	1.01629291	356.61	0.0001

Bounds on condition number: 1.9134, 41.05188

The above model is the best 5-variable model found.

Step 7 Variable D21 Entered R-square = 0.88062522 C(p) = 51.00173650

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	6	1.31330646	0.21888774	84.84	0.0001
Error	69	0.17811853	0.00258027		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40509573	0.01775742	1.34202882	520.42	0.0001
D21	0.03822765	0.01335040	0.02145025	8.31	0.0053
D41	0.07263304	0.01517376	0.05079800	22.79	0.0001
D42	0.07377008	0.01703303	0.05660413	21.94	0.0001
D02	0.06596281	0.01744221	0.03604906	13.97	0.0004
D91	0.17521739	0.01879853	0.22640897	86.97	0.0001
D92	0.28886713	0.01607882	0.83270816	322.72	0.0001

Bounds on condition number: 1.949971, 58.15679

Step 8 Variable D41 Removed R-square = 0.89705053 C(p) = 36.14324766
Variable D22 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	6	1.33788357	0.22298060	100.31	0.0001
Error	69	0.15356141	0.00222524		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.45351338	0.01386706	2.76438026	1242.39	0.0001
D21	0.12115288	0.01707865	0.10210266	45.92	0.0001
D22	0.12320152	0.02013699	0.08329511	37.43	0.0001
D42	0.03138097	0.01398896	0.00597325	2.68	0.1059
D02	0.06765968	0.01620391	0.03841652	17.26	0.0001
D91	0.10363735	0.01857036	0.06930573	31.15	0.0001
D92	0.18795365	0.02061596	0.18495710	83.12	0.0001

Bounds on condition number: 3.610926, 82.01772

MAXR Procedure

tep 9 Variable D42 Removed R-square = 0.90290959 C(p) = 30.55771996
Variable D01 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	6	1.34662192	0.22443699	106.95	0.0001
Error	69	0.14480307	0.00209860		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.46065445	0.01132297	3.47041558	1653.69	0.0001
D21	0.11573015	0.01736110	0.09325306	44.44	0.0001
D22	0.12160226	0.01951367	0.08122777	38.71	0.0001
D01	0.06181408	0.01579272	0.01471160	7.01	0.0100
D02	0.10529529	0.02020263	0.05700733	27.16	0.0001
D91	0.07644383	0.01893976	0.03242181	15.45	0.0002
D92	0.15717688	0.02281822	0.09957322	47.45	0.0001

lounds on condition number: 4.700929, 100.6121

The above model is the best 6-variable model found.

Step10 Variable D142 Entered R-square = 0.91136416 C(p) = 24.51691855

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	7	1.35920165	0.19417166	99.86	0.0001
Error	68	0.13222356	0.00194446		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.46929633	0.01176926	3.06341770	1462.31	0.0001
D21	0.12804387	0.01739860	0.10531469	54.16	0.0001
D22	0.13505389	0.01953520	0.09293602	47.79	0.0001
D01	0.06116076	0.01520388	0.01425160	7.33	0.0086
D02	0.10220661	0.01960256	0.05359750	27.56	0.0001
D91	0.06880036	0.01836550	0.02720823	14.03	0.0004
D92	0.14496736	0.02248461	0.08080857	41.56	0.0001
D142	0.03762465	0.01006007	0.01257953	6.47	0.0133

lounds on condition number: 4.926199, 130.1816

The above model is the best 7-variable model found.

Step11 Variable D131 Entered R-square = 0.91605500 C(p) = 22.01600327

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	8	1.36622733	0.17077841	91.19	0.0001
Error	67	0.12519767	0.00186862		
Total	75	1.49142499			

MAXR Procedure

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.46381079	0.01105996	2.61669040	1400.33	0.0001
D21	0.12342920	0.01722115	0.09599155	51.37	0.0001
D22	0.12943166	0.01936870	0.08364693	44.76	0.0001
D01	0.06177609	0.01490781	0.01667402	7.05	0.0066
D02	0.10807640	0.01933083	0.05800936	31.36	0.0001
D91	0.06865066	0.01800396	0.02716913	14.54	0.0003
D92	0.14565183	0.02304655	0.08157383	43.65	0.0001
D131	0.02010928	0.01037060	0.00702587	3.76	0.0547
D142	0.02448775	0.01076916	0.00966175	5.17	0.0262

Bounds on condition number: 4.927538, 150.9836

Step12 Variable D102 Removed R-square = 0.92323967 C(p) = 15.17696191
Variable D132 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	8	1.37694262	0.17211780	100.73	0.0001
Error	67	0.11448257	0.00170870		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42607126	0.01353006	1.67858388	982.38	0.0001
D21	0.09798212	0.01625497	0.06208690	36.33	0.0001
D22	0.09201972	0.01909700	0.03967309	23.22	0.0001
D01	0.04386470	0.01425865	0.01617106	9.46	0.0030
D02	0.10035199	0.01871306	0.04913019	28.76	0.0001
D91	0.08502818	0.01746233	0.04127012	24.16	0.0001
D92	0.14881625	0.02090531	0.11162433	65.31	0.0001
D131	0.05660605	0.01368197	0.02324859	17.12	0.0001
D132	0.05265315	0.01507338	0.02037605	11.93	0.0010

Bounds on condition number: 4.066156, 177.6859

The above model is the best 8-variable model found.

Step13 Variable D102 Entered R-square = 0.92988888 C(p) = 10.03795962

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	9	1.38685952	0.15409550	97.26	0.0001
Error	66	0.10456547	0.00158433		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42339806	0.01302113	1.67256551	1055.68	0.0001
D21	0.09909366	0.01565853	0.06145040	40.05	0.0001
D22	0.09565990	0.01844021	0.04245753	26.80	0.0001
D01	0.04763590	0.01381243	0.01804400	11.09	0.0010

MAXR Procedure

D82	0.09410059	0.01819156	0.04239251	26.76	0.0001
D91	0.08431193	0.01683572	0.03978096	25.11	0.0001
D92	0.14531193	0.02231661	0.06779103	42.79	0.0001
D102	0.03351689	0.01339657	0.00991710	6.26	0.0148
D131	0.05671626	0.01317671	0.02936142	18.53	0.0001
D132	0.05305205	0.01451796	0.02099697	13.25	0.0005

Bounds on condition number: 5.901659, 226.956

Step14 Variable D91 Removed R-square = 0.93397569 C(p) = 7.89526428
Variable D101 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	9	1.39168325	0.15460703	102.08	0.0001
Error	66	0.09996173	0.00151457		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.44688727	0.01132068	2.36015511	1558.30	0.0001
D21	0.08663222	0.01618224	0.04340819	28.66	0.0001
D22	0.09793860	0.01775795	0.04606933	30.42	0.0001
D81	0.05780137	0.01380379	0.03086663	20.38	0.0001
D82	0.09626688	0.01754558	0.04559138	30.10	0.0001
D92	0.03563707	0.01036558	0.00719935	6.75	0.0320
D101	0.09459964	0.01747502	0.04438469	29.31	0.0001
D102	0.13133868	0.03195300	0.05421080	35.79	0.0001
D131	0.04489680	0.01279419	0.01865075	12.31	0.0008
D132	0.01291617	0.01393111	0.00845443	5.58	0.0211

Bounds on condition number: 5.335153, 241.6789

The above model is the best 9-variable model found.

Step15 Variable D91 Entered R-square = 0.93951881 C(p) = 3.65761008

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	10	1.40122183	0.14012218	100.97	0.0001
Error	65	0.09040316	0.00138774		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.43883250	0.01261292	1.67177292	1204.67	0.0001
D21	0.08200513	0.01550782	0.03660840	27.68	0.0001
D22	0.08702665	0.01761066	0.03527223	25.42	0.0001
D81	0.06408171	0.01392925	0.01824603	13.15	0.0006
D82	0.08663324	0.01718308	0.03527568	25.42	0.0001
D91	0.05039705	0.01896751	0.00975058	7.03	0.0100
D92	0.09239101	0.02651162	0.01685395	12.14	0.0009
D101	0.06481713	0.02016799	0.01636231	10.35	0.0020
D102	0.09986041	0.02413474	0.02375808	17.12	0.0001

MAXR Procedure

D131	0.05096914	0.01265903	0.02322696	16.74	0.0001
D132	0.04335657	0.01390434	0.01349328	9.72	0.0027

Bounds on condition number: 9.596361, 608.7678

The above model is the best 10-variable model found.

Step16 Variable D52 Entered R-square = 0.94153624 C(p) = 3.73436323

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	11	1.40423067	0.12765733	93.70	0.0001
Error	64	0.08719431	0.00136241		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42746091	0.01250903	1.59078118	1167.63	0.0001
D21	0.08074681	0.01568921	0.03712397	27.25	0.0001
D22	0.08499798	0.01736555	0.03261985	23.94	0.0001
D52	0.01562020	0.01051838	0.00300885	2.21	0.1422
D81	0.04859934	0.01286275	0.01946919	14.29	0.0003
D82	0.08140232	0.01737670	0.02996378	21.99	0.0001
D91	0.05045974	0.01879393	0.00982117	7.21	0.0092
D92	0.09776190	0.02651581	0.01851985	13.59	0.0005
D101	0.05990565	0.02023499	0.01196091	8.76	0.0043
D102	0.09232696	0.02644487	0.01963526	14.27	0.0004
D131	0.05209130	0.01261237	0.02473016	18.16	0.0001
D132	0.04336399	0.01377686	0.01349790	9.91	0.0025

Bounds on condition number: 9.778813, 673.5523

The above model is the best 11-variable model found.

Step17 Variable D112 Entered R-square = 0.96326473 C(p) = 4.08656791

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	12	1.43680859	0.11723405	87.39	0.0001
Error	63	0.08461640	0.00134312		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42373086	0.01270360	1.49383896	1112.33	0.0001
D21	0.08362168	0.01569902	0.03918613	29.18	0.0001
D22	0.08815914	0.01745650	0.03471134	25.86	0.0001
D52	0.01450734	0.01046057	0.00260790	1.94	0.1684
D81	0.04902867	0.01277510	0.01970169	14.73	0.0003
D82	0.08187918	0.01725190	0.03010667	22.42	0.0001
D91	0.04650110	0.01887700	0.00816956	6.07	0.0165
D92	0.09004900	0.02680945	0.01504078	11.20	0.0014
D101	0.06347294	0.02025553	0.01110075	8.23	0.0056
D102	0.09210528	0.02427169	0.01934118	14.40	0.0003

MAXR Procedure

D112	0.01306786	0.00963251	0.00257791	1.92	0.1709
D131	0.05062817	0.01241196	0.02227507	16.58	0.0001
D132	0.04037962	0.01384754	0.01142071	8.50	0.0049

Bounds on condition number: 10.31515, 541.8305

The above model is the best 12-variable model found.

Step18 Variable D41 Entered R-square = 0.96468631 C(p) = 6.73135521

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	13	1.43892877	0.10837914	81.45	0.0001
Error	61	0.05249622	0.00133058		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.61735566	0.01361737	1.24987957	939.35	0.0001
D21	0.07564201	0.01667422	0.02738334	20.58	0.0001
D22	0.07990331	0.01873600	0.02420016	18.19	0.0001
D41	0.01265012	0.01002142	0.00213018	1.59	0.2116
D52	0.01707295	0.01073979	0.00368505	2.77	0.1011
D01	0.05078805	0.01279152	0.02097593	15.76	0.0002
D02	0.08151730	0.01717169	0.02998580	22.54	0.0001
D91	0.05177673	0.01924864	0.00962491	7.24	0.0093
D93	0.09996316	0.02791122	0.01706730	12.83	0.0007
D101	0.05980139	0.02036058	0.01150921	8.65	0.0046
D102	0.09024890	0.02420290	0.01850080	13.90	0.0004
D112	0.01388991	0.00939062	0.00247597	1.86	0.1775
D131	0.05178862	0.01260792	0.02317997	17.42	0.0001
D132	0.04144335	0.01300851	0.01198550	9.01	0.0039

Bounds on condition number: 11.09338, 616.8071

Step19 Variable D112 Removed R-square = 0.96479081 C(p) = 4.63172944
Variable D42 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	13	1.43908663	0.10839113	81.62	0.0001
Error	62	0.05233836	0.00132807		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.60797326	0.01619018	0.84330607	634.99	0.0001
D21	0.08018597	0.01680989	0.02185151	16.45	0.0001
D22	0.08454619	0.02021341	0.01354118	10.20	0.0022
D41	0.02650190	0.01388883	0.00483552	3.64	0.0610
D42	0.02132439	0.01514809	0.00263183	1.98	0.1642
D52	0.01903178	0.01069861	0.00420277	3.16	0.0802
D01	0.04866893	0.01285051	0.01089328	16.23	0.0006
D02	0.07948990	0.01720408	0.02835195	21.35	0.0001

MAXR Procedure

D91	0.07149567	0.02204273	0.01397173	10.52	0.0019
D92	0.12627877	0.03010209	0.02306411	17.37	0.0001
D101	0.05166433	0.02046229	0.00840089	6.33	0.0145
D102	0.08036747	0.02521665	0.01368313	10.15	0.0023
D131	0.05307262	0.01230566	0.02670323	18.60	0.0001
D132	0.04063185	0.01300473	0.01137311	8.56	0.0048

Bounds on condition number: 13.18805, 737.5931

The above model is the best 13-variable model found.

Step20 Variable D112 Entered R-square = 0.96590265 C(p) = 5.57188367

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	14	1.44076286	0.10076735	76.19	0.0001
Error	61	0.08066216	0.00132266		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.60705245	0.01617789	0.83733450	633.07	0.0001
D21	0.07130569	0.01701726	0.02327505	17.60	0.0001
D22	0.06955852	0.02066330	0.01498017	11.33	0.0013
D41	0.02416227	0.01401699	0.00393051	2.97	0.0899
D42	0.01803530	0.01539996	0.00181607	1.37	0.2461
D52	0.01810933	0.01070966	0.00378102	2.86	0.0960
D01	0.04900633	0.01283607	0.01934057	14.62	0.0003
D02	0.07993629	0.01717362	0.02865577	21.67	0.0001
D91	0.06573435	0.02359156	0.01119000	8.47	0.0050
D92	0.11692751	0.03127230	0.01837320	13.89	0.0004
D101	0.05519672	0.02060055	0.00961216	7.12	0.0098
D102	0.08175670	0.02519667	0.01392563	10.53	0.0019
D112	0.01067927	0.00953773	0.00165021	1.25	0.2672
D131	0.05134966	0.01237659	0.02276759	17.21	0.0001
D132	0.03875330	0.01395761	0.01019831	7.71	0.0073

Bounds on condition number: 14.09926, 841.2805

Step21 Variable D42 Removed R-square = 0.96595139 C(p) = 5.52933661
Variable D112 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	14	1.44081556	0.10077254	76.26	0.0001
Error	61	0.08060943	0.00132147		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.61613867	0.01360882	1.23563791	935.05	0.0001
D112	0.01191631	0.00997265	0.00100677	1.41	0.2360
D21	0.07934150	0.01690284	0.02911639	22.03	0.0001
D22	0.08763851	0.01976205	0.02590854	19.67	0.0001

MAXR Procedure

D61	0.01225689	0.00999245	0.00198826	1.50	0.2247
D52	0.01648115	0.01076613	0.00309679	2.34	0.1310
D81	0.04703171	0.01312952	0.01695666	12.83	0.0007
D82	0.08102309	0.01711776	0.02960602	22.40	0.0001
D91	0.05004113	0.01923717	0.00894186	6.77	0.0116
D92	0.09865403	0.02795294	0.01579961	11.96	0.0010
D101	0.05717107	0.02041705	0.01036164	7.84	0.0068
D102	0.08720989	0.02425356	0.01708586	12.93	0.0006
D112	0.01627749	0.00963866	0.00302371	2.29	0.1355
D131	0.06921964	0.01255080	0.02032269	15.38	0.0002
D132	0.04060413	0.01378057	0.01134669	8.59	0.0048

unds on condition number: 11.20335, 721.706

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ie above model is the best 14-variable model found

ep22 Variable D42 Entered R-square = 0.94707155 C(p) = 6.65746946

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	15	1.41248618	0.09416575	71.57	0.0001
rror	60	0.07893881	0.00131565		
otal	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0.40628917	0.01614868	0.83279077	633.09	0.0001
12	0.01166373	0.00995078	0.00176333	1.33	0.2542
21	0.07511235	0.01727011	0.02686393	18.90	0.0001
22	0.07760925	0.02270766	0.01673012	12.72	0.0007
41	0.02332943	0.01399054	0.00365411	2.78	0.1000
42	0.01732169	0.03537159	0.00167066	1.27	0.2643
52	0.01676106	0.01076527	0.00330116	2.43	0.1261
81	0.06853007	0.01316746	0.01573565	11.96	0.0010
82	0.07952160	0.01713179	0.02816800	21.55	0.0001
91	0.00351625	0.02261398	0.01037836	7.89	0.0067
92	0.11307283	0.03146770	0.01698737	12.91	0.0007
101	0.05277116	0.02074258	0.00951688	6.47	0.0135
102	0.07916913	0.02523015	0.01395433	9.85	0.0026
112	0.01217542	0.00960081	0.00211580	1.61	0.2096
131	0.06889523	0.01252652	0.02006526	15.24	0.0002
132	0.03786080	0.01396218	0.00970155	7.37	0.0086

unds on condition number: 14.26073, 941.7116

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e above model is the best 15-variable model found.

ep23 Variable D71 Entered R-square = 0.94801067 C(p) = 7.54331775

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	16	1.41391633	0.08836977	67.27	0.0001
rror	59	0.07750865	0.00131371		
otal	75	1.49142499			

MAXR Procedure

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40096078	0.01692557	0.73725081	561.20	0.0001
D12	0.01161806	0.00995252	0.00179019	1.36	0.2478
D21	0.08223859	0.01856720	0.02577251	19.62	0.0001
D22	0.08174976	0.02252670	0.01815796	13.82	0.0004
D41	0.02403978	0.01606291	0.00409865	3.12	0.0825
D42	0.02071315	0.01570040	0.00328849	2.74	0.1922
D52	0.01588561	0.01077007	0.00285805	2.18	0.1455
D71	0.01865796	0.01789054	0.00143016	1.09	0.3010
D81	0.04236029	0.01350564	0.01292367	9.84	0.0027
D82	0.07928061	0.01712073	0.02817006	21.44	0.0001
D91	0.06665893	0.02279740	0.01123167	8.55	0.0049
D92	0.11851026	0.03187348	0.01816148	13.82	0.0004
D101	0.04929111	0.02099423	0.00726162	5.51	0.0223
D102	0.07667266	0.02561023	0.01110868	8.46	0.0051
D112	0.01234796	0.00959515	0.00217563	1.66	0.2032
D131	0.06730341	0.01260991	0.01848670	14.07	0.0004
D132	0.03650670	0.01428074	0.00770579	5.87	0.0185

Bounds on condition number: 14.65243, 1060.029

The above model is the best 16-variable model found.

Step24 Variable D72 Entered R-square = 0.94886883 C(p) = 8.74609882

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	17	1.41516668	0.08324510	63.31	0.0001
Error	58	0.07625831	0.00131480		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39389337	0.01841836	0.60133227	457.36	0.0001
D12	0.01160170	0.00995667	0.00178517	1.36	0.2487
D21	0.07799017	0.01909836	0.02187932	16.64	0.0001
D22	0.08079368	0.02273907	0.01659057	12.62	0.0008
D41	0.02383599	0.01610635	0.00375602	2.86	0.0964
D42	0.02203824	0.01576568	0.00256917	1.95	0.1678
D52	0.01336011	0.01107950	0.00191408	1.46	0.2328
D71	0.03211610	0.02256936	0.00266236	2.02	0.1601
D72	0.02153975	0.02208793	0.00125035	0.95	0.3335
D81	0.04176639	0.01352497	0.01251035	9.56	0.0033
D82	0.07930419	0.01713787	0.02810670	21.46	0.0001
D91	0.05722599	0.02473352	0.00708302	5.37	0.0240
D92	0.10771811	0.03375258	0.01330129	10.19	0.0023
D101	0.05303035	0.02151258	0.00733246	5.36	0.0352
D102	0.07916034	0.02606796	0.01214441	9.22	0.0036
D112	0.01111537	0.00960199	0.00172292	1.32	0.2557
D131	0.06952912	0.01319551	0.01430758	10.88	0.0017
D132	0.03177989	0.01457374	0.00625204	4.76	0.0333

Bounds on condition number: 16.61738, 1296.174

MAXR Procedure

he above model is the best 17-variable model found.

tep25 Variable D131 Entered R-square = 0.94920644 C(p) = 10.42224727

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	18	1.41567020	0.07864834	59.18	0.0001
Error	57	0.07575478	0.00132903		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39597378	0.01882271	0.58810862	442.51	0.0001
D12	0.01101503	0.01001641	0.00186919	1.39	0.2431
D21	0.07679855	0.01920588	0.02107675	15.86	0.0002
D22	0.07906179	0.02303836	0.01564396	11.77	0.0011
D41	0.03520240	0.01435526	0.00409644	3.08	0.0845
D42	0.02454718	0.01636640	0.00298972	2.25	0.1392
D52	0.01390498	0.01117360	0.00205028	1.55	0.2184
D71	0.03139286	0.02272166	0.00253685	1.91	0.1725
D72	0.02282227	0.02230689	0.00139163	1.05	0.3105
D81	0.06056002	0.01376317	0.01156456	8.70	0.0066
D82	0.07865495	0.01725260	0.02762348	20.78	0.0001
D91	0.05708988	0.01806999	0.00700339	5.27	0.0256
D92	0.10570063	0.03609271	0.01277519	9.61	0.0030
D101	0.05562976	0.02102537	0.00863420	6.50	0.0135
D102	0.08166056	0.02647460	0.01250379	9.47	0.0032
D112	0.00863137	0.01053764	0.00089160	0.67	0.4161
D121	-0.00717200	0.01165321	0.00050352	0.38	0.5407
D131	0.04663355	0.01330710	0.01477224	11.12	0.0015
D132	0.03069931	0.01675720	0.00575156	4.33	0.0420

ounds on condition number: 16.57056, 1421.669

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he above model is the best 18-variable model found.

tep26 Variable D61 Entered R-square = 0.94935221 C(p) = 12.20328378

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	19	1.41580761	0.07452040	55.25	0.0001
Error	56	0.07553738	0.00134888		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39503061	0.01896875	0.58752199	435.56	0.0001
D12	0.01111958	0.01023056	0.00159102	1.18	0.2821
D21	0.07799176	0.01965539	0.02123776	15.74	0.0002
D22	0.08074209	0.02359302	0.01579818	11.71	0.0012
D41	0.02561171	0.01447143	0.00415928	3.08	0.0846
D42	0.02628220	0.01650127	0.00292115	2.17	0.1467
D52	0.01374553	0.01126354	0.00200085	1.49	0.2276
D61	0.00758344	0.01080948	0.00021140	0.16	0.6896
D71	0.02976753	0.02324563	0.00231196	1.64	0.2056

MAXR Procedure

D72	0.02291237	0.02267177	0.00160210	1.06	0.3133
D81	0.03972065	0.01399512	0.01086549	8.06	0.0063
D82	0.07810672	0.01743452	0.02707263	20.07	0.0001
D91	0.05500785	0.02558624	0.00623458	4.62	0.0359
D92	0.10673096	0.03684212	0.01295314	9.60	0.0030
D101	0.05369255	0.02262102	0.00756153	5.59	0.0215
D102	0.07901456	0.02736093	0.01124932	8.34	0.0055
D112	0.00897091	0.01064968	0.00095716	0.71	0.4032
D121	-0.00749004	0.01176640	0.00054657	0.41	0.5278
D131	0.04517052	0.01355335	0.01498271	11.11	0.0015
D132	0.03170568	0.01507685	0.00596522	4.42	0.0400

Bounds on condition number: 16.66306, 1575.913

The above model is the best 19-variable model found.

Step27 Variable D31 Entered R-square = 0.94943738 C(p) = 14.20209334

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	20	1.41601663	0.07080075	51.64	0.0001
Error	55	0.07541036	0.00137110		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39575939	0.01913408	0.58717887	428.25	0.0001
D12	0.01129660	0.01033888	0.00163688	1.19	0.2793
D21	0.07785393	0.01982183	0.02115098	15.43	0.0002
D22	0.08004608	0.02378896	0.01503563	11.55	0.0013
D31	0.00352491	0.01158105	0.00012702	0.09	0.7620
D41	0.02624963	0.01500156	0.00354469	2.59	0.1136
D42	0.02312060	0.01706952	0.00251550	1.83	0.1811
D52	0.01401821	0.01139120	0.00207462	1.51	0.2237
D61	0.00782218	0.01906055	0.00023092	0.17	0.6821
D71	0.03004700	0.02345425	0.00225023	1.64	0.2055
D72	0.02266454	0.02267289	0.00136791	1.00	0.3222
D81	0.04000825	0.01414154	0.01097423	8.00	0.0065
D82	0.07820041	0.01758020	0.02712930	19.79	0.0001
D91	0.05306886	0.02657091	0.00560936	3.99	0.0500
D92	0.10478191	0.03531009	0.01207378	8.81	0.0044
D101	0.05369643	0.02281839	0.00759258	5.54	0.0222
D102	0.07942280	0.02761779	0.01133093	8.27	0.0057
D112	0.00898598	0.01124289	0.00100166	0.79	0.3783
D121	-0.00710581	0.01192996	0.00048643	0.35	0.5539
D131	0.04605266	0.01396849	0.01690317	10.07	0.0017
D132	0.03158719	0.01520549	0.00591684	4.32	0.0425

Bounds on condition number: 17.22872, 1726.617

MAXR Procedure

ep20 Variable D61 Removed R-square = 0.94946588 C(p) = 14.17491967
Variable D62 Entered

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	20	1.41605716	0.07080286	51.67	0.0001
rror	55	0.07536785	0.00137032		
otal	75	1.49142499			

ariable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0.39823051	0.01981293	0.55359892	403.99	0.0001
12	0.01300311	0.01020156	0.00183436	1.34	0.2523
21	0.01877030	0.02017238	0.02089885	15.25	0.0003
22	0.07700110	0.02157119	0.01492907	10.89	0.0017
31	0.00436257	0.01178027	0.00018596	0.14	0.7160
41	0.02110089	0.01649936	0.00234125	1.64	0.2063
42	0.01871235	0.02008369	0.00118960	0.87	0.3555
52	0.01304677	0.01140479	0.00201997	1.47	0.2299
62	-0.00001277	0.01972089	0.00027343	0.20	0.6569
71	0.03029539	0.02331101	0.00231633	1.69	0.1992
72	0.02165666	0.02275786	0.00126069	0.91	0.3455
81	0.04062503	0.01400092	0.01153713	8.42	0.0053
82	0.07662966	0.01815963	0.02440077	17.81	0.0001
91	0.05367719	0.02631647	0.00565855	4.13	0.0470
92	0.10470016	0.01537868	0.01207146	8.81	0.0044
101	0.05718775	0.02237016	0.00895537	6.56	0.0136
102	0.08670493	0.02746096	0.01306872	9.39	0.0034
112	0.01105912	0.01167563	0.00122963	0.90	0.3477
121	-0.00594392	0.01205603	0.00033305	0.24	0.6240
131	0.06806393	0.01395675	0.01693079	10.90	0.0017
132	0.03142009	0.01511466	0.00592006	4.32	0.0423

unds on condition number: 17.20878, 1789.116

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e above model is the best 20-variable model found.

ep29 Variable D61 Entered R-square = 0.94952418 C(p) = 16.11934292

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	21	1.41614409	0.06743543	48.37	0.0001
rror	54	0.07528090	0.00139409		
otal	75	1.49142499			

ariable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0.39755654	0.02016540	0.54184524	388.67	0.0001
12	0.01137917	0.01043813	0.00165978	1.19	0.2801
21	0.01906616	0.02037813	0.02098438	15.05	0.0003
22	0.07929866	0.02651919	0.01458177	10.46	0.0021
31	0.00422221	0.01189982	0.00017550	0.13	0.7241
41	0.02194602	0.01698241	0.00232811	1.67	0.2018
42	0.01966453	0.02061259	0.00126800	0.91	0.3443
52	0.01302619	0.01150355	0.00201193	1.44	0.2346

MAXR Procedure

D61	0.00524426	0.02099908	0.00008695	0.06	0.8037
D62	-0.00662540	0.02174152	0.00012946	0.09	0.7617
D71	0.02953396	0.02370994	0.00216309	1.55	0.2183
D72	0.02193378	0.02298154	0.00126987	0.91	0.3461
D81	0.04012335	0.01426456	0.01102931	7.91	0.0069
D82	0.07678336	0.01032676	0.02447112	17.55	0.0001
D91	0.05242509	0.02607594	0.00530447	3.80	0.0563
D92	0.10512078	0.03562313	0.01216146	8.71	0.0047
D101	0.05539675	0.02367588	0.00703221	5.07	0.0230
D102	0.08233809	0.02964654	0.01089992	7.82	0.0071
D112	0.01096416	0.01178258	0.00120715	0.87	0.3563
D121	-0.00636126	0.01227520	0.00037430	0.27	0.6064
D131	0.06631538	0.01631149	0.01501746	10.77	0.0018
D132	0.03189634	0.01536598	0.00600692	4.31	0.0427

Bounds on condition number: 17.24733, 2007.081

The above model is the best 21-variable model found.

Step10 Variable D141 Entered R-square = 0.94950616 C(p) = 18.06025836

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	22	1.41623652	0.06437439	45.38	0.0001
Error	53	0.07518846	0.00141865		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39797822	0.02040921	0.53963785	380.35	0.0001
D12	0.01230272	0.01052465	0.00163623	1.15	0.2877
D21	0.07962864	0.02067597	0.02106167	14.84	0.0003
D22	0.08010863	0.02693686	0.01464026	10.32	0.0023
D31	0.00388123	0.01207827	0.00016469	0.10	0.7492
D41	0.02186391	0.01712437	0.00230991	1.63	0.2078
D42	0.01947052	0.02080725	0.00126223	0.88	0.3516
D52	0.01392875	0.01161137	0.00206142	1.44	0.2356
D61	0.00655907	0.02100049	0.00012862	0.09	0.7647
D62	-0.00687706	0.02193313	0.00013168	0.09	0.7620
D71	0.02880395	0.02400930	0.00202845	1.43	0.2371
D72	0.02100869	0.02361861	0.00115861	0.81	0.3719
D81	0.03975367	0.01466196	0.01071955	7.56	0.0082
D82	0.07657921	0.01050670	0.02439570	17.13	0.0001
D91	0.05337023	0.02736757	0.00539674	3.80	0.0566
D92	0.10778938	0.03741666	0.01177329	8.28	0.0057
D101	0.05630772	0.02426150	0.00710826	5.01	0.0296
D102	0.08023668	0.03082666	0.00961067	6.77	0.0120
D112	0.01142266	0.01202088	0.00128097	0.90	0.3463
D121	-0.00630657	0.01238686	0.00036763	0.26	0.6130
D131	0.06664823	0.01629666	0.01510730	10.65	0.0019
D132	0.03181656	0.01550363	0.00598221	4.22	0.0458
D141	-0.00289027	0.01332207	0.00009244	0.07	0.7995

Bounds on condition number: 18.69834, 2203.836

MAXR Procedure

he above model is the best 22-variable model found

tep31 Variable D51 Entered R-square = 0.94961632 C(p) = 20.03150518

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	23	1.41628151	0.06157746	42.61	0.0001
Error	52	0.07514348	0.00144507		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39728726	0.02096734	0.51881288	359.02	0.0001
D12	0.01157227	0.01073129	0.00168043	1.16	0.2858
D21	0.07915706	0.02103792	0.02065792	14.16	0.0004
D22	0.07978075	0.02523638	0.01446309	9.99	0.0026
D31	0.00395344	0.01219707	0.00015102	0.11	0.7471
D41	0.02164068	0.01733930	0.00225093	1.56	0.2176
D42	0.01960357	0.02100351	0.00123330	0.85	0.3598
D51	0.00261328	0.01481167	0.00006490	0.04	0.8406
D52	0.01568521	0.01537673	0.00150363	1.04	0.3126
D61	0.00630516	0.02202660	0.00012165	0.08	0.7730
D62	-0.00630269	0.02219918	0.00011986	0.08	0.7749
D71	0.02063773	0.02632976	0.00200212	1.39	0.2465
D72	0.02162057	0.02303284	0.00119012	0.82	0.3683
D81	0.03917237	0.01496321	0.00990372	6.85	0.0116
D82	0.07619961	0.01878399	0.02411028	16.68	0.0002
D91	0.05276126	0.02705614	0.00510021	3.58	0.0639
D92	0.10088120	0.03811260	0.01130458	7.86	0.0071
D101	0.05498828	0.02670830	0.00711107	4.92	0.0309
D102	0.08095341	0.03137806	0.00961848	6.66	0.0127
D112	0.01162865	0.01213231	0.00120224	0.83	0.3566
D121	-0.00801649	0.01260582	0.00032818	0.23	0.6352
D131	0.04558424	0.01561697	0.01228039	8.50	0.0052
D132	0.03065324	0.01701869	0.00668801	3.26	0.0775
D141	-0.00297016	0.01143677	0.00009746	0.07	0.7961

ounds on condition number: 19.04575, 2449.002

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e above model is the best 23-variable model found.

ep32 Variable D111 Entered R-square = 0.94963349 C(p) = 22.01513580

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	24	1.41630712	0.05901280	40.07	0.0001
Error	51	0.07511787	0.00147290		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39771722	0.02141796	0.50788557	344.82	0.0001
D12	0.01183213	0.01101192	0.00170049	1.15	0.2877
D21	0.07958976	0.02149156	0.02020001	13.71	0.0005
D22	0.08044800	0.02600589	0.01410185	9.57	0.0032

MAXR Procedure

D31	0.00408331	0.01235310	0.00016093	0.11	0.7423
D41	0.02145147	0.01756428	0.00219698	1.49	0.2276
D42	0.01961075	0.02130698	0.00123470	0.84	0.3642
D51	0.00303750	0.01529580	0.00005008	0.04	0.8436
D52	0.01558108	0.01556387	0.00149011	1.00	0.3209
D61	0.00628373	0.02230899	0.00011749	0.08	0.7788
D62	-0.00626682	0.02242916	0.00011699	0.08	0.7811
D71	0.02916946	0.02489175	0.00202264	1.37	0.2467
D72	0.02202210	0.02426565	0.00121513	0.82	0.3688
D81	0.03839515	0.01621588	0.00825751	5.61	0.0217
D82	0.07580421	0.01941565	0.02265203	15.26	0.0003
D91	0.05306099	0.02822746	0.00520651	3.53	0.0659
D92	0.10748219	0.03874688	0.01133372	7.69	0.0077
D101	0.05459190	0.02920577	0.00690923	4.69	0.0350
D102	0.08083312	0.03192350	0.00935017	6.35	0.0149
D111	-0.00160758	0.01219156	0.00002561	0.02	0.8956
D112	0.01092970	0.01281931	0.00107068	0.73	0.3979
D121	-0.00572675	0.01291753	0.00028929	0.20	0.6595
D131	0.04501020	0.01633643	0.01118093	7.60	0.0081
D132	0.03066299	0.01726227	0.00459758	3.13	0.0833
D141	-0.00303659	0.01155737	0.00010168	0.07	0.7930

Bounds on condition number: 19.31298, 2655.516

The above model is the best 24-variable model found.

Step33 Variable D142 Entered R-square = 0.94964193 C(p) = 24.00788658

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	25	1.41631871	0.05665279	37.72	0.0001
Error	50	0.07510628	0.00150211		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39150825	0.02176934	0.50176506	334.04	0.0001
D12	0.01181989	0.01112136	0.00169673	1.13	0.2930
D21	0.07877414	0.02346056	0.01693523	11.27	0.0015
D22	0.07940388	0.02871967	0.01140233	7.66	0.0080
D31	0.00410830	0.01267816	0.00016203	0.11	0.7436
D41	0.02169375	0.01774358	0.00220416	1.47	0.2315
D42	0.01967303	0.02159910	0.00126616	0.83	0.3660
D51	0.00296370	0.01546772	0.00005515	0.04	0.8408
D52	0.01599404	0.01632091	0.00144095	0.96	0.3321
D61	0.00642588	0.02252201	0.00012238	0.08	0.7766
D62	-0.00642288	0.02271440	0.00012010	0.08	0.7785
D71	0.02903060	0.02615306	0.00195413	1.30	0.2595
D72	0.02259619	0.02504915	0.00123260	0.81	0.3723
D81	0.03866637	0.01630534	0.00826998	5.51	0.0230
D82	0.07561752	0.01971293	0.02210258	14.71	0.0004
D91	0.05260208	0.02811206	0.00509235	3.39	0.0711
D92	0.10060089	0.04099233	0.01036295	7.03	0.0108
D101	0.05434003	0.02560266	0.00676659	4.50	0.0388
D102	0.08031484	0.03226441	0.00930775	6.20	0.0162
D111	-0.00139670	0.01252539	0.00001868	0.01	0.9117

MAXR Procedure

112	0.01100371	0.01305461	0.00108279	0.72	0.3999
131	-0.00581199	0.01307972	0.00029659	0.20	0.6587
131	0.06565406	0.01784928	0.00982493	6.56	0.0136
132	0.01069493	0.01759567	0.00657111	3.04	0.0872
141	-0.00403883	0.01599967	0.00009573	0.06	0.8018
142	-0.00148758	0.01624680	0.00001259	0.01	0.9274

nds on condition number: 21.19599, 3035.38

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e above model is the best 25-variable model found.

ep)4 Variable D32 Entered R-square = 0.94964905 C(p) = 26.00030328

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	26	1.41833032	0.05447424	35.56	0.0001
rror	49	0.07509467	0.00153256		
tal	75	1.49142499			

riable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
TERCEP	0.39786196	0.02237036	0.48442266	316.09	0.0001
2	0.01103089	0.01123626	0.00169965	1.11	0.2975
1	0.07893847	0.02377931	0.01688867	11.02	0.0017
3	0.07939299	0.02900939	0.01147890	7.49	0.0086
3	0.00388389	0.01761853	0.00006895	0.05	0.8218
2	-0.00150062	0.01001335	0.00001061	0.01	0.9340
1	0.02156176	0.01794108	0.00221352	1.44	0.2352
3	0.01960712	0.02183130	0.00123618	0.81	0.3735
1	0.00200851	0.01566977	0.00005221	0.03	0.8543
2	0.01590321	0.01449505	0.00143091	0.94	0.3373
1	0.00083237	0.02123510	0.00010330	0.07	0.7963
2	-0.00850325	0.02302627	0.00013529	0.09	0.7761
1	0.02970157	0.02666299	0.00193081	1.26	0.2672
2	0.02214207	0.02567725	0.00113960	0.74	0.3927
1	0.03035407	0.01650765	0.00819344	5.35	0.0250
2	0.07556660	0.01992114	0.02205170	14.39	0.0004
1	0.05420727	0.03053665	0.00466258	3.16	0.0816
2	0.11007637	0.00504266	0.00915207	5.97	0.0182
01	0.05429261	0.02588706	0.00675151	4.41	0.0410
02	0.00030813	0.03259214	0.00029010	0.07	0.8173
11	-0.00166690	0.01266606	0.00002000	0.01	0.9095
12	0.01126177	0.01335071	0.00108918	0.71	0.4033
31	-0.00969882	0.01328139	0.00020216	0.18	0.6697
31	0.00576390	0.01806150	0.00083036	0.41	0.0166
32	0.03063209	0.01778910	0.00656421	2.97	0.0916
41	-0.00021302	0.01629752	0.00010245	0.07	0.7971
42	-0.00163286	0.01650321	0.00001500	0.01	0.9216

nds on condition number: 25.00303, 3639.269

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above model is the best 26-variable model found.

MAXR Procedure

Step35 Variable D11 Entered R-square = 0.94964937 C(p) = 28.00000000

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	27	1.41833079	0.05265670	33.53	0.0001
Error	48	0.07509419	0.00156446		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39772899	0.02388307	0.43386986	277.33	0.0001
D11	0.00025341	0.01455103	0.00000047	0.00	0.9862
D12	0.01196672	0.01377215	0.00118117	0.75	0.3892
D21	0.07886371	0.02660603	0.01633523	10.44	0.0022
D22	0.07929903	0.02979607	0.01100281	7.00	0.0105
D31	0.00308062	0.01780217	0.00006686	0.03	0.8538
D32	-0.00151780	0.01024686	0.00001882	0.01	0.9341
D41	0.02155306	0.01813366	0.00221851	1.41	0.2406
D42	0.01963176	0.02210270	0.00123421	0.79	0.3789
D51	0.00291532	0.01588669	0.00005268	0.03	0.8552
D52	0.01590087	0.01666648	0.00143860	0.92	0.3424
D61	0.00606269	0.02354038	0.00010377	0.07	0.7979
D62	-0.00666790	0.02355713	0.00012659	0.08	0.7790
D71	0.02965344	0.02687962	0.00190401	1.22	0.2756
D72	0.02215576	0.02595517	0.00113996	0.73	0.3976
D81	0.03032759	0.01682837	0.00811539	5.19	0.0272
D82	0.07553919	0.02010000	0.02190390	14.00	0.0005
D91	0.05425955	0.03089405	0.00402578	2.58	0.0854
D92	0.11010617	0.04594178	0.00899862	5.75	0.0206
D101	0.05636704	0.02632124	0.00666987	4.26	0.0444
D102	0.00035160	0.03310504	0.00017232	0.86	0.0193
D111	-0.00145168	0.01300020	0.00002012	0.01	0.9102
D112	0.01123766	0.01358009	0.00107319	0.69	0.4116
D121	-0.00569078	0.01361090	0.00020216	0.13	0.6730
D131	0.00576190	0.01827796	0.00080644	0.27	0.0157
D132	0.03062290	0.01790107	0.00453762	2.90	0.0850
D141	-0.00025656	0.01666029	0.00010237	0.07	0.7993
D142	-0.00166519	0.01677717	0.00001541	0.01	0.9214

Bounds on condition number: 25.56647, 3689.955

The above model is the best 27-variable model found.

No further improvement in R-square is possible.

Appendix (D) SAS Output

Part (III)

Results of 'FORWARD' Model Selection Procedure

FORWARD selection procedure

Forward Selection Procedure for Dependent Variable Y

Statistics for Entry: Step 1
DF = 1,74

Variable	Tolerance	Model R**2	F	Prob>F
D11	1.000000	0.0881	7.1520	0.0092
D13	1.000000	0.0471	3.6577	0.0597
D21	1.000000	0.0988	8.1101	0.0057
D22	1.000000	0.2653	26.7107	0.0001
D31	1.000000	0.0670	5.3160	0.0239
D32	1.000000	0.1587	13.9606	0.0004
D41	1.000000	0.0002	0.0157	0.9005
D42	1.000000	0.0328	2.5072	0.1176
D51	1.000000	0.0071	0.5467	0.4620
D52	1.000000	0.0604	5.4343	0.0225
D61	1.000000	0.0050	0.4201	0.5150
D62	1.000000	0.0575	4.5155	0.0369
D71	1.000000	0.1095	9.1022	0.0035
D72	1.000000	0.4400	58.1544	0.0001
D81	1.000000	0.1811	16.3678	0.0001
D82	1.000000	0.1462	12.6490	0.0007
D91	1.000000	0.0284	2.0108	0.1604
D92	1.000000	0.6317	121.6217	0.0001
D101	1.000000	0.0786	6.3006	0.0142
D102	1.000000	0.3366	37.5525	0.0001
D111	1.000000	0.0026	0.1813	0.6715
D112	1.000000	0.0676	5.3613	0.0236
D121	1.000000	0.0253	1.9232	0.1697
D122	.	0.0000	.	.
D131	1.000000	0.0267	2.0308	0.1583
D132	1.000000	0.0325	2.4865	0.1193
D141	1.000000	0.0027	0.2076	0.6734
D142	1.000000	0.0053	0.3975	0.5303

ep 1 Variable D92 Entered R-square = 0.62171891 C(p) =288.62093004

	DF	Sum of Squares	Mean Square	F	Prob>F
legression	1	0.92734713	0.92734713	121.62	0.0001
Error	74	0.56417786	0.00762403		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.56255556	0.01455261	11.39207511	1494.34	0.0001
D92	0.22121944	0.02005939	0.92734713	121.62	0.0001

Bounds on condition number: 1, 1

FORWARD selection procedure

Statistics for Entry: Step 2
DF = 1,73

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.863370	0.6220	0.0601	0.8071
D13	0.970860	0.6384	1.3139	0.2554
D21	0.956863	0.6452	1.8230	0.0312
D22	0.806527	0.6560	7.6642	0.0079
D31	0.972437	0.6386	3.4017	0.0692
D32	0.720999	0.6222	0.0870	0.7679
D41	0.984927	0.6343	2.5166	0.1171
D42	0.942510	0.6218	0.0131	0.9092
D51	0.901609	0.6222	0.0962	0.7598
D52	0.997769	0.6721	11.2200	0.0013
D61	0.907113	0.6515	6.2474	0.0147
D62	0.836800	0.6292	1.4856	0.2300
D71	0.887279	0.6267	0.9665	0.3288
D72	0.749104	0.7179	24.8865	0.0001
D81	0.822222	0.6323	2.0939	0.1522
D82	0.972507	0.6869	15.1972	0.0002
D91	0.629630	0.7015	53.4103	0.0001
D101	0.995230	0.6730	11.4618	0.0012
D102	0.586615	0.6306	1.7533	0.1896
D111	0.999566	0.6261	0.8685	0.3600
D112	0.818536	0.6250	0.2562	0.6142
D121	0.962903	0.6220	0.1744	0.6775
D122	.	0.6317	.	.
D131	0.992475	0.6300	1.7994	0.1839
D132	0.990291	0.6323	2.1002	0.1508
D141	0.934007	0.6217	0.0033	0.9546
D142	0.995741	0.6232	0.0909	0.7640

Step 2 Variable D91 Entered R-square = 0.78156855 C(p) =130.25298101

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	2	1.16562100	0.58281052	130.59	0.0001
Error	73	0.32580395	0.00446307		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.47652941	0.01030288	3.88036476	864.96	0.0001
D91	0.16299690	0.02230338	0.23037392	51.61	0.0001
D92	0.30724559	0.01936893	1.12617367	252.33	0.0001

Bounds on condition number: 1.588235, 6.353941

FORWARD selection procedure

Statistics for Entry: Step 3
DF = 1,72

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.861105	0.7816	0.0015	0.9691
D12	0.940482	0.7817	0.0489	0.8255
D21	0.924050	0.7881	2.2244	0.1402
D22	0.782826	0.7961	5.1332	0.0265
D31	0.918810	0.7839	0.6535	0.5033
D32	0.720923	0.7810	0.0975	0.7557
D41	0.983699	0.7975	5.6836	0.0190
D42	0.874878	0.7921	3.6468	0.0602
D51	0.900516	0.7816	0.0331	0.8561
D52	0.965776	0.8057	8.9604	0.0038
D61	0.706633	0.7818	0.0986	0.7544
D62	0.836536	0.7920	3.9251	0.0514
D71	0.870821	0.7825	0.3270	0.5692
D72	0.561128	0.7977	5.7335	0.0193
D81	0.748968	0.7821	0.1930	0.6611
D82	0.968011	0.8197	15.2116	0.0002
D101	0.792857	0.7862	0.8909	0.3486
D102	0.584615	0.7904	3.0678	0.0851
D111	0.999307	0.7868	1.7672	0.1879
D112	0.918693	0.7827	0.3761	0.5417
D121	0.941854	0.7835	0.6367	0.4275
D122	.	0.7815	.	.
D131	0.990246	0.7876	1.9837	0.1633
D132	0.986137	0.7982	5.9580	0.0171
D141	0.910062	0.7852	1.2350	0.2701
D142	0.995622	0.7818	0.0991	0.7539

tep 3 Variable D82 Entered R-square = 0.01965127 C(p) =103.92910001

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	3	1.22246838	0.40748279	109.08	0.0001
Error	72	0.26894660	0.00373579		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.67652941	0.01602606	3.86036476	1033.35	0.0001
D82	0.07978892	0.02065761	0.05682735	15.21	0.0002
D91	0.15039865	0.02065929	0.19798809	53.00	0.0001
D92	0.29128781	0.01816280	0.96086191	257.20	0.0001

ounds on condition number: 1.673141, 13.06538

FORWARD selection procedure

Statistics for Entry: Step 4
DF = 1,71

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.836311	0.8198	0.0628	0.8028
D12	0.914220	0.8217	0.8223	0.3676
D21	0.905336	0.8317	5.0870	0.0272
D22	0.751424	0.8266	2.0316	0.0968
D31	0.913219	0.8201	0.1871	0.6666
D32	0.720300	0.8198	0.0517	0.8208
D41	0.983582	0.8351	6.6526	0.0120
D42	0.861956	0.8240	1.7570	0.1891
D51	0.915698	0.8214	0.6867	0.4101
D52	0.803023	0.8265	2.7947	0.0990
D61	0.703605	0.8197	0.0080	0.9280
D62	0.753126	0.8219	0.9867	0.3642
D71	0.874866	0.8200	0.1331	0.7163
D72	0.558927	0.8329	5.6106	0.0206
D81	0.650293	0.8355	6.8250	0.0110
D101	0.785265	0.8247	2.0683	0.1560
D102	0.551596	0.8221	0.9663	0.3289
D111	0.902972	0.8219	0.9101	0.3433
D112	0.910730	0.8199	0.0987	0.7543
D121	0.940050	0.8209	0.4926	0.4851
D122	.	0.8197	.	.
D131	0.964706	0.8316	5.0368	0.0279
D133	0.882626	0.8245	1.9672	0.1651
D141	0.903025	0.8216	0.7606	0.3861
D142	0.996112	0.8197	0.0373	0.8474

Step 4 Variable D81 Entered R-square = 0.03546735 C(p) = 90.85139559

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	4	1.24603889	0.31150922	90.13	0.0001
Error	71	0.24538810	0.00345617		
Total	75	1.49142699			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.67344070	0.01630741	3.78446372	1096.99	0.0001
D81	0.05250805	0.02009895	0.02350850	6.83	0.0110
D82	0.12108947	0.02524108	0.07956110	23.01	0.0001
D91	0.12209399	0.02263284	0.10057064	29.10	0.0001
D92	0.24936077	0.02372254	0.38180198	110.49	0.0001

Bounds on condition number: 3.085148, 36.6088

FORWARD selection procedure

Statistics for Entry: Step 5
DF = 1,70

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.830110	0.0355	0.0016	0.9704
D12	0.885527	0.0160	0.2366	0.6284
D21	0.906393	0.0484	5.9940	0.0169
D22	0.742827	0.0406	2.1560	0.1465
D31	0.913006	0.0360	0.2397	0.6259
D32	0.715988	0.0355	0.0013	0.9716
D61	0.983167	0.0516	7.5961	0.0075
D62	0.838792	0.0382	1.1639	0.2844
D51	0.860995	0.0356	0.0531	0.8185
D52	0.797593	0.0442	3.9105	0.0519
D61	0.686250	0.0361	0.2028	0.5965
D62	0.728263	0.0361	0.2725	0.6033
D71	0.857523	0.0368	0.5696	0.4530
D72	0.555725	0.0510	7.3194	0.0088
D101	0.774060	0.0387	1.6109	0.2189
D102	0.583653	0.0397	1.8631	0.1789
D111	0.940132	0.0360	0.2067	0.6508
D112	0.905588	0.0361	0.2745	0.6020
D121	0.928254	0.0379	1.0647	0.3057
D122	.	0.0355	.	.
D131	0.960679	0.0476	5.5525	0.0211
D132	0.882261	0.0400	1.9747	0.1664
D141	0.901795	0.0370	0.6568	0.4204
D142	0.993905	0.0356	0.0568	0.8123

Step 5 Variable D41 Entered R-square = 0.85157397 C(p) = 77.49672140

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	5	1.27005870	0.25401174	80.32	0.0001
Error	70	0.22136629	0.00316238		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.45600707	0.01507688	2.89289965	914.79	0.0001
D41	0.03691038	0.01339220	0.02402181	7.60	0.0075
D81	0.05350707	0.01922977	0.02456673	7.77	0.0068
D82	0.13130020	0.02414467	0.07992287	25.27	0.0001
D91	0.12362467	0.02165490	0.10273187	32.49	0.0001
D92	0.25397808	0.02275363	0.39600763	124.59	0.0001

Bounds on condition number: 3.101964, 50.94079

FORWARD selection procedure

Statistics for Entry: Step 6
DF = 1,69

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.819359	0.0510	0.1206	0.7292
D12	0.883210	0.0525	0.4327	0.5177
D21	0.868416	0.0500	6.0526	0.0400
D22	0.735318	0.0549	1.5003	0.2130
D31	0.864905	0.0516	0.0145	0.9045
D32	0.713268	0.0516	0.0173	0.8957
D62	0.527652	0.0776	14.6625	0.0003
D51	0.832651	0.0517	0.0677	0.7955
D52	0.777598	0.0648	6.7293	0.0116
D61	0.666730	0.0516	0.0088	0.9256
D62	0.728260	0.0522	0.3045	0.5829
D71	0.846536	0.0521	0.2382	0.6329
D72	0.526743	0.0613	4.0170	0.0315
D101	0.738521	0.0523	0.3383	0.5644
D102	0.531636	0.0580	3.5110	0.0652
D111	0.937653	0.0524	0.2813	0.5389
D112	0.895672	0.0531	0.7006	0.4020
D121	0.927534	0.0537	1.0037	0.3199
D122	.	0.0516	.	.
D131	0.963165	0.0627	5.5725	0.0211
D132	0.880089	0.0553	1.7721	0.1875
D141	0.899629	0.0527	0.5070	0.4785
D142	0.939917	0.0535	0.0907	0.3406

Step 6 Variable D62 Entered R-square = 0.87758678 C(p) = 56.69832868

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	6	1.30885405	0.21814267	82.44	0.0001
Error	69	0.18257016	0.00264596		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.41279393	0.01781989	1.41903281	536.41	0.0001
D41	0.07266623	0.01537120	0.05888475	22.32	0.0001
D62	0.06556251	0.01712189	0.03879615	14.66	0.0003
D81	0.04405185	0.01771732	0.01691886	6.39	0.0137
D82	0.09748860	0.02284981	0.04774526	18.04	0.0001
D91	0.15013193	0.02157215	0.13861730	52.39	0.0001
D92	0.26703305	0.02169837	0.42617232	160.51	0.0001

Bounds on condition number: 3.1852, 79.91036

FORWARD selection procedure

Statistics for Entry: Step 7
DF = 1,68

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.817618	0.8777	0.0643	0.8339
D12	0.870016	0.8801	1.4265	0.2365
D21	0.843167	0.8921	9.1884	0.0035
D22	0.805297	0.8777	0.0699	0.7923
D31	0.829288	0.8791	0.8612	0.3567
D32	0.699719	0.8786	0.4575	0.5011
D51	0.831927	0.8779	0.1576	0.6926
D52	0.760337	0.8868	5.0320	0.0281
D61	0.655293	0.8778	0.1247	0.7251
D62	0.551667	0.8813	1.1527	0.1469
D71	0.810708	0.8777	0.0695	0.7928
D72	0.517766	0.8837	3.5595	0.0635
D101	0.725801	0.8790	0.7726	0.3826
D102	0.509681	0.8806	1.6127	0.2084
D111	0.937653	0.8784	0.4517	0.5038
D112	0.872718	0.8778	0.0960	0.7566
D121	0.901264	0.8780	0.2060	0.6508
D122	.	0.8776	.	.
D131	0.961522	0.8902	7.8316	0.0067
D132	0.883589	0.8778	0.1098	0.7416
D141	0.892755	0.8779	0.1991	0.6569
D142	0.928840	0.8785	0.4895	0.4865

› 7 Variable D21 Entered R-square = 0.89213074 C(p) = 42.83334932

	DF	Sum of Squares	Mean Square	F	Prob>F
;ression	7	1.33054608	0.19007801	80.34	0.0001
or	68	0.16087890	0.00236587		
al	75	1.49142499			

lable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
ERCEP	0.40586516	0.01700596	1.34746101	569.53	0.0001
	0.03866256	0.01269595	0.02169123	9.17	0.0035
	0.07001139	0.01455767	0.05472103	23.13	0.0001
	0.07621237	0.01660864	0.06820753	28.30	0.0001
	0.06517105	0.01677264	0.01715963	7.25	0.0089
	0.10294061	0.02177599	0.05287803	22.35	0.0001
	0.14848191	0.02055362	0.12347215	52.19	0.0001
	0.35227205	0.02053011	0.35722827	150.99	0.0001

ds on condition number: 3.375525, 103.6805

FORWARD selection procedure

Statistics for Entry: Step 0
DF = 1,67

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.816230	0.8921	0.0098	0.9213
D12	0.861122	0.8930	0.5415	0.4644
D22	0.220001	0.9120	15.1272	0.0002
D31	0.828039	0.8961	1.2155	0.2743
D32	0.698688	0.8927	0.3594	0.5508
D51	0.819638	0.8921	0.0030	0.9567
D52	0.755245	0.8989	4.6825	0.0309
D61	0.651247	0.8922	0.0188	0.8912
D62	0.369060	0.8922	0.0650	0.7996
D71	0.778291	0.8934	0.8167	0.3694
D72	0.488026	0.8947	1.6291	0.2062
D101	0.718625	0.8928	0.3971	0.5307
D102	0.502407	0.8937	0.9645	0.3296
D111	0.937467	0.8920	0.4467	0.5062
D112	0.872089	0.8924	0.1602	0.6918
D121	0.906197	0.8921	0.0085	0.9268
D122	.	0.8921	.	.
D131	0.961630	0.9065	6.6951	0.0044
D132	0.883128	0.8924	0.1705	0.6748
D141	0.881660	0.8922	0.0284	0.8666
D142	0.926608	0.8934	0.8055	0.3727

Step 0 Variable D22 Entered R-square = 0.91199930 C(p) = 25.89220602

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	8	1.36017867	0.17002233	86.79	0.0001
Error	67	0.13124632	0.00195890		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42838910	0.01652420	1.31657035	672.10	0.0001
D21	0.09788759	0.01915884	0.05113630	26.10	0.0001
D22	0.08958784	0.02303385	0.02963258	15.13	0.0002
D41	0.03476287	0.01604893	0.00918041	4.69	0.0339
D42	0.04356619	0.01691039	0.01398989	6.83	0.0113
D01	0.03960388	0.01533710	0.01313168	6.70	0.0118
D02	0.09646985	0.01908648	0.04610532	23.54	0.0001
D91	0.10525445	0.02175556	0.04585151	23.41	0.0001
D92	0.18633705	0.02532649	0.10680019	54.56	0.0001

Bounds on condition number: 6.155312, 211.4961

FORWARD selection procedure

Statistics for Entry: Step 9
DF = 1,66

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.776707	0.9133	1.0271	0.3146
D12	0.791530	0.9166	3.4747	0.0668
D31	0.825096	0.9167	2.0700	0.1550
D32	0.698013	0.9128	0.6101	0.4378
D51	0.818658	0.9120	0.0374	0.8472
D52	0.737952	0.9158	2.9767	0.0892
D61	0.598231	0.9143	1.7523	0.1902
D62	0.357866	0.9122	0.1591	0.6912
D71	0.735757	0.9170	4.0056	0.0495
D72	0.661966	0.9121	0.0442	0.8342
D101	0.700086	0.9120	0.0056	0.9410
D102	0.690711	0.9158	2.9490	0.0906
D111	0.805172	0.9149	2.3469	0.1307
D112	0.833661	0.9142	1.7119	0.1953
D121	0.985057	0.9120	0.0007	0.9795
D122	.	0.9120	.	.
D131	0.941658	0.9205	7.0317	0.0100
D132	0.798563	0.9130	0.0300	0.8631
D141	0.889637	0.9123	0.1762	0.6761
D142	0.854537	0.9181	4.9223	0.0300

ep 9 Variable D131 Entered R-square = 0.92047237 C(p) = 19.81486436

	DF	Sum of Squares	Mean Square	F	Prob>F
legression	9	1.37281569	0.15253505	84.88	0.0001
Error	66	0.11860858	0.00179711		
Total	75	1.49142699			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.41622222	0.01647805	1.14669545	637.96	0.0001
D21	0.09198807	0.01840517	0.04469935	24.76	0.0001
D22	0.06110810	0.02229267	0.02178926	13.24	0.0005
D41	0.03800176	0.01542131	0.01091209	6.07	0.0163
D42	0.06803252	0.01620510	0.01563375	8.70	0.0044
D81	0.06015509	0.01460161	0.01366195	7.60	0.0080
D82	0.10279223	0.01919656	0.05153958	28.68	0.0001
D91	0.10727131	0.02085166	0.04756217	26.47	0.0001
D92	0.18821098	0.02617266	0.10894765	60.62	0.0001
D131	0.02680945	0.01011015	0.01263682	7.03	0.0100

unds on condition number: 6.160577, 249.5205

FORWARD selection procedure

Statistics for Entry: Step 10
DF = 1,65

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.753630	0.9209	0.3896	0.5347
D12	0.770514	0.9232	2.3917	0.1269
D31	0.726100	0.9209	0.3551	0.5533
D32	0.633697	0.9205	0.0002	0.9893
D51	0.796563	0.9210	0.4161	0.5212
D52	0.723126	0.9262	5.0093	0.0286
D61	0.596735	0.9223	1.5588	0.2163
D62	0.357788	0.9206	0.1425	0.7078
D71	0.733614	0.9263	5.0961	0.0273
D72	0.626623	0.9206	0.0762	0.7836
D101	0.699378	0.9205	0.0241	0.8778
D102	0.689726	0.9238	2.7974	0.0992
D111	0.867186	0.9217	1.0591	0.3072
D112	0.831362	0.9223	1.5197	0.2221
D121	0.813622	0.9212	0.5784	0.4497
D122	.	0.9205	.	.
D131	0.611815	0.9301	9.9290	0.0040
D141	0.856645	0.9216	0.7076	0.3781
D142	0.830120	0.9244	3.4006	0.0694

Step10 Variable D132 Entered R-square = 0.93007756 C(p) = 12.65809411

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	10	1.38716091	0.13871609	86.46	0.0001
Error	65	0.10426608	0.00160417		
Total	75	1.49142699			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39841886	0.01647111	0.91633758	571.15	0.0001
D21	0.08258653	0.01774667	0.03470476	21.63	0.0001
D22	0.06580128	0.02167726	0.01478307	9.21	0.0035
D41	0.03247563	0.01660778	0.00786336	4.89	0.0306
D42	0.05197884	0.01575120	0.00932348	5.81	0.0188
D81	0.06206443	0.01388667	0.01472186	9.18	0.0035
D82	0.09513776	0.01831698	0.04328598	26.98	0.0001
D91	0.11150967	0.01975275	0.05112968	31.87	0.0001
D92	0.19377761	0.02391845	0.11472417	71.51	0.0001
D131	0.05467156	0.01330233	0.02690166	16.77	0.0001
D132	0.04670224	0.01495987	0.01532542	9.93	0.0040

Bounds on condition number: 6.281563, 317.9187

FORWARD selection procedure

Statistics for Entry: Step 11
DF = 1,64

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.753409	0.9306	0.6578	0.5011
D12	0.767288	0.9322	1.9790	0.1643
D31	0.726099	0.9305	0.6027	0.5279
D32	0.630666	0.9301	0.0687	0.9261
D51	0.739696	0.9329	2.6963	0.1055
D52	0.723019	0.9356	5.6768	0.0224
D61	0.593103	0.9327	2.4684	0.1211
D62	0.356915	0.9301	0.0179	0.8939
D71	0.691210	0.9330	2.7917	0.0996
D72	0.426550	0.9301	0.0652	0.7993
D101	0.679597	0.9302	0.1152	0.7356
D102	0.485020	0.9365	6.2935	0.0023
D111	0.867052	0.9313	1.3377	0.2501
D112	0.826696	0.9313	1.1564	0.2862
D121	0.797773	0.9302	0.1555	0.6947
D122	.	0.9301	.	.
D141	0.852099	0.9306	0.5218	0.6727
D142	0.800160	0.9322	1.9715	0.1651

Step11 Variable D52 Entered R-square = 0.93558951 C(p) = 9.40366622

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	11	1.39536150	0.12685105	84.51	0.0001
Error	64	0.09606341	0.00150099		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39232645	0.01633386	0.86595706	576.92	0.0001
D31	0.07516320	0.01745690	0.02782988	18.54	0.0001
D32	0.05766607	0.02135344	0.01104995	7.36	0.0085
D41	0.03696041	0.01633537	0.00997778	6.65	0.0122
D42	0.03596993	0.01525926	0.00834040	5.56	0.0215
D52	0.02603338	0.01112613	0.00822067	5.48	0.0224
D81	0.04594607	0.01353384	0.01729968	11.53	0.0012
D82	0.08562695	0.01817626	0.03331116	22.19	0.0001
D91	0.10788078	0.01916857	0.04756301	31.67	0.0001
D92	0.19581377	0.02210194	0.11696758	77.93	0.0001
D131	0.05731202	0.01292364	0.03951886	19.67	0.0001
D132	0.04428078	0.01447095	0.01405955	9.37	0.0032

Bounds on condition number: 6.211119, 370.3669

FORWARD selection procedure

Statistics for Entry: Step 12
DF = 1,63

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.752722	0.9362	0.5965	0.6636
D12	0.756089	0.9370	1.3755	0.2453
D31	0.711619	0.9357	0.1228	0.7274
D32	0.627330	0.9356	0.0036	0.9523
D51	0.399560	0.9356	0.0186	0.8918
D61	0.584041	0.9376	1.7029	0.1866
D62	0.350312	0.9356	0.0550	0.8154
D71	0.682289	0.9377	2.1327	0.1492
D72	0.423077	0.9358	0.2269	0.6355
D101	0.679329	0.9350	0.1577	0.6926
D102	0.481724	0.9392	3.4951	0.0591
D111	0.821669	0.9359	0.3347	0.5649
D112	0.823325	0.9365	0.9369	0.3373
D121	0.791770	0.9360	0.3753	0.5423
D122	.	0.9356	.	.
D141	0.852099	0.9362	0.5575	0.6580
D142	0.729076	0.9362	0.6039	0.4486

Step12 Variable D102 Entered R-square = 0.93915802 C(p) = 8.00155425

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	12	1.40060376	0.11672364	81.06	0.0001
Error	63	0.09074125	0.00144034		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39598457	0.01611320	0.86987596	603.84	0.0001
D31	0.07695609	0.01712512	0.02908654	20.19	0.0001
D32	0.06359413	0.02106076	0.01315006	9.13	0.0036
D41	0.03399648	0.01612714	0.00834111	5.79	0.0191
D42	0.02772246	0.01555133	0.00657712	3.18	0.0795
D52	0.02610193	0.01094328	0.00898671	6.05	0.0313
D81	0.04937933	0.01337733	0.01903519	13.63	0.0005
D82	0.08102651	0.01705655	0.03113085	21.62	0.0001
D91	0.10372069	0.01896021	0.04324017	29.33	0.0001
D92	0.17889968	0.02430088	0.07461069	51.80	0.0001
D102	0.02593847	0.01349376	0.00532216	3.70	0.0591
D131	0.05703213	0.01266215	0.03006392	20.86	0.0001
D132	0.04677301	0.01423634	0.01555178	10.80	0.0017

Bounds on condition number: 7.760298, 453.9639

FORWARD selection procedure

Statistics for Entry: Step 13
DF = 1,62

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.752292	0.9398	0.6952	0.4076
D12	0.755733	0.9406	1.5402	0.2193
D31	0.703793	0.9392	0.0258	0.8730
D32	0.622617	0.9392	0.0109	0.9171
D51	0.399522	0.9392	0.0142	0.9057
D61	0.503561	0.9408	1.7096	0.1959
D62	0.334093	0.9392	0.0497	0.8244
D71	0.670789	0.9409	1.8288	0.1812
D72	0.622923	0.9394	0.3023	0.6565
D101	0.179361	0.9448	6.3258	0.0145
D111	0.814399	0.9393	0.1687	0.6827
D112	0.799461	0.9396	0.4451	0.5072
D121	0.791131	0.9395	0.3261	0.5700
D122	.	0.9393	.	.
D161	0.812639	0.9393	0.1276	0.7222
D162	0.690458	0.9393	0.1395	0.7202

pi3 Variable D101 Entered R-square = 0.94479081 C(p) = 6.61172944

	DF	Sum of Squares	Mean Square	F	Prob>F
gression	13	1.40900863	0.10839313	81.62	0.0001
ror	62	0.08216036	0.00132807		
tal	75	1.49162899			

riable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
TERCEP	0.60797324	0.01619010	0.84330607	634.99	0.0001
11	0.08818597	0.01690989	0.02185151	16.45	0.0001
12	0.06654619	0.02021341	0.01156110	10.20	0.0022
61	0.02650190	0.01388883	0.00483552	3.64	0.0610
62	0.02132439	0.01514809	0.00263183	1.98	0.1642
52	0.01903378	0.01069961	0.00420377	3.16	0.0802
01	0.04866893	0.01285051	0.01809328	14.23	0.0004
02	0.07948998	0.01720408	0.02835195	21.35	0.0001
91	0.07149567	0.02206273	0.01397172	10.52	0.0018
92	0.12627877	0.03030209	0.02306411	17.37	0.0001
101	0.05166032	0.02046229	0.00840089	6.33	0.0145
102	0.08836747	0.02521665	0.01348313	10.15	0.0023
131	0.05307263	0.01230584	0.02470323	18.60	0.0001
132	0.04063185	0.01388473	0.01137311	8.56	0.0048

unds on condition number: 13.10005, 737.5931

FORWARD selection procedure

Statistics for Entry: Step 14
DF = 1,61

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.726757	0.9469	0.1692	0.6823
D12	0.744211	0.9457	0.9676	0.3292
D31	0.702832	0.9448	0.0056	0.9405
D32	0.622610	0.9448	0.0137	0.9071
D51	0.390957	0.9448	0.0596	0.8079
D61	0.526356	0.9451	0.3522	0.5551
D62	0.330892	0.9450	0.2298	0.6336
D71	0.660816	0.9457	1.0067	0.3197
D72	0.388736	0.9448	0.0637	0.8017
D111	0.810585	0.9448	0.0673	0.7962
D112	0.778733	0.9459	1.2537	0.2672
D121	0.772649	0.9457	0.9878	0.3243
D122	.	0.9448	.	.
D141	0.806511	0.9448	0.0150	0.9028
D142	0.688520	0.9450	0.2591	0.6133

Step14 Variable D112 Entered R-square = 0.94590265 C(p) = 5.57180367

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	14	1.41074284	0.10076735	76.19	0.0001
Error	61	0.08088214	0.00132266		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.60705265	0.01617799	0.83733650	633.07	0.0001
D21	0.07138569	0.01701736	0.02327505	17.60	0.0001
D22	0.06955052	0.02066330	0.01498817	11.33	0.0013
D41	0.02416327	0.01401699	0.00391051	2.97	0.0898
D42	0.01803530	0.01539998	0.00181607	1.37	0.2461
D52	0.01810933	0.01070966	0.00378182	2.86	0.0960
D81	0.04908633	0.01283607	0.01914057	14.47	0.0003
D82	0.07991629	0.01717362	0.02065517	31.47	0.0001
D91	0.06573035	0.02259156	0.01119800	8.47	0.0050
D92	0.11692751	0.03137236	0.01837320	13.89	0.0000
D101	0.05519672	0.02069055	0.00961236	7.12	0.0098
D102	0.08175670	0.02519667	0.01393563	10.53	0.0019
D112	0.01067927	0.00951771	0.00165021	1.25	0.2672
D131	0.05134966	0.01337659	0.02276759	17.21	0.0001
D132	0.03075330	0.01395761	0.01019631	7.71	0.0075

Bounds on condition number: 14.09924, 841.285

FORWARD selection procedure

Statistics for Entry: Step 15
DF = 1,60

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.687022	0.9463	0.4806	0.4909
D12	0.730572	0.9471	1.3251	0.2542
D31	0.653107	0.9459	0.0523	0.8199
D32	0.574290	0.9461	0.1980	0.6579
D51	0.390319	0.9459	0.0399	0.8423
D61	0.516481	0.9464	0.5710	0.4528
D62	0.317360	0.9464	0.5211	0.4732
D71	0.660480	0.9480	1.0466	0.3104
D72	0.383784	0.9459	0.0164	0.8984
D111	0.679550	0.9459	0.0416	0.8390
D121	0.663216	0.9462	0.3008	0.5395
D122	.	0.9459	.	.
D141	0.788391	0.9460	0.0801	0.7781
D142	0.687994	0.9462	0.2917	0.5911

ep15 Variable D12 Entered R-square = 0.94707155 C(p) = 6.65746944

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	15	1.41240618	0.09416575	71.57	0.0001
rror	60	0.07893881	0.00131565		
otal	75	1.49142499			

ariable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0.40628917	0.01614860	0.83279077	632.99	0.0001
12	0.01146273	0.00995076	0.00174333	1.33	0.2542
31	0.07511235	0.01727011	0.02486393	18.90	0.0001
32	0.07740925	0.02176766	0.01673012	12.72	0.0007
61	0.02332943	0.01398056	0.00365611	2.78	0.1000
62	0.01732169	0.01537159	0.00167066	1.27	0.2643
52	0.01676106	0.01074527	0.00320116	2.43	0.1241
01	0.04553007	0.01316746	0.01573565	11.96	0.0010
02	0.07952140	0.01713179	0.02834800	21.55	0.0001
91	0.06351425	0.02261398	0.01037834	7.89	0.0067
92	0.11307203	0.03166778	0.01690727	12.91	0.0007
101	0.05277316	0.02074258	0.00851608	6.47	0.0135
102	0.07916912	0.02523015	0.01295623	9.85	0.0026
112	0.01217562	0.00960001	0.00211508	1.61	0.2096
131	0.04089523	0.01252652	0.02006526	15.26	0.0002
132	0.03706008	0.01394218	0.00970155	7.37	0.0086

unds on condition number: 16.26073, 941.7116

FORWARD selection procedure

Statistics for Entry: Step 16
DF = 1,59

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.667156	0.9471	0.0032	0.9552
D31	0.650255	0.9472	0.0933	0.7611
D32	0.573820	0.9473	0.2296	0.6336
D51	0.383692	0.9472	0.1242	0.7258
D61	0.502585	0.9474	0.3319	0.5667
D62	0.316635	0.9475	0.4480	0.5059
D71	0.660516	0.9480	1.0086	0.3018
D72	0.383741	0.9471	0.0136	0.9077
D111	0.666485	0.9471	0.0022	0.9630
D121	0.662341	0.9475	0.4369	0.5113
D122	.	0.9471	.	.
D141	0.787927	0.9472	0.0971	0.7566
D142	0.687970	0.9473	0.2860	0.5948

Step16 Variable D71 Entered R-square = 0.94803067 C(p) = 7.54331715

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	16	1.41391633	0.08836977	67.27	0.0001
Error	59	0.07750865	0.00131371		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40086078	0.01602557	0.73735001	561.20	0.0001
D12	0.01161886	0.00995252	0.00179019	1.36	0.2478
D31	0.08223059	0.01856720	0.02577251	19.62	0.0001
D32	0.08174976	0.02252670	0.01815798	13.82	0.0004
D61	0.02403970	0.01408291	0.00409865	3.12	0.0826
D62	0.02071315	0.01570040	0.00228649	1.74	0.1922
D52	0.01580561	0.01077007	0.00285008	2.18	0.1455
D71	0.01865796	0.01769056	0.00143018	1.09	0.3018
D81	0.04236029	0.01350566	0.01393367	9.86	0.0027
D82	0.07920861	0.01712073	0.02817006	21.44	0.0001
D91	0.06665893	0.02279748	0.01122167	8.55	0.0049
D92	0.11051024	0.03107368	0.01816148	13.82	0.0004
D101	0.04939111	0.02009423	0.00736163	5.61	0.0223
D102	0.07667266	0.02561033	0.01110868	8.46	0.0051
D112	0.01234794	0.00958515	0.00217561	1.66	0.2032
D131	0.08730341	0.01280991	0.01848670	14.07	0.0004
D132	0.03458678	0.01428074	0.00770579	5.87	0.0185

Bounds on condition number: 16.65243, 1060.029

FORWARD selection procedure

Statistics for Entry: Step 17
DF = 1,58

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.458926	0.9481	0.0102	0.9458
D31	0.666601	0.9482	0.1670	0.7020
D32	0.573617	0.9483	0.2573	0.6139
D51	0.369839	0.9481	0.0267	0.8756
D61	0.478629	0.9481	0.1202	0.7216
D62	0.310875	0.9483	0.2050	0.5955
D72	0.235963	0.9489	0.9510	0.3335
D111	0.659181	0.9480	0.0038	0.9508
D121	0.669656	0.9483	0.2725	0.6037
D122	.	0.9480	.	.
D141	0.787461	0.9481	0.1137	0.7373
D142	0.671624	0.9482	0.1639	0.7058

:p17 Variable D72 Entered R-square = 0.94886883 C(p) = 8.74409882

	DF	Sum of Squares	Mean Square	F	Prob>F
gression	17	1.41516660	0.08324510	63.31	0.0001
ror	58	0.07625831	0.00131480		
tal	75	1.49142499			

riable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
TERCEP	0.39389337	0.01841836	0.60133227	457.36	0.0001
2	0.01160178	0.00995667	0.00178517	1.36	0.2487
1	0.07790817	0.01909834	0.02187932	16.64	0.0001
2	0.08079388	0.02273907	0.01659857	12.63	0.0008
1	0.02303599	0.01010035	0.00375402	2.86	0.0966
2	0.02203024	0.01576560	0.00256917	1.95	0.1675
2	0.01336011	0.01107950	0.00191408	1.46	0.2325
1	0.03211610	0.01256936	0.00366236	2.02	0.1601
2	0.02153975	0.02308792	0.00125035	0.95	0.3335
1	0.04176639	0.01352497	0.01253035	9.54	0.0031
2	0.07930619	0.01712707	0.02018674	21.44	0.0001
1	0.05732599	0.02473352	0.00706302	5.37	0.0240
2	0.10771011	0.03375250	0.01339129	10.19	0.0023
01	0.05303035	0.02151250	0.00823266	6.26	0.0152
02	0.07916030	0.02606796	0.01212461	9.22	0.0036
12	0.01111537	0.00960199	0.00173202	1.32	0.2557
33	0.04353913	0.01319551	0.01430750	10.88	0.0017
33	0.03177909	0.01457374	0.00625204	4.76	0.0333

nds on condition number: 16.61730, 1294.174

FORWARD selection procedure

Statistics for Entry: Step 18
DF = 1,57

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.458667	0.9489	0.0297	0.8638
D31	0.666078	0.9490	0.1272	0.7227
D32	0.562105	0.9490	0.1600	0.7006
D51	0.362200	0.9489	0.0005	0.7672
D61	0.478613	0.9490	0.1306	0.7191
D62	0.309667	0.9491	0.2197	0.6411
D111	0.650636	0.9489	0.0300	0.8631
D121	0.663985	0.9492	0.3709	0.5407
D122	.	0.9489	.	.
D141	0.772339	0.9489	0.0618	0.8305
D142	0.633907	0.9489	0.0158	0.9005

No other variable met the 0.5000 significance level for entry into the model.

Summary of Forward Selection Procedure for Dependent Variable Y

Step	Variable Entered	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	D92	1	0.6217	0.6217	208.6209	121.6217	0.0001
2	D91	2	0.1598	0.7815	130.3530	53.6103	0.0001
3	D82	3	0.0381	0.8197	103.9291	15.2116	0.0002
4	D81	4	0.0158	0.8355	90.8514	6.0250	0.0116
5	D41	5	0.0161	0.8516	77.6967	7.5961	0.0075
6	D42	6	0.0260	0.8776	56.6983	10.6625	0.0001
7	D31	7	0.0165	0.8921	43.0333	9.1686	0.0035
8	D22	8	0.0199	0.9120	25.8923	15.1273	0.0002
9	D131	9	0.0085	0.9205	19.0169	7.0317	0.0100
10	D132	10	0.0096	0.9301	12.6501	8.9280	0.0040
11	D52	11	0.0055	0.9356	9.4035	5.6760	0.0234
12	D103	12	0.0036	0.9392	8.0016	3.6951	0.0591
13	D101	13	0.0056	0.9448	6.0317	6.3256	0.0145
14	D112	14	0.0011	0.9459	5.9710	1.3937	0.2672
15	D13	15	0.0012	0.9471	6.6575	1.3251	0.2563
16	D71	16	0.0010	0.9480	7.5433	1.0886	0.3010
17	D72	17	0.0008	0.9489	8.7441	0.9530	0.3335

FORWARD selection procedure

odel: MODEL1
ependent Variable: Y

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	17	1.41517	0.08325	63.314	0.0001
Error	58	0.07626	0.00131		
C Total	75	1.49142			

Root MSE	0.03626	R-square	0.9489
Dep Mean	0.67099	Adj R-sq	0.9339
C.V	5.40333		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.393893	0.01861036	21.306	0.0001
D12	1	0.011602	0.00995667	1.165	0.2487
D21	1	0.077990	0.01909036	4.079	0.0001
D22	1	0.080796	0.02273987	3.553	0.0008
D41	1	0.023036	0.01610835	1.430	0.0964
D42	1	0.022030	0.01576560	1.398	0.1675
D52	1	0.013368	0.01107950	1.207	0.2325
D71	1	0.032116	0.02256936	1.423	0.1601
D72	1	0.021540	0.02200792	0.975	0.3335
D81	1	0.041766	0.01352697	3.088	0.0031
D82	1	0.079304	0.01712787	4.630	0.0001
D91	1	0.057328	0.02473352	2.318	0.0248
D92	1	0.107718	0.03375250	3.191	0.0023
D101	1	0.053036	0.02151250	2.502	0.0152
D102	1	0.079140	0.02606796	3.037	0.0036
D111	1	0.011115	0.00960199	1.140	0.2557
D131	1	0.043529	0.01319551	3.299	0.0017
D132	1	0.031700	0.01457374	2.191	0.0333

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STEPWISE selection procedure

Stepwise Procedure for Dependent Variable Y

Statistics for Entry: Step 1
DF = 1,74

Variable	Tolerance	Model R**2	F	Prob>F
D11	1.000000	0.0881	7.1530	0.0092
D12	1.000000	0.0671	5.0577	0.0597
D21	1.000000	0.0980	8.1101	0.0057
D22	1.000000	0.2653	26.7197	0.0001
D31	1.000000	0.0670	5.3168	0.0239
D32	1.000000	0.1587	13.9804	0.0004
D41	1.000000	0.0002	0.0157	0.9005
D42	1.000000	0.0330	2.5073	0.1178
D51	1.000000	0.0073	0.5467	0.4620
D52	1.000000	0.0606	4.6143	0.0225
D61	1.000000	0.0058	0.4281	0.5150
D62	1.000000	0.0575	4.3155	0.0169
D71	1.000000	0.1095	9.1022	0.0025
D72	1.000000	0.4400	58.1544	0.0001
D81	1.000000	0.1811	16.3676	0.0001
D82	1.000000	0.1462	13.4690	0.0007
D91	1.000000	0.0264	2.0104	0.1604
D92	1.000000	0.6317	121.6217	0.0001
D101	1.000000	0.0706	5.3006	0.0162
D102	1.000000	0.3366	37.5535	0.0001
D111	1.000000	0.0024	0.1813	0.6715
D112	1.000000	0.0676	5.3633	0.0234
D121	1.000000	0.0253	1.9232	0.1697
D122	.	0.0000	.	.
D131	1.000000	0.0267	2.0308	0.1583
D132	1.000000	0.0328	2.4865	0.1193
D141	1.000000	0.0427	3.2978	0.0734
D142	1.000000	0.0053	0.3975	0.5303

Step 1 Variable D92 Entered R-square = 0.63171691 C(p) =288.63093004

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	1	0.93726712	0.93726712	121.62	0.0001
Error	74	0.56617786	0.00762403		
Total	75	1.49143499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.56355556	0.01455261	11.39387511	1494.26	0.0001
D92	0.22121944	0.02005939	0.93726712	121.62	0.0001

Bounds on condition number: 1, 1

STEPWISE selection procedure

Statistics for Entry: Step 2
DF = 1,73

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.862370	0.6220	0.0601	0.8071
D12	0.970060	0.6284	1.3139	0.2554
D21	0.956663	0.6452	4.8238	0.0312
D22	0.806527	0.6560	7.6662	0.0079
D31	0.972427	0.6386	3.4017	0.0692
D32	0.720999	0.6222	0.0870	0.7679
D41	0.906927	0.6363	2.5140	0.1171
D42	0.962530	0.6218	0.0131	0.9092
D51	0.981408	0.6222	0.0962	0.7598
D52	0.997769	0.6721	11.2288	0.0013
D61	0.907113	0.6515	6.2474	0.0147
D62	0.836600	0.6293	1.4654	0.2300
D71	0.807279	0.6267	0.9665	0.3288
D72	0.749106	0.7179	26.8865	0.0001
D81	0.822222	0.6323	2.0939	0.1522
D82	0.972587	0.6869	15.1972	0.0002
D91	0.629630	0.7015	53.6103	0.0001
D101	0.995230	0.6730	11.6418	0.0012
D102	0.586615	0.6306	1.7531	0.1896
D111	0.999564	0.6261	0.8405	0.3600
D112	0.918536	0.6230	0.2562	0.6142
D121	0.962963	0.6236	0.1746	0.6775
D122	.	0.6217	.	.
D131	0.992675	0.6300	1.7996	0.1839
D132	0.990291	0.6323	2.1093	0.1508
D141	0.914007	0.6217	0.0033	0.9544
D142	0.995741	0.6222	0.0909	0.7640

Step 2 Variable D91 Entered R-square = 0.78154855 C(p) =138.25298181

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	2	1.16562104	0.58281052	130.59	0.0001
Error	73	0.32580395	0.00446307		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.47652941	0.01620288	3.86036476	864.96	0.0001
D91	0.16399698	0.02290318	0.23837393	53.41	0.0001
D92	0.30726559	0.01934193	1.12617367	252.33	0.0001

Bounds on condition number: 1.588235, 6.352941

STEPWISE selection procedure

Statistics for Removal: Step 3
DF = 1,73

Variable	Partial R**2	Model R**2
D91	0.1598	0.6217
D92	0.7551	0.0266

Statistics for Entry: Step 3
DF = 1,72

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.861105	0.7016	0.0015	0.9691
D12	0.960602	0.7017	0.0089	0.0255
D21	0.924050	0.7081	2.2346	0.1402
D22	0.782826	0.7961	5.1332	0.0265
D31	0.918810	0.7029	0.4525	0.5033
D32	0.720923	0.7018	0.0075	0.7557
D41	0.903699	0.7075	5.6836	0.0198
D42	0.874878	0.7021	3.4469	0.0682
D51	0.980516	0.7016	0.0331	0.8561
D52	0.965776	0.8057	0.9886	0.0010
D61	0.706633	0.7018	0.0086	0.1566
D62	0.836536	0.7020	3.9251	0.0514
D71	0.878021	0.7025	0.3270	0.5692
D72	0.561128	0.7077	5.7325	0.0193
D81	0.740960	0.7021	0.1930	0.6611
D82	0.940811	0.8197	15.3116	0.0002
D101	0.792857	0.7063	0.8909	0.3486
D102	0.586615	0.7906	3.0670	0.0851
D111	0.999307	0.7068	1.7672	0.1879
D112	0.918493	0.7027	0.3761	0.5417
D121	0.961856	0.7035	0.6367	0.4275
D122	.	0.7015	.	.
D131	0.990246	0.7074	1.9837	0.1633
D132	0.988137	0.7902	5.9588	0.0171
D141	0.910043	0.7052	1.3350	0.2701
D142	0.995622	0.7018	0.0991	0.7539

Step 3 Variable D82 Entered R-square = 0.81965127 C(p) =103.92910001

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	3	1.22244818	0.40748273	109.08	0.0001
Error	72	0.26897660	0.00373579		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.47652941	0.01483486	3.86036476	1033.35	0.0001
D82	0.07978892	0.02065761	0.05682738	15.21	0.0002
D91	0.15039865	0.02065939	0.19798869	53.00	0.0001
D92	0.29128701	0.01916280	0.96006191	257.20	0.0001

STEPWISE selection procedure

inds on condition number: 1.673141, 13.06538

Statistics for Removal: Step 4
DF = 1,72

Variable	Partial R**2	Model R**2
D02	0.0301	0.7815
D91	0.1320	0.6869
D92	0.6463	0.1756

Statistics for Entry: Step 4
DF = 1,71

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.836111	0.8198	0.0628	0.8028
D12	0.914220	0.8217	0.8233	0.3676
D21	0.905336	0.8317	5.0870	0.0272
D22	0.751424	0.8266	3.0316	0.0960
D31	0.913219	0.8201	0.1871	0.6666
D32	0.728360	0.8198	0.0517	0.8208
D41	0.903582	0.8351	6.6526	0.0120
D42	0.861954	0.8240	1.7570	0.1891
D51	0.915698	0.8214	0.6867	0.4101
D52	0.883023	0.8265	2.7967	0.0998
D61	0.703605	0.8197	0.0080	0.9289
D62	0.753124	0.8219	0.9087	0.3442
D71	0.874066	0.8200	0.1331	0.7163
D72	0.858927	0.8329	5.8186	0.0206
D101	0.650293	0.8355	6.8250	0.0110
D102	0.705365	0.8247	2.0403	0.1560
D111	0.551598	0.8231	0.9663	0.3289
D112	0.902972	0.8219	0.9101	0.3413
D113	0.910738	0.8199	0.0987	0.7543
D121	0.940050	0.8209	0.4926	0.4851
D122	.	0.8197	.	.
D131	0.966706	0.8316	5.0368	0.0279
D132	0.883626	0.8265	1.9672	0.1651
D141	0.903025	0.8216	0.7886	0.3861
D142	0.994112	0.8197	0.0373	0.8474

Step 4 Variable D01 Entered R-square = 0.83546735 C(p) = 90.85139559

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	4	1.24603689	0.31150922	90.13	0.0001
Error	71	0.24538810	0.00345617		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.47366970	0.01430761	3.78666372	1096.99	0.0001
D01	0.05250805	0.02009895	0.02358850	6.83	0.0110

STEPWISE selection procedure

D02	0.12108947	0.02526108	0.07954118	23.01	0.0001
D91	0.13209399	0.02263284	0.10057866	29.10	0.0001
D92	0.24936077	0.02372254	0.38188198	110.49	0.0001

Bounds on condition number: 3.085148, 36.6088

Statistics for Removal: Step 5
DF = 1,71

Variable	Partial R**2	Model R**2
D01	0.0158	0.8197
D02	0.0533	0.7821
D91	0.0874	0.7480
D92	0.2561	0.5794

Statistics for Entry: Step 5
DF = 1,70

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.830110	0.8355	0.0016	0.9704
D12	0.885537	0.8360	0.2364	0.6284
D21	0.900393	0.8486	5.9948	0.0169
D22	0.742827	0.8404	2.1560	0.1465
D31	0.913006	0.8360	0.2397	0.6259
D32	0.715900	0.8355	0.0013	0.9718
D41	0.903167	0.8516	7.5961	0.0075
D42	0.830792	0.8382	1.1639	0.2844
D51	0.866995	0.8358	0.0531	0.8185
D52	0.787593	0.8462	3.9105	0.0519
D61	0.686250	0.8361	0.2038	0.5965
D62	0.730263	0.8361	0.2735	0.6033
D71	0.857523	0.8360	0.5896	0.4530
D72	0.855725	0.8510	7.3196	0.0086
D101	0.774860	0.8387	1.6109	0.2388
D102	0.563653	0.8397	1.8631	0.1789
D111	0.940132	0.8360	0.2087	0.6508
D113	0.905580	0.8361	0.2745	0.6020
D121	0.928256	0.8379	1.0047	0.3057
D122	.	0.8355	.	.
D131	0.964679	0.8476	5.5525	0.0213
D132	0.882261	0.8400	1.0747	0.1644
D141	0.901795	0.8370	0.6560	0.4200
D142	0.993905	0.8356	0.0560	0.8133

Step 5 Variable D61 Entered R-square = 0.85157397 C(p) = 77.69673140

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	5	1.27005870	0.25401174	80.32	0.0001
Error	70	0.22136629	0.00316238		
Total	75	1.49142499			

Variable	Parameter	Standard	Type II

STEPWISE selection procedure

Variable	Estimate	Error	Sum of Squares	F	Prob>F
INTERCEP	0.45600707	0.01507688	1.89289965	916.79	0.0001
D41	0.03691034	0.01339220	0.02402181	7.60	0.0075
D81	0.05359701	0.01932977	0.02456673	7.77	0.0068
D82	0.12138020	0.02610467	0.07992207	25.27	0.0001
D91	0.12362467	0.02165490	0.10273187	32.49	0.0001
D92	0.25397808	0.01275361	0.39400763	124.59	0.0001

Bounds on condition number: 3.101966, 59.94079

Statistics for Removal: Step 6
DF = 1,70

Variable	Partial R**2	Model R**2
D41	0.0161	0.8155
D81	0.0165	0.8151
D82	0.0536	0.7980
D91	0.0609	0.7927
D92	0.2602	0.5874

Statistics for Entry: Step 6
DF = 1,69

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.819359	0.8518	0.1246	0.7252
D12	0.883210	0.8525	0.4227	0.5177
D21	0.869416	0.8590	4.0526	0.0600
D22	0.735310	0.8540	1.5803	0.2130
D31	0.866905	0.8516	0.0145	0.9045
D32	0.713260	0.8516	0.0173	0.8957
D62	0.527652	0.8776	14.6625	0.0003
D51	0.832651	0.8517	0.0677	0.7955
D52	0.777599	0.8648	6.7293	0.0116
D61	0.664720	0.8516	0.0088	0.9256
D62	0.720260	0.8523	0.3045	0.5820
D71	0.866536	0.8531	0.2302	0.6329
D72	0.526763	0.8613	4.0174	0.0315
D101	0.720521	0.8523	0.3353	0.5646
D102	0.531436	0.8588	3.5110	0.0652
D111	0.937653	0.8524	0.3013	0.5389
D112	0.895672	0.8531	0.7086	0.4028
D121	0.927536	0.8537	1.0037	0.3199
D122	.	0.8516	.	.
D131	0.963365	0.8627	5.5725	0.0211
D132	0.888089	0.8553	1.7721	0.1875
D141	0.899628	0.8527	0.5078	0.4785
D142	0.935917	0.8535	0.8907	0.3486

STEPWISE selection procedure

Step 6 Variable D62 Entered R-square = 0.87758678 C(p) = 56.69832664

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	6	1.30885685	0.21814247	81.66	0.0001
Error	69	0.18257014	0.00266594		
Total	75	1.49182699			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.41279393	0.01781989	1.61983281	536.61	0.0001
D41	0.07266623	0.01537120	0.05880675	22.22	0.0001
D42	0.06556251	0.01712189	0.03879815	14.66	0.0003
D81	0.04685185	0.01773132	0.01691864	6.39	0.0137
D82	0.09748860	0.02294981	0.04776526	18.04	0.0001
D91	0.15613193	0.02157115	0.13061736	52.39	0.0001
D92	0.26703305	0.02109037	0.42617223	160.31	0.0001

Bounds on condition number: 3.1852, 79.91836

Statistics for Removal: Step 7
DF = 1,69

Variable	Partial R**2	Model R**2
D41	0.0396	0.8382
D42	0.0360	0.8516
D81	0.0113	0.8882
D82	0.0320	0.8456
D91	0.0929	0.7846
D92	0.2884	0.5932

STEPWISE selection procedure

Statistics for Entry: Step 7
DF = 1,68

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.817618	0.8777	0.0663	0.8139
D12	0.870014	0.8801	1.6365	0.2365
D21	0.843167	0.8921	9.1686	0.0035
D22	0.805297	0.8777	0.0699	0.7923
D31	0.829280	0.8791	0.8612	0.3567
D32	0.699719	0.8784	0.4575	0.5011
D51	0.831927	0.8779	0.1578	0.6926
D52	0.760337	0.8860	5.0320	0.0281
D61	0.655293	0.8778	0.1247	0.7251
D62	0.553667	0.8813	2.1527	0.1669
D71	0.810748	0.8777	0.0695	0.7928
D72	0.517766	0.8837	3.5595	0.0635
D101	0.725601	0.8790	0.7726	0.3826
D102	0.509681	0.8804	1.6127	0.2084
D111	0.937653	0.8786	0.4517	0.5038
D112	0.872718	0.8778	0.0960	0.7566
D121	0.901264	0.8780	0.2068	0.6508
D122	.	0.8776	.	.
D131	0.961522	0.8902	7.0316	0.0067
D132	0.883589	0.8778	0.1096	0.7416
D141	0.892755	0.8779	0.1991	0.6569
D142	0.928840	0.8785	0.4895	0.4865

Step 7 Variable D21 Entered R-square = 0.89213076 C(p) = 62.83334932

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	7	1.33056600	0.19007801	80.34	0.0001
Error	68	0.16087899	0.00236587		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40506516	0.01700594	1.34744101	569.53	0.0001
D21	0.03864258	0.01269595	0.02169222	9.17	0.0035
D41	0.07001129	0.01455767	0.05472103	23.13	0.0001
D42	0.07421327	0.01646046	0.04820753	20.38	0.0001
D81	0.04517105	0.01677264	0.01715963	7.25	0.0089
D82	0.10296861	0.02177599	0.05207803	22.35	0.0001
D91	0.10060191	0.02055343	0.12347215	52.19	0.0001
D92	0.25227205	0.02053011	0.35722027	150.99	0.0001

Bounds on condition number: 3.375525, 103.6805

STEPWISE selection procedure

Statistics for Removal: Step 8
DF = 1,68

Variable	Partial R**2	Model R**2
D21	0.0165	0.8776
D41	0.0367	0.8556
D42	0.0323	0.8590
D81	0.0115	0.8806
D82	0.0355	0.8567
D91	0.0028	0.8893
D92	0.2395	0.6526

Statistics for Entry: Step 8
DF = 1,67

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.816238	0.8921	0.0098	0.9213
D12	0.863122	0.8930	0.5615	0.4666
D22	0.320001	0.9130	15.1373	0.0002
D31	0.828039	0.8941	1.2155	0.2742
D32	0.698600	0.8927	0.3594	0.5500
D51	0.819638	0.8921	0.0030	0.9567
D52	0.755245	0.8989	4.0025	0.0380
D61	0.651247	0.8922	0.0108	0.9912
D62	0.369060	0.8922	0.0050	0.7996
D71	0.778291	0.8936	0.8167	0.3696
D72	0.488026	0.8967	1.6291	0.2062
D101	0.718625	0.8928	0.3971	0.5307
D102	0.502407	0.8937	0.9605	0.3286
D111	0.937467	0.8928	0.4467	0.5062
D112	0.872089	0.8924	0.1602	0.6830
D121	0.886197	0.8921	0.0005	0.9260
D122	.	0.8921	.	.
D131	0.961630	0.9065	8.6951	0.0044
D132	0.883128	0.8928	0.1705	0.6760
D141	0.883660	0.8933	0.2286	0.6466
D142	0.926488	0.8930	0.0855	0.3727

Step 8 Variable D22 Entered R-square = 0.91199930 C(p) = 35.89228482

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	8	1.36017867	0.17002233	86.79	0.0001
Error	67	0.13124632	0.00195890		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42038910	0.01652420	1.31657035	672.10	0.0001
D21	0.09780759	0.01915886	0.05111630	26.10	0.0001
D22	0.08958706	0.02303385	0.02963250	15.13	0.0002
D41	0.03476207	0.01604993	0.00918961	4.69	0.0339
D42	0.04356619	0.01691039	0.01298989	6.63	0.0123

STEPWISE selection procedure

D01	0.03960388	0.01532710	0.01313168	6.70	0.0110
D02	0.09646905	0.01909660	0.04610532	23.54	0.0001
D91	0.10525645	0.02175554	0.04585151	23.41	0.0001
D92	0.18633705	0.02522649	0.10688019	54.56	0.0001

Bounds on condition number: 6.155312, 211.4961

Statistics for Removal: Step 9
DF = 1,67

Variable	Partial R**2	Model R**2
D21	0.0143	0.8777
D22	0.0199	0.8921
D41	0.0063	0.9058
D42	0.0057	0.9033
D01	0.0088	0.9032
D02	0.0309	0.0811
D91	0.0307	0.0813
D92	0.0717	0.0803

Statistics for Entry: Step 9
DF = 1,66

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.774707	0.9133	1.0271	0.3166
D12	0.791520	0.9166	3.6767	0.0660
D31	0.825496	0.9167	2.0700	0.1550
D32	0.698012	0.9128	0.6101	0.4376
D51	0.810658	0.9120	0.0376	0.8472
D52	0.737952	0.9150	2.9767	0.0892
D61	0.598231	0.9143	1.7523	0.1902
D62	0.357866	0.9122	0.1591	0.6912
D71	0.735751	0.9170	4.0056	0.0695
D72	0.441966	0.9121	0.0442	0.8342
D101	0.700006	0.9120	0.0056	0.9418
D102	0.690711	0.9158	3.0498	0.0906
D111	0.905173	0.9149	2.2469	0.1387
D112	0.833661	0.9162	1.7119	0.1953
D121	0.805057	0.9120	0.0007	0.9795
D122	.	0.9120	.	.
D131	0.961658	0.9205	7.0317	0.0100
D132	0.798563	0.9120	0.0300	0.8631
D141	0.880437	0.9123	0.1782	0.6761
D142	0.856537	0.9101	4.9233	0.0300

Step 9 Variable D131 Entered R-square = 0.92067237 C(p) = 19.81486616

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	9	1.37281569	0.15253505	84.88	0.0001
Error	66	0.11860950	0.00179711		
Total	75	1.49142499			

STEPWISE selection procedure

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.41622222	0.01647085	1.16649545	637.96	0.0001
D21	0.09199407	0.01860517	0.06469935	26.76	0.0001
D22	0.08110810	0.02229267	0.02378926	13.24	0.0005
D41	0.01800176	0.01562131	0.01091209	6.07	0.0163
D42	0.04803252	0.01628514	0.01563175	8.70	0.0044
D01	0.04015589	0.01468161	0.01346395	7.49	0.0080
D02	0.10279323	0.01919454	0.05153850	28.68	0.0001
D91	0.10727131	0.02005166	0.04756217	26.47	0.0001
D92	0.18821090	0.02617286	0.10896765	60.62	0.0001
D131	0.02600945	0.01011013	0.01263602	7.03	0.0100

Bounds on condition number: 6.160577, 249.5205

Statistics for Removal: Step 10
DF = 1,66

Variable	Partial R**2	Model R**2
D21	0.0298	0.8906
D22	0.0160	0.9065
D41	0.0073	0.9133
D42	0.0105	0.9100
D01	0.0090	0.9115
D02	0.0346	0.0859
D91	0.0319	0.0806
D92	0.0730	0.0476
D131	0.0085	0.9120

Statistics for Entry: Step 10
DF = 1,65

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.751630	0.9209	0.3806	0.5341
D12	0.770516	0.9232	2.2917	0.1349
D31	0.736100	0.9209	0.3551	0.5533
D32	0.633697	0.9205	0.0002	0.9893
D51	0.796561	0.9210	0.4161	0.5213
D52	0.723126	0.9262	5.0092	0.0288
D61	0.596735	0.9223	1.5588	0.2163
D62	0.357788	0.9206	0.1025	0.7078
D71	0.733616	0.9263	5.0961	0.0273
D72	0.426623	0.9206	0.0762	0.7836
D101	0.699378	0.9205	0.0241	0.8778
D102	0.689726	0.9238	3.7976	0.0892
D111	0.867106	0.9217	1.0591	0.3072
D112	0.831362	0.9223	1.5197	0.2221
D121	0.813422	0.9212	0.5706	0.4497
D122	.	0.9205	.	.
D132	0.611015	0.9201	0.9290	0.0660
D141	0.856665	0.9216	0.7076	0.3701
D142	0.828138	0.9246	3.4006	0.0694

STEPWISE selection procedure

tep10 Variable D132 Entered R-square = 0.93007756 C(p) = 12.65809411

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	10	1.38716091	0.13871609	86.46	0.0001
Error	65	0.10629408	0.00160437		
Total	75	1.49163499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39861886	0.01667111	0.91633758	571.15	0.0001
D21	0.08258653	0.01774667	0.03476476	21.66	0.0001
D22	0.06580128	0.02167726	0.01478307	9.21	0.0035
D41	0.03267561	0.01460778	0.00780336	4.89	0.0306
D42	0.03797086	0.01575120	0.00933368	5.81	0.0188
D81	0.06206643	0.01308667	0.01472104	9.18	0.0035
D82	0.09513776	0.01831604	0.04328598	26.98	0.0001
D91	0.11150947	0.01975275	0.05112960	31.87	0.0001
D92	0.19377761	0.02291545	0.11472417	71.51	0.0001
D131	0.05467156	0.01330223	0.02690266	16.77	0.0001
D132	0.04670220	0.01495987	0.01432562	8.93	0.0040

ounds on condition number: 6.201563, 317.9307

Statistics for Removal: Step 11
DF = 1,65

Variable	Partial R**2	Model R**2
D21	0.0233	0.9068
D22	0.0099	0.9202
D41	0.0053	0.9248
D42	0.0063	0.9238
D81	0.0099	0.9202
D82	0.0290	0.9011
D91	0.0343	0.8958
D92	0.0769	0.8532
D131	0.0180	0.9120
D132	0.0096	0.9205

STEPWISE selection procedure

Statistics for Entry: Step 11
DF = 1,64

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.751609	0.9306	0.4578	0.5011
D12	0.767288	0.9322	1.9790	0.1663
D31	0.720099	0.9305	0.4027	0.5279
D32	0.630666	0.9301	0.0687	0.7941
D51	0.729694	0.9329	2.6963	0.1055
D52	0.723019	0.9356	5.4760	0.0226
D61	0.593103	0.9327	2.4684	0.1211
D62	0.356915	0.9301	0.0179	0.8939
D71	0.691210	0.9330	2.7917	0.0986
D72	0.426550	0.9301	0.0652	0.7993
D101	0.679597	0.9302	0.1152	0.7356
D102	0.405020	0.9345	4.2935	0.0423
D111	0.867052	0.9313	1.1377	0.2901
D112	0.826494	0.9313	1.1566	0.2882
D121	0.797773	0.9302	0.1555	0.6967
D122	.	0.9301	.	.
D141	0.852099	0.9306	0.5218	0.4727
D142	0.800140	0.9322	1.9715	0.1651

Step11 Variable D52 Entered R-square = 0.93558951 C(p) = 9.40366622

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	11	1.39536150	0.12685105	84.51	0.0001
Error	64	0.09606161	0.00150099		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39132665	0.01633386	0.86595706	576.92	0.0001
D21	0.07516320	0.01745600	0.02702900	18.56	0.0001
D22	0.05766607	0.02125346	0.01106995	7.36	0.0085
D41	0.03696061	0.01433537	0.00997770	6.65	0.0122
D42	0.03596993	0.01525926	0.00836660	5.56	0.0215
D52	0.02603330	0.01112613	0.00822067	5.48	0.0224
D81	0.06594607	0.01353366	0.01739960	11.59	0.0012
D82	0.08562695	0.01817626	0.03331116	22.19	0.0001
D91	0.10788078	0.01910857	0.04756101	31.67	0.0001
D92	0.19581377	0.02218194	0.11696758	77.93	0.0001
D131	0.05733202	0.01292360	0.02951886	19.67	0.0001
D132	0.04628078	0.01447095	0.01405955	9.37	0.0032

Bounds on condition number: 6.211119, 378.1669

STEPWISE selection procedure

Statistics for Removal: Step 12
DF = 1,64

Variable	Partial R**2	Model R**2
D21	0.0187	0.9169
D22	0.0074	0.9282
D41	0.0067	0.9289
D42	0.0056	0.9300
D52	0.0055	0.9301
D01	0.0116	0.9240
D02	0.0223	0.9133
D91	0.0319	0.9037
D92	0.0784	0.8572
D131	0.0198	0.9158
D132	0.0094	0.9262

Statistics for Entry: Step 12
DF = 1,63

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.752723	0.9362	0.5945	0.4436
D12	0.756089	0.9370	1.3755	0.2453
D31	0.711619	0.9357	0.1226	0.7274
D32	0.627338	0.9356	0.0036	0.9523
D51	0.399560	0.9356	0.0106	0.9918
D61	0.586061	0.9374	1.7029	0.1866
D62	0.350312	0.9358	0.0550	0.8154
D71	0.683289	0.9377	2.1337	0.1492
D72	0.623077	0.9358	0.2269	0.6355
D101	0.679339	0.9358	0.1577	0.6926
D102	0.681726	0.9392	3.6951	0.0591
D111	0.821669	0.9359	0.3347	0.5649
D112	0.823325	0.9365	0.9349	0.3373
D121	0.791770	0.9360	0.3753	0.5423
D122	.	0.9356	.	.
D141	0.852099	0.9362	0.5575	0.4580
D142	0.729076	0.9362	0.6029	0.4404

Step12 Variable D102 Entered R-square = 0.93915802 C(p) = 8.00155625

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	12	1.40068374	0.11672364	81.04	0.0001
Error	63	0.09094125	0.00144034		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39598657	0.01611320	0.86987590	603.94	0.0001
D21	0.07695609	0.01712512	0.02908654	20.19	0.0001
D22	0.06359613	0.02106676	0.01315006	9.13	0.0036
D41	0.03399648	0.01412714	0.00834111	5.79	0.0191
D42	0.02772246	0.01555133	0.00457713	3.18	0.0795

STEPWISE selection procedure

D52	0.02610193	0.01094328	0.00698671	4.85	0.0313
D01	0.06937923	0.01337733	0.01962519	13.63	0.0005
D02	0.08302651	0.01705655	0.03113885	21.63	0.0001
D91	0.10272069	0.01896021	0.04224017	29.33	0.0001
D92	0.17489960	0.02430080	0.07661060	51.00	0.0001
D102	0.02593967	0.01349376	0.00532216	3.70	0.0591
D131	0.05703273	0.01266273	0.03006392	20.86	0.0001
D132	0.04677301	0.01423434	0.01555178	10.80	0.0017

Bounds on condition number: 7.760298, 453.9639

Statistics for Removal: Step 13
DF = 1,63

Variable	Partial R**2	Model R**2
D21	0.0195	0.9197
D22	0.0088	0.9303
D41	0.0058	0.9336
D42	0.0031	0.9361
D52	0.0047	0.9365
D01	0.0132	0.9260
D02	0.0189	0.9103
D91	0.0283	0.9100
D92	0.0500	0.0891
D102	0.0026	0.9356
D131	0.0201	0.9198
D132	0.0104	0.9287

Statistics for Entry: Step 13
DF = 1,62

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.752392	0.9398	0.6953	0.4076
D12	0.755733	0.9406	1.5402	0.2193
D31	0.703793	0.9393	0.0258	0.8730
D32	0.622617	0.9393	0.0109	0.9171
D51	0.399522	0.9393	0.0162	0.8957
D61	0.583561	0.9408	1.7096	0.1959
D62	0.334093	0.9392	0.0497	0.8246
D71	0.678789	0.9409	1.8288	0.1813
D72	0.622923	0.9394	0.2023	0.6545
D101	0.679361	0.9460	6.3256	0.0145
D111	0.816299	0.9393	0.1687	0.6827
D112	0.799461	0.9398	0.4651	0.5072
D121	0.791131	0.9395	0.3281	0.5700
D122	.	0.9392	.	.
D141	0.812639	0.9393	0.1276	0.7222
D142	0.690450	0.9393	0.1295	0.7202

STEPWISE selection procedure

ep13 Variable D101 Entered R-square = 0.94679081 C(p) = 4.63172944

	DF	Sum of Squares	Mean Square	F	Prob>F
legression	13	1.40908463	0.10839113	81.62	0.0001
Error	62	0.08236036	0.00132807		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40797326	0.01619010	0.86330607	636.99	0.0001
)21	0.06818597	0.01600989	0.02185151	16.45	0.0001
)22	0.06456619	0.02021341	0.01354118	10.20	0.0022
)41	0.02650190	0.01300803	0.00483552	3.64	0.0610
)42	0.02132639	0.01514809	0.00263183	1.98	0.1642
)52	0.01903378	0.01069961	0.00420277	3.16	0.0802
)81	0.06866893	0.01205051	0.01089328	16.23	0.0004
)82	0.07948998	0.01720488	0.02835195	21.35	0.0001
)91	0.07169567	0.02206273	0.01397172	10.52	0.0019
)92	0.12627877	0.01030209	0.02306411	17.37	0.0001
)101	0.05146432	0.02066229	0.00840089	6.33	0.0145
)102	0.08036747	0.02521665	0.01348313	10.15	0.0023
)131	0.05307362	0.01230564	0.02470323	18.60	0.0001
)132	0.04063185	0.01388473	0.01137311	8.56	0.0048

)unds on condition number: 13.10005, 737.5931

Statistics for Removal: Step 14
DF = 1,62

Variable	Partial R**2	Model R**2
D21	0.0167	0.9301
D22	0.0091	0.9357
D41	0.0032	0.9415
D42	0.0018	0.9430
D52	0.0028	0.9420
D81	0.0127	0.9321
D82	0.0190	0.9258
D91	0.0094	0.9354
D92	0.0155	0.9293
D101	0.0056	0.9392
D102	0.0090	0.9358
D131	0.0166	0.9282
D132	0.0076	0.9372

STEPWISE selection procedure

Statistics for Entry: Step 14
DF = 1,61

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.726757	0.9449	0.1692	0.6823
D12	0.744211	0.9457	0.9676	0.3292
D31	0.702832	0.9448	0.0056	0.9405
D32	0.622610	0.9448	0.0137	0.9071
D51	0.390957	0.9448	0.0596	0.8079
D61	0.526356	0.9451	0.3522	0.5551
D62	0.330892	0.9450	0.2298	0.6334
D71	0.660816	0.9457	1.0067	0.3197
D72	0.308736	0.9448	0.0637	0.8017
D111	0.810585	0.9449	0.0673	0.7963
D112	0.778733	0.9459	1.2537	0.2672
D131	0.772649	0.9457	0.9878	0.3242
D132	.	0.9448	.	.
D141	0.806511	0.9448	0.0150	0.9028
D142	0.688520	0.9450	0.2581	0.6133

Step14 Variable D42 Removed R-square = 0.94302617 C(p) = 4.31399026

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	12	1.40665279	0.11720440	86.90	0.0001
Error	63	0.08497219	0.00134876		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42084083	0.01346662	1.31728095	976.68	0.0001
D21	0.07262620	0.01663946	0.02569476	19.05	0.0001
D22	0.07600988	0.01864341	0.02241949	16.62	0.0001
D41	0.01294760	0.01080727	0.00222213	1.65	0.2040
D52	0.01897005	0.01070255	0.00417474	3.10	0.0834
D81	0.05048876	0.01207557	0.02067357	15.33	0.0002
D82	0.08132066	0.01720888	0.02986340	22.13	0.0001
D91	0.05577740	0.01915300	0.01143076	8.48	0.0050
D92	0.10778269	0.02750609	0.02069702	15.35	0.0002
D101	0.05630172	0.02032026	0.01036618	7.67	0.0074
D102	0.09062252	0.02436735	0.01857261	13.77	0.0004
D131	0.05403332	0.01230206	0.02568665	19.04	0.0001
D132	0.04439233	0.01373168	0.01409752	10.45	0.0020

Bounds on condition number: 10.62908, 561.8036

STEPWISE selection procedure

Statistics for Removal: Step 15
DF = 1,63

Variable	Partial R**2	Model R**2
D21	0.0172	0.9258
D22	0.0150	0.9280
D41	0.0015	0.9415
D52	0.0028	0.9402
D61	0.0139	0.9292
D62	0.0200	0.9230
D91	0.0077	0.9354
D92	0.0139	0.9291
D101	0.0069	0.9361
D103	0.0135	0.9306
D131	0.0172	0.9258
D132	0.0095	0.9336

Statistics for Entry: Step 15
DF = 1,62

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.761629	0.9434	0.3606	0.5505
D12	0.744366	0.9439	0.9927	0.3330
D31	0.722059	0.9430	0.0233	0.8791
D32	0.626729	0.9431	0.0521	0.8202
D42	0.338357	0.9440	1.9817	0.1662
D51	0.380963	0.9431	0.0612	0.8056
D61	0.526386	0.9433	0.3367	0.5650
D62	0.412365	0.9440	1.1036	0.2976
D71	0.692595	0.9434	0.4693	0.5052
D72	0.391552	0.9431	0.1369	0.7166
D111	0.813286	0.9431	0.1136	0.7372
D112	0.809137	0.9447	1.0608	0.1775
D121	0.801653	0.9435	0.0897	0.4867
D122	.	0.9430	.	.
D141	0.804554	0.9430	0.0174	0.8955
D142	0.497896	0.9434	0.4391	0.5100

ep15 Variable D41 Removed R-square = 0.94153624 C(p) = 3.73436333

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	11	1.40423067	0.12765733	93.70	0.0001
rror	64	0.08719431	0.00136241		
otal	75	1.49142499			

eriable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0.62744091	0.01250907	1.59078110	1167.62	0.0001
11	0.08074441	0.01544021	0.03712387	27.25	0.0001
12	0.08499798	0.01736555	0.01261985	23.96	0.0001
52	0.01562830	0.01051630	0.00300085	2.21	0.1422
31	0.04059934	0.01286275	0.01944919	14.28	0.0003

STEPWISE selection procedure

D82	0.08148232	0.01737678	0.02996378	21.99	0.0001
D91	0.05065974	0.01079393	0.00982117	7.21	0.0092
D92	0.09776190	0.02651581	0.01851985	13.59	0.0005
D101	0.05990565	0.02023699	0.01194091	8.76	0.0043
D102	0.09232696	0.02444407	0.01961526	14.27	0.0004
D131	0.05209130	0.01241237	0.02673014	19.16	0.0001
D132	0.04336199	0.01377686	0.01349790	9.91	0.0025

Bounds on condition number: 9.778813, 473.5523

Statistics for Removal: Step 16
DF = 1,64

Variable	Partial R**2	Model R**2
D21	0.0249	0.9166
D22	0.0219	0.9197
D52	0.0020	0.9395
D81	0.0130	0.9285
D82	0.0201	0.9214
D91	0.0068	0.9350
D92	0.0134	0.9291
D101	0.0080	0.9335
D103	0.0130	0.9285
D131	0.0166	0.9249
D132	0.0091	0.9325

Statistics for Entry: Step 16
DF = 1,63

Variable	Tolerance	Model R**2	F	Prob>F
D11	0.765333	0.9418	0.3534	0.6160
D12	0.745029	0.9425	1.0599	0.3072
D31	0.734017	0.9416	0.0978	0.7555
D32	0.626702	0.9416	0.0570	0.8131
D41	0.739106	0.9430	1.6475	0.2040
D42	0.453441	0.9415	0.0133	0.9085
D51	0.392727	0.9416	0.1096	0.7418
D61	0.529019	0.9417	0.2279	0.6347
D62	0.413381	0.9425	1.0756	0.3037
D71	0.695077	0.9420	0.5511	0.4606
D72	0.396403	0.9418	0.2552	0.6152
D111	0.817016	0.9417	0.1841	0.6693
D112	0.808519	0.9433	1.9196	0.1708
D121	0.802670	0.9420	0.5633	0.4636
D122	.	0.9415	.	.
D141	0.806263	0.9416	0.0359	0.8503
D142	0.498619	0.9419	0.3095	0.5160

STEPWISE selection procedure

Summary of Stepwise Procedure for Dependent Variable Y

Step	Variable Entered	Variable Removed	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	D92		1	0.6217	0.6217	288.6209	121.6217	0.0001
2	D91		2	0.1598	0.7815	138.2530	53.4103	0.0001
3	D02		3	0.0381	0.8197	102.9291	15.2116	0.0002
4	D01		4	0.0158	0.8355	90.0514	6.8250	0.0110
5	D41		5	0.0161	0.8516	77.4967	7.5961	0.0075
6	D42		6	0.0260	0.8776	56.6983	14.6625	0.0003
7	D21		7	0.0145	0.8921	42.8333	9.1686	0.0035
8	D22		8	0.0199	0.9120	25.8923	15.1272	0.0002
9	D131		9	0.0085	0.9205	19.8149	7.0317	0.0100
10	D133		10	0.0096	0.9301	13.6501	8.9290	0.0040
11	D52		11	0.0055	0.9356	9.4035	5.4168	0.0236
12	D102		12	0.0036	0.9392	8.0018	3.6951	0.0591
13	D101		13	0.0056	0.9448	4.6317	6.3256	0.0145
14		D42	12	0.0018	0.9430	4.3140	1.9817	0.1642
15		D41	11	0.0015	0.9415	3.7344	1.6475	0.2040

STEPWISE selection procedure

Model: MODEL1
Dependent Variable: Y

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	11	1.40423	0.12766	93.700	0.0001
Error	64	0.08719	0.00136		
C Total	75	1.49142			

Root MSE	0.03691	R-square	0.9415
Dep Mean	0.67899	Adj R-sq	0.9315
C.V.	5.43817		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.437441	0.01250907	34.970	0.0001
D21	1	0.080744	0.01546821	5.220	0.0001
D22	1	0.084990	0.01736555	4.895	0.0001
D52	1	0.015620	0.01051630	1.486	0.1422
D01	1	0.060599	0.01286275	3.770	0.0003
D02	1	0.081402	0.01737670	4.698	0.0001
D91	1	0.050460	0.01879393	2.685	0.0093
D92	1	0.097762	0.02651501	3.687	0.0005
D101	1	0.059906	0.02023499	2.960	0.0043
D102	1	0.092227	0.02444407	3.777	0.0004
D131	1	0.052891	0.01241237	4.261	0.0001
D133	1	0.043366	0.01377606	3.148	0.0025

Variable	DF	Tolerance
INTERCEP	1	.
D21	1	0.32710114
D22	1	0.26929079
D52	1	0.73432044
D01	1	0.43339832
D02	1	0.41970038
D91	1	0.27068125
D92	1	0.10237027
D101	1	0.18815526
D102	1	0.13806550
D131	1	0.47361975
D133	1	0.41226569

Appendix (D) SAS Output

Part (V)

Results of 'BACKWARD' Model Selection Procedure

BACKWARD selection procedure

Backward Elimination Procedure for Dependent Variable Y

Step 0 All Variables Entered R-square = 0.94966937 C(p) = 28.00000000

NOTE: The model is not of full rank. A subset of the model which is of full rank is chosen.

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	27	1.41633079	0.05245670	33.53	0.0001
Error	48	0.07509419	0.00156446		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39772899	0.02388307	0.43386984	277.33	0.0001
D11	0.00025361	0.01655103	0.00000047	0.00	0.9862
D12	0.01196672	0.01377215	0.00118117	0.75	0.3892
D21	0.07806371	0.02440603	0.01633523	10.44	0.0022
D22	0.07929903	0.02979607	0.01100281	7.00	0.0105
D31	0.00308062	0.01780217	0.00004686	0.03	0.8634
D32	-0.00151780	0.01826686	0.00001882	0.01	0.9341
D41	0.02155306	0.01813266	0.00221051	1.41	0.2400
D42	0.01963176	0.02210270	0.00123421	0.79	0.3789
D51	0.00291532	0.01580669	0.00005268	0.03	0.8553
D52	0.01590087	0.01666648	0.00143868	0.92	0.3424
D61	0.00606269	0.02356038	0.00010377	0.07	0.7979
D62	-0.00666790	0.02355713	0.00012459	0.08	0.7790
D71	0.02965244	0.02607962	0.00190401	1.22	0.2756
D72	0.02215576	0.02595517	0.00113996	0.73	0.3976
D81	0.01032759	0.01602037	0.00811529	5.19	0.0272
D82	0.07553919	0.02010804	0.02190398	14.00	0.0005
D91	0.05425955	0.01089405	0.00482570	3.08	0.0850
D92	0.11010617	0.00596376	0.00899862	5.75	0.0204
D101	0.05434700	0.02632128	0.00666967	4.26	0.0444
D102	0.08035168	0.03310504	0.00917212	5.86	0.0193
D111	-0.00145168	0.01280020	0.00002012	0.01	0.9102
D112	0.01123764	0.01356809	0.00107319	0.69	0.4116
D121	-0.00569078	0.01341898	0.00020216	0.13	0.7230
D131	0.06576199	0.01837796	0.00900664	6.27	0.0157
D132	0.03662296	0.01799107	0.00453763	2.90	0.0950
D141	-0.00625656	0.01664829	0.00010227	0.07	0.7993
D142	-0.00166519	0.01677717	0.00001561	0.01	0.9214

Bounds on condition number: 25.56667, 3689.955

BACKWARD selection procedure

Statistics for Removal: Step 1
DF = 1,48

Variable	Partial R**2	Model R**2
D11	0.0000	0.9496
D12	0.0008	0.9489
D21	0.0110	0.9387
D22	0.0074	0.9422
D31	0.0000	0.9496
D32	0.0000	0.9496
D41	0.0015	0.9482
D42	0.0008	0.9488
D51	0.0000	0.9496
D52	0.0010	0.9487
D61	0.0001	0.9496
D62	0.0001	0.9496
D71	0.0013	0.9484
D72	0.0000	0.9489
D81	0.0054	0.9442
D82	0.0147	0.9350
D91	0.0032	0.9466
D92	0.0060	0.9436
D101	0.0045	0.9452
D102	0.0061	0.9435
D111	0.0000	0.9496
D112	0.0007	0.9489
D121	0.0003	0.9495
D131	0.0066	0.9431
D132	0.0030	0.9466
D141	0.0001	0.9496
D142	0.0000	0.9496

Step 1 Variable D11 Removed R-square = 0.94966905 C(p) = 26.00030320

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	26	1.41633032	0.05447424	35.54	0.0001
Error	49	0.07509467	0.00153256		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39786296	0.02237036	0.48462266	316.09	0.0001
D12	0.01183089	0.01122626	0.00169965	1.11	0.2975
D21	0.07893867	0.02377931	0.01688867	11.02	0.0017
D22	0.07939299	0.02900929	0.01167898	7.62	0.0080
D31	0.00308389	0.01761853	0.00004695	0.03	0.8618
D32	-0.00150063	0.01803335	0.00001861	0.01	0.9140
D41	0.02156176	0.01796188	0.00221352	1.44	0.2352
D42	0.01960712	0.02183130	0.00123618	0.81	0.3735
D51	0.00288051	0.01564977	0.00005231	0.03	0.8563
D52	0.01598331	0.01649505	0.00143891	0.94	0.3373
D61	0.00603237	0.02333510	0.00010330	0.07	0.7962
D62	-0.00658325	0.02182427	0.00013529	0.08	0.7761
D71	0.02970157	0.01646299	0.00193061	1.26	0.2672

BACKWARD selection procedure

D13	0.02218207	0.02567725	0.00113960	0.74	0.3927
D81	0.03835607	0.01650765	0.00819364	5.35	0.0250
D82	0.07556640	0.01992114	0.02205170	14.39	0.0004
D91	0.05428737	0.03051665	0.00498358	3.16	0.0816
D92	0.11007637	0.04504266	0.00915207	5.97	0.0182
D101	0.05439261	0.02506704	0.00675151	4.41	0.0410
D103	0.08028012	0.03250234	0.00929818	6.07	0.0173
D111	-0.00166690	0.01266604	0.00002000	0.01	0.9095
D112	0.01126177	0.01335071	0.00100918	0.71	0.4033
D121	-0.00569802	0.01328139	0.00028216	0.18	0.6697
D131	0.08574398	0.01806158	0.00983036	6.41	0.0146
D133	0.01063209	0.01778910	0.00454421	2.97	0.0914
D141	-0.00421382	0.01629752	0.00010265	0.07	0.7971
D142	-0.00163286	0.01650321	0.00001500	0.01	0.9216

Bounds on condition number: 25.08303, 3429.269

Statistics for Removal, Step 2
DF = 1,49

Variable	Partial R**2	Model R**2
D12	0.0011	0.9485
D21	0.0113	0.9383
D22	0.0077	0.9420
D31	0.0000	0.9496
D32	0.0000	0.9496
D41	0.0015	0.9482
D42	0.0008	0.9488
D51	0.0000	0.9496
D52	0.0010	0.9487
D61	0.0001	0.9496
D62	0.0001	0.9496
D71	0.0013	0.9484
D72	0.0008	0.9489
D81	0.0055	0.9442
D82	0.0148	0.9349
D91	0.0032	0.9464
D92	0.0061	0.9435
D101	0.0045	0.9451
D102	0.0042	0.9454
D111	0.0000	0.9496
D112	0.0007	0.9489
D121	0.0002	0.9495
D131	0.0066	0.9431
D132	0.0030	0.9466
D141	0.0001	0.9496
D142	0.0000	0.9496

Step 2 Variable D13 Removed R-square = 0.94964193 C(p) = 24.00708650

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	25	1.41631911	0.05665279	37.72	0.0001
Error	50	0.07510528	0.00150211		
Total	75	1.49142499			

BACKWARD selection procedure

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39750825	0.02174934	0.50176504	334.08	0.0001
D12	0.01101909	0.01112138	0.00169671	1.13	0.2930
D21	0.07877414	0.02346056	0.01693523	11.27	0.0015
D22	0.07940380	0.02871947	0.01140233	7.64	0.0080
D31	0.00410830	0.01247816	0.00016283	0.11	0.7434
D41	0.02149375	0.01774358	0.00220416	1.47	0.2315
D42	0.01967303	0.02159910	0.00124614	0.83	0.3668
D51	0.00296370	0.01546772	0.00005515	0.04	0.8408
D52	0.01599404	0.01632991	0.00144095	0.96	0.3321
D61	0.00642580	0.02252201	0.00012228	0.08	0.7766
D62	-0.00642288	0.02271440	0.00012010	0.08	0.7785
D71	0.02983060	0.02615386	0.00195613	1.30	0.2595
D72	0.02250610	0.02504915	0.00121260	0.81	0.3712
D81	0.03844637	0.01638534	0.00826990	5.51	0.0230
D82	0.07561752	0.01971293	0.02210258	14.71	0.0004
D91	0.05160200	0.02911206	0.00509235	3.39	0.0715
D92	0.10960089	0.04099233	0.01054295	7.02	0.0108
D101	0.05434083	0.02560266	0.00676659	4.50	0.0388
D103	0.08031406	0.03226681	0.00930779	6.20	0.0162
D111	-0.00139610	0.01252539	0.00001068	0.01	0.9117
D112	0.01100371	0.01305461	0.00100279	0.72	0.3999
D121	-0.00581199	0.01307972	0.00029659	0.20	0.6587
D131	0.08565406	0.01780920	0.00882693	6.56	0.0136
D133	0.01069493	0.01759567	0.00057111	3.84	0.0872
D141	-0.00403863	0.01599967	0.00009571	0.06	0.8018
D142	-0.00148758	0.01624680	0.00001259	0.01	0.9274

Bounds on condition number: 21.19599, 3035.38

BACKWARD selection procedure

Statistics for Removal: Step 3
DF = 1,50

Variable	Partial R**2	Model R**2
D12	0.0011	0.9485
D21	0.0110	0.9381
D22	0.0077	0.9619
D31	0.0001	0.9495
D41	0.0015	0.9482
D42	0.0000	0.9480
D51	0.0000	0.9496
D52	0.0010	0.9487
D61	0.0001	0.9496
D62	0.0001	0.9496
D71	0.0013	0.9483
D72	0.0000	0.9480
D81	0.0055	0.9441
D82	0.0148	0.9348
D91	0.0036	0.9462
D92	0.0071	0.9426
D101	0.0045	0.9451
D102	0.0062	0.9434
D111	0.0000	0.9496
D112	0.0007	0.9489
D121	0.0002	0.9494
D131	0.0066	0.9431
D132	0.0031	0.9466
D141	0.0001	0.9496
D142	0.0000	0.9496

Step 3 Variable D142 Removed R-square = 0.94963369 C(p) = 22.01513580

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	24	1.41630712	0.05901280	40.07	0.0001
Error	51	0.07511787	0.00147290		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39771722	0.02161796	0.50788557	344.82	0.0001
D12	0.01183213	0.01101192	0.00178069	1.15	0.2877
D21	0.07958976	0.02149156	0.02020001	13.71	0.0005
D22	0.08046800	0.02600589	0.01410185	9.57	0.0032
D31	0.00488331	0.01235130	0.00016093	0.11	0.7423
D41	0.02145167	0.01756428	0.00219698	1.49	0.2276
D42	0.01961675	0.02120498	0.00123470	0.84	0.3642
D51	0.00303758	0.01529500	0.00005000	0.04	0.8436
D52	0.01550188	0.01556387	0.00148011	1.00	0.3209
D61	0.00620373	0.02224899	0.00011749	0.08	0.7788
D62	-0.00626602	0.02262916	0.00011499	0.08	0.7811
D71	0.02916946	0.02489175	0.00202264	1.37	0.2467
D72	0.02302210	0.02626565	0.00121513	0.82	0.3690
D81	0.03039515	0.01621580	0.00825751	5.61	0.0217
D82	0.07580421	0.01961565	0.02245203	15.24	0.0003

BACKWARD selection procedure

D91	0.05306099	0.02822746	0.00520651	3.53	0.0659
D92	0.10748219	0.03874688	0.01133372	7.69	0.0077
D101	0.05459190	0.02520577	0.00690923	4.69	0.0350
D102	0.08063312	0.03192358	0.00935017	6.35	0.0149
D111	-0.00160758	0.01219156	0.00002561	0.02	0.8956
D112	0.01092970	0.01281931	0.00107068	0.73	0.3979
D121	-0.00572475	0.01291753	0.00028929	0.20	0.6595
D131	0.04503020	0.01633643	0.01119093	7.60	0.0081
D132	0.03046299	0.01726327	0.00659758	3.13	0.0813
D141	-0.00303659	0.01155737	0.00010160	0.07	0.7930

Bounds on condition number: 19.31298, 2655.916

Statistics for Removal: Step 4
DF = 1,51

Variable	Partial R**2	Model R**2
D12	0.0011	0.9485
D21	0.0135	0.9361
D22	0.0095	0.9602
D31	0.0001	0.9495
D41	0.0015	0.9482
D42	0.0000	0.9480
D51	0.0000	0.9496
D52	0.0010	0.9486
D61	0.0001	0.9496
D62	0.0001	0.9496
D71	0.0014	0.9482
D72	0.0000	0.9480
D81	0.0056	0.9441
D82	0.0151	0.9346
D91	0.0035	0.9461
D92	0.0070	0.9430
D101	0.0046	0.9450
D102	0.0063	0.9434
D111	0.0000	0.9496
D112	0.0007	0.9489
D121	0.0002	0.9494
D131	0.0075	0.9421
D132	0.0031	0.9466
D141	0.0001	0.9496

Step 4 Variable D111 Removed R-square = 0.94961632 C(p) = 20.03150918

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	23	1.41620151	0.06157746	42.61	0.0001
Error	52	0.07514348	0.00144507		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39728726	0.02096734	0.51001208	359.01	0.0001
D12	0.01157327	0.01073129	0.00160045	1.16	0.2858

BACKWARD selection procedure

)21	0 07915706	0 02103792	0 02065792	14 16	0 0004
)22	0.07978075	0 02523638	0 01444209	9 99	0.0026
)31	0.00395346	0 01219707	0 00015102	0 11	0 7471
)41	0.02164068	0 01733930	0.00225093	1 56	0 2176
)42	0 01900357	0 01100351	0 00133330	0 85	0 3598
)51	0 00261320	0 01401167	0 00004498	0 03	0 8606
)52	0 01568521	0 01537673	0 00150363	1 04	0.3124
)61	0 00638516	0 02202460	0 00012165	0 08	0 7730
)62	-0.00630269	0 02219918	0.00011946	0 08	0.7749
)71	0.02863773	0 02432976	0 00200212	1 39	0.2465
)72	0 02162857	0.02303284	0 00119012	0.82	0.3693
)81	0.03917237	0.01496321	0.00990372	6.85	0.0116
)82	0.07439963	0.01870399	0.02411020	16.68	0.0002
)91	0.05278136	0.02705614	0.00510021	3.50	0.0639
)92	0.10608120	0.03811260	0.01136458	7.86	0.0071
)101	0.05498820	0.02478838	0 00711107	4.92	0.0309
)102	0.08095341	0 01137006	0 00961848	6 66	0.0127
)112	0.01162865	0.01213231	0 00128226	0 89	0 3506
)121	-0.00601649	0 01260582	0 00032910	0 23	0.6352
)131	0.04558434	0 01583697	0 01220039	8 50	0.0052
)132	0.01065326	0 01701869	0.00468001	3 24	0.0775
)141	-0.00297018	0 01143677	0 00009746	0.07	0.7961

ounds on condition number: 19.06575, 2449.802

Statistics for Removal: Step 5
DF = 1,52

Variable	Partial R**2	Model R**2
D12	0.0011	0.9485
D21	0 0137	0.9359
D22	0.0097	0.9399
D31	0 0001	0.9495
D41	0.0015	0.9481
D42	0 0008	0.9488
D51	0 0000	0.9496
D52	0.0010	0.9486
D61	0.0001	0.9495
D62	0.0001	0.9495
D71	0.0013	0.9483
D72	0.0008	0.9488
D81	0.0066	0.9430
D82	0.0162	0.9335
D91	0.0035	0.9461
D92	0.0076	0.9420
D101	0.0040	0.9460
D102	0.0064	0.9432
D112	0.0009	0.9488
D121	0 0002	0.9494
D131	0.0002	0.9414
D132	0.0031	0.9465
D141	0.0001	0.9496

BACKWARD selection procedure

Step 5 Variable D51 Removed R-square = 0.94958616 C(p) = 18.06025036

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	22	1.41623652	0.06437439	45.38	0.0001
Error	53	0.07518846	0.00141885		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39797822	0.02040921	0.53943705	380.25	0.0001
D12	0.01130273	0.01052445	0.00163623	1.15	0.2877
D21	0.07982866	0.02087597	0.02184167	16.03	0.0003
D22	0.08010063	0.02482606	0.01466026	10.33	0.0022
D31	0.00388123	0.01207027	0.00014669	0.10	0.7492
D41	0.02186391	0.01713637	0.00330991	1.63	0.2075
D42	0.01947052	0.02080725	0.00176233	0.80	0.3536
D52	0.01392075	0.01161137	0.00204142	1.44	0.2356
D61	0.00655907	0.02180049	0.00012862	0.09	0.7647
D62	-0.00667706	0.02193213	0.00013140	0.09	0.7620
D71	0.02880385	0.02408830	0.00202065	1.43	0.2371
D72	0.02108849	0.02241061	0.00115061	0.81	0.3719
D81	0.03975367	0.01446198	0.01071935	7.56	0.0082
D82	0.07051921	0.01850478	0.02429570	17.13	0.0001
D91	0.05337023	0.02736757	0.00539874	3.80	0.0566
D92	0.10778930	0.03741664	0.01177329	8.30	0.0057
D101	0.05610772	0.02426150	0.00710026	5.01	0.0294
D102	0.08023440	0.03082646	0.00961047	6.77	0.0120
D112	0.01142264	0.01203086	0.00120097	0.90	0.3465
D121	-0.00630657	0.01238686	0.00036763	0.26	0.6120
D131	0.04664023	0.01629484	0.01510730	10.65	0.0019
D132	0.03183456	0.01550263	0.00598221	4.22	0.0450
D141	-0.00289027	0.01132207	0.00009244	0.07	0.7995

Bounds on condition number: 18.69836, 2203.836

BACKWARD selection procedure

Statistics for Removal: Step 6
DF = 1,53

Variable	Partial R**2	Model R**2
D12	0.0011	0.9485
D21	0.0141	0.9355
D22	0.0098	0.9398
D31	0.0001	0.9495
D41	0.0015	0.9480
D42	0.0008	0.9488
D52	0.0014	0.9482
D61	0.0001	0.9495
D62	0.0001	0.9495
D71	0.0014	0.9482
D72	0.0008	0.9488
D81	0.0072	0.9424
D82	0.0163	0.9333
D91	0.0036	0.9460
D92	0.0079	0.9417
D101	0.0040	0.9440
D102	0.0064	0.9431
D112	0.0009	0.9487
D121	0.0002	0.9493
D131	0.0101	0.9395
D132	0.0060	0.9436
D141	0.0001	0.9495

Step 6 Variable D141 Removed R-square = 0.94952418 C(p) = 16.11934292

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	21	1.41614409	0.06743543	48.37	0.0001
Error	54	0.07538098	0.00139409		
Total	75	1.49152499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39755654	0.02016560	0.56186524	388.67	0.0001
D12	0.01137917	0.01042873	0.00165978	1.19	0.2801
D21	0.07906414	0.02037873	0.01098438	15.05	0.0003
D22	0.07929864	0.02451919	0.01458177	10.46	0.0021
D31	0.00422321	0.01189982	0.00017550	0.13	0.7241
D41	0.02196602	0.01690241	0.00232011	1.67	0.1818
D42	0.01966453	0.02061359	0.00126880	0.91	0.3443
D52	0.01302639	0.01150355	0.00201393	1.44	0.2346
D61	0.00524436	0.02099908	0.00008695	0.06	0.8037
D62	-0.00662560	0.02174153	0.00012946	0.09	0.7617
D71	0.02953396	0.02370996	0.00216300	1.55	0.2183
D72	0.02193379	0.02298156	0.00126987	0.91	0.3461
D81	0.06012235	0.01426656	0.01102931	7.91	0.0068
D82	0.07670336	0.01032676	0.02447112	17.55	0.0001
D91	0.05243569	0.02687596	0.00530467	3.80	0.0563
D92	0.10512070	0.03582313	0.01216144	8.71	0.0047
D101	0.05539675	0.02367580	0.00763221	5.47	0.0230
D102	0.08233800	0.02944656	0.01089992	7.82	0.0071

BACKWARD selection procedure

D112	0.01096416	0.01178258	0.00120715	0.87	0.3562
D121	-0.00636124	0.01227520	0.00037438	0.27	0.6066
D131	0.04631538	0.01611149	0.01501744	10.77	0.0018
D132	0.03189614	0.01536598	0.00600692	4.31	0.0427

Bounds on condition number: 17.26733, 2007.081

Statistics for Removal: Step 7
DF = 1,54

Variable	Partial R**2	Model R**2
D12	0.0011	0.9484
D21	0.0141	0.9355
D22	0.0098	0.9397
D31	0.0001	0.9494
D41	0.0016	0.9480
D42	0.0009	0.9487
D52	0.0014	0.9482
D61	0.0001	0.9495
D62	0.0001	0.9494
D71	0.0015	0.9481
D72	0.0009	0.9487
D81	0.0074	0.9421
D82	0.0166	0.9331
D91	0.0036	0.9460
D92	0.0081	0.9414
D101	0.0051	0.9444
D102	0.0073	0.9422
D112	0.0008	0.9487
D121	0.0003	0.9492
D131	0.0101	0.9395
D132	0.0048	0.9455

Step 7 Variable D61 Removed R-square = 0.94946588 C(p) = 16.17491967

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	20	1.41605716	0.07080286	51.67	0.0001
Error	55	0.07536785	0.00137032		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39823051	0.01981293	0.55359893	403.99	0.0001
D12	0.01100311	0.01020156	0.00183636	1.34	0.2523
D21	0.07877030	0.02017238	0.02089885	15.25	0.0003
D22	0.07700110	0.02357119	0.01492907	10.89	0.0017
D31	0.00436257	0.01170027	0.00010598	0.16	0.7160
D41	0.02110089	0.01649936	0.00226125	1.64	0.2063
D42	0.01971235	0.02000369	0.00110969	0.87	0.3555
D52	0.01304677	0.01140479	0.00201997	1.47	0.2299
D62	-0.00881277	0.01972889	0.00037361	0.30	0.6569
D71	0.03029519	0.02331181	0.00231633	1.69	0.1992
D72	0.02165466	0.02275784	0.00120049	0.91	0.3455

BACKWARD selection procedure

D01	0.00062503	0.01600092	0.01153712	0.42	0.0053
D02	0.07682966	0.01815963	0.02440077	17.81	0.0001
D91	0.05387719	0.02831647	0.00565855	4.13	0.0470
D92	0.10470816	0.03527868	0.01207146	8.81	0.0044
D101	0.05710775	0.02237036	0.00895537	6.54	0.0134
D102	0.08470493	0.02764094	0.01286872	9.39	0.0034
D112	0.01105912	0.01167563	0.00122963	0.90	0.3477
D121	-0.00594392	0.01205603	0.00033305	0.24	0.6240
D131	0.04606293	0.01395475	0.01493079	10.90	0.0017
D132	0.03162009	0.01511666	0.00592006	4.32	0.0423

Bounds on condition number: 17.20878, 1789.116

Statistics for Removal: Step 8
DF = 1,55

Variable	Partial R**2	Model R**2
D12	0.0013	0.9402
D21	0.0140	0.9355
D22	0.0100	0.9395
D31	0.0001	0.9493
D41	0.0015	0.9480
D42	0.0008	0.9487
D52	0.0016	0.9481
D62	0.0002	0.9493
D71	0.0016	0.9479
D72	0.0008	0.9486
D81	0.0077	0.9417
D82	0.0166	0.9331
D91	0.0038	0.9457
D92	0.0081	0.9414
D101	0.0060	0.9435
D102	0.0086	0.9408
D112	0.0008	0.9486
D121	0.0003	0.9492
D131	0.0100	0.9395
D132	0.0040	0.9455

Step 8 Variable D31 Removed R-square = 0.94934120 C(p) = 12.39378405

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	19	1.41507118	0.07451956	55.33	0.0001
Error	56	0.07555381	0.00134918		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39795018	0.01964492	0.55361677	410.35	0.0001
D12	0.01159886	0.01010758	0.00177866	1.32	0.2560
D21	0.07866690	0.02001298	0.02083576	15.44	0.0002
D22	0.07708576	0.02338516	0.01498076	11.11	0.0015
D41	0.02296328	0.01550405	0.00292938	2.17	0.1462
D42	0.02003673	0.01909032	0.00160701	1.19	0.2790

BACKWARD selection procedure

D52	0.01356810	0.01129153	0.00194808	1.44	0.2346
D62	-0.00701030	0.01921022	0.00020090	0.15	0.7019
D71	0.03012674	0.02312675	0.00228951	1.70	0.1988
D72	0.02211039	0.02254697	0.00139837	0.96	0.3308
D81	0.04028650	0.01386250	0.01139473	8.45	0.0051
D82	0.07683605	0.01801037	0.02655575	18.20	0.0001
D91	0.05599204	0.02521060	0.00665083	4.93	0.0305
D92	0.10691940	0.03449495	0.01296195	9.61	0.0030
D101	0.05665967	0.02215141	0.00882695	6.54	0.0133
D102	0.08368846	0.02728981	0.01268816	9.40	0.0033
D112	0.00963291	0.01092971	0.00104881	0.78	0.3819
D121	-0.00656753	0.01185243	0.00041179	0.31	0.5839
D131	0.04493907	0.01351160	0.01492443	11.06	0.0016
D132	0.03146137	0.01499914	0.00593595	4.40	0.0405

Bounds on condition number: 16.71058, 1623.542

Statistics for Removal: Step 9
DF = 1,56

Variable	Partial R**2	Model R**2
D12	0.0012	0.9401
D21	0.0140	0.9356
D22	0.0100	0.9393
D41	0.0020	0.9474
D42	0.0011	0.9483
D52	0.0013	0.9480
D62	0.0001	0.9492
D71	0.0015	0.9478
D72	0.0009	0.9485
D81	0.0076	0.9417
D82	0.0165	0.9329
D91	0.0045	0.9469
D92	0.0087	0.9427
D101	0.0059	0.9454
D102	0.0085	0.9428
D112	0.0007	0.9486
D121	0.0003	0.9491
D131	0.0100	0.9393
D132	0.0040	0.9454

Step 9 Variable D62 Removed R-square = 0.94920644 C(p) = 10.43224727

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	18	1.41567828	0.07864824	59.18	0.0001
Error	57	0.07594670	0.00133067		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.39597370	0.01802371	0.58818862	442.51	0.0001
D12	0.01181503	0.01001641	0.00186919	1.39	0.2431
D21	0.07679055	0.01920588	0.02107475	15.84	0.0002

BACKWARD selection procedure

2	0.07904179	0.02303836	0.01566394	11.77	0.0011
1	0.02520268	0.01435526	0 00409644	3.08	0.0845
2	0.02454716	0.01636640	0.00298972	2 25	0 1392
2	0.01390498	0.01117340	0.00205020	1.55	0 2184
1	0.03139206	0.02272166	0.00253685	1 91	0.1725
2	0.02202227	0.02230469	0.00139183	1 05	0.3105
1	0.04054002	0.01374317	0.01156456	8.70	0.0046
2	0.07865495	0.01725260	0.02762348	20.78	0.0001
1	0.05700900	0.02406999	0.00700329	5.27	0.0254
2	0.10570863	0.03409271	0.01277519	9.61	0.0030
01	0.05562976	0.02101537	0.00863628	6.50	0.0135
02	0.00166656	0 02667668	0.01250379	9.47	0.0032
12	0.00863137	0.01053764	0.00089168	0.67	0.4161
21	-0.00717280	0.01165321	0.00050352	0.38	0.5407
31	0.04463155	0.01338710	0.01477224	11.12	0.0015
32	0.03069931	0.01475720	0.00575154	4 33	0.0426

nds on condition number: 16.57054, 1621.668

Statistics for Removal: Step 10
DF = 1,57

Variable	Partial R**2	Model R**2
D12	0.0012	0.9480
D21	0.0141	0.9351
D22	0.0105	0.9387
D41	0.0027	0.9465
D42	0.0020	0.9472
D52	0.0016	0.9476
D71	0 0017	0.9475
D72	0.0009	0.9481
D81	0.0078	0.9415
D82	0.0185	0.9307
D91	0.0047	0.9445
D92	0 0086	0.9406
D101	0.0058	0.9434
D102	0.0084	0.9408
D112	0.0006	0.9486
D121	0.0003	0.9489
D131	0.0099	0.9393
D132	0.0039	0.9454

ep10 Variable D131 Removed R-square = 0.94886883 C(p) = 8.74409882

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	17	1.41516660	0 08326510	63 31	0 0001
rror	58	0 07625831	0 00131480		
tal	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0 39389337	0 01861036	0 60133227	457 36	0 0001
12	0.01160178	0.00995667	0 00178517	1 36	0 2487

BACKWARD selection procedure

D21	0.07790817	0.01909834	0.02107932	16.66	0.0001
D22	0 08079388	0.02273907	0.01659857	13.62	0.0008
D41	0.02383599	0.01010635	0.00375402	2.86	0.0964
D42	0.02203824	0.01576560	0.00256917	1.95	0.1675
D52	0.01336811	0.01107950	0.00191408	1.46	0.2325
D71	0.03211610	0.02256936	0.00266236	2.02	0.1601
D72	0 02153975	0.02200792	0.00125035	0.95	0.3335
D81	0.04176619	0.01352497	0.01253035	9.56	0.0031
D82	0.07930419	0.01712787	0.02810676	21.46	0.0001
D91	0.05732599	0.02473352	0.00706302	5.37	0.0240
D92	0 10771811	0.03375250	0.01339129	10.19	0.0023
D101	0.05303035	0.02151250	0.00823246	6.26	0.0152
D102	0.07916036	0.02606796	0.01212441	9.22	0 0036
D112	0.01111537	0.00968199	0.00173292	1.33	0.2557
D131	0.04352912	0.01319551	0.01630750	10.00	0.0017
D132	0.03177989	0.01457374	0.00625304	4.76	0.0333

Bounds on condition number: 16.41738, 1294.174

Statistics for Removal: Step 11
DF = 1,58

Variable	Partial R**2	Model R**2
D12	0.0012	0.9477
D21	0.0167	0.9362
D22	0.0111	0.9377
D41	0.0025	0.9464
D42	0.0017	0.9471
D52	0.0013	0.9476
D71	0.0010	0.9471
D72	0.0008	0.9480
D81	0.0086	0.9405
D82	0.0189	0.9300
D91	0.0047	0.9443
D92	0.0090	0.9399
D101	0.0055	0.9433
D102	0.0081	0.9407
D112	0.0012	0.9477
D131	0.0096	0.9393
D132	0.0042	0.9447

Step11 Variable D72 Removed R-square = 0.94893847 C(p) = 7.56331775

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	16	1.41391633	0.08836977	67.37	0.0001
Error	59	0.07750865	0.00131371		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40096078	0 01692557	0.73725001	561.20	0.0001
D12	0.01161806	0 00995252	0.00179019	1.36	0.2478
D21	0 08233059	0 01856730	0.02577251	19.62	0.0001

BACKWARD selection procedure

D22	0.08374976	0.02252670	0.01815796	13.82	0.0004
D41	0.02483970	0.01406291	0.00609865	3.12	0.0825
D42	0.02071315	0.01570048	0.00238649	1.74	0.1922
D52	0.01580561	0.01077007	0.00285805	2.18	0.1455
D71	0.01865796	0.01769058	0.00143016	1.09	0.3010
D81	0.06336029	0.01350564	0.01292367	9.86	0.0027
D82	0.07920061	0.01712073	0.02017004	21.44	0.0001
D91	0.06665893	0.02279740	0.01123167	8.55	0.0049
D92	0.11851024	0.03187148	0.01816148	13.82	0.0004
D101	0.04929111	0.02099423	0.00724163	5.51	0.0221
D102	0.07667246	0.02561023	0.01110868	8.46	0.0051
D112	0.01236794	0.00959515	0.00217563	1.66	0.2032
D131	0.06730341	0.01260991	0.01040670	14.07	0.0004
D132	0.03458678	0.01420076	0.00770579	5.87	0.0185

Bounds on condition number: 14.65243, 1068.029

Statistics for Removal: Step 12
DF = 1,59

Variable	Partial R**2	Model R**2
D12	0.0012	0.9468
D21	0.0173	0.9308
D22	0.0122	0.9359
D41	0.0027	0.9453
D42	0.0015	0.9465
D52	0.0019	0.9461
D71	0.0010	0.9471
D81	0.0087	0.9394
D82	0.0109	0.9291
D91	0.0075	0.9405
D92	0.0122	0.9359
D101	0.0069	0.9432
D102	0.0074	0.9406
D112	0.0015	0.9466
D131	0.0124	0.9356
D132	0.0052	0.9429

Step12 Variable D71 Removed R-square = 0.94707155 C(p) = 6.45746944

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	15	1.41248618	0.09416575	71.57	0.0001
Error	60	0.07893881	0.00131565		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.40628917	0.01614868	0.03379077	432.99	0.0001
D12	0.01166373	0.00995876	0.00176333	1.33	0.2562
D21	0.07511235	0.01727811	0.02486393	18.90	0.0001
D22	0.07740935	0.02170766	0.01673012	12.72	0.0007
D41	0.02332943	0.01399856	0.00365411	2.78	0.1008
D42	0.01732169	0.01537159	0.00167084	1.27	0.2643

BACKWARD selection procedure

D52	0.01676104	0.01074527	0.00320116	2.43	0.1241
D81	0.04553807	0.01316746	0.01573565	11.96	0.0010
D82	0.07952360	0.01713179	0.02814008	21.55	0.0001
D91	0.06351425	0.02261398	0.01037036	7.89	0.0067
D92	0.11307283	0.03146778	0.01698727	12.91	0.0007
D101	0.05277316	0.02074258	0.00851608	6.47	0.0135
D102	0.07916912	0.02523015	0.01395423	9.85	0.0026
D112	0.01217542	0.00960081	0.00221588	1.61	0.2098
D131	0.04889523	0.01252652	0.02004526	15.24	0.0002
D132	0.03786008	0.01394210	0.00970155	7.37	0.0066

Bounds on condition number: 14.26073, 941.7116

Statistics for Removal: Step 13
DF = 1,60

Variable	Partial R**2	Model R**2
D12	0.0013	0.9459
D21	0.0167	0.9304
D22	0.0112	0.9359
D41	0.0025	0.9446
D42	0.0011	0.9460
D52	0.0021	0.9449
D81	0.0106	0.9365
D82	0.0190	0.9281
D91	0.0070	0.9401
D92	0.0114	0.9357
D101	0.0057	0.9414
D102	0.0087	0.9386
D112	0.0014	0.9457
D131	0.0134	0.9336
D132	0.0065	0.9406

Step13 Variable D42 Removed R-square = 0.94595139 C(p) = 5.52533863

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	14	1.41001556	0.10071254	76.26	0.0001
Error	61	0.08060945	0.00132147		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.41613867	0.01360082	1.23563791	935.05	0.0001
D12	0.01191631	0.00997265	0.00188677	1.43	0.2360
D21	0.07934150	0.01690284	0.02911639	22.03	0.0001
D22	0.08763851	0.01976205	0.02598856	19.67	0.0001
D41	0.01225689	0.00999265	0.00198826	1.50	0.2247
D52	0.01648115	0.01076613	0.00309679	2.34	0.1310
D81	0.04703171	0.01312952	0.01695666	12.83	0.0007
D82	0.08102309	0.01711776	0.02960602	22.40	0.0001
D91	0.05006113	0.01923717	0.00896188	6.77	0.0116
D92	0.09665403	0.02795296	0.01579961	11.96	0.0010
D101	0.05717167	0.02041705	0.01036164	7.84	0.0068

BACKWARD selection procedure

102	0 08720989	0 02425356	0 01708586	12 93	0 0006
112	0 01627749	0 00943864	0 00302371	2 29	0 1355
131	0 04921944	0 01255088	0 02032269	15 38	0 0002
132	0 04060413	0 01370857	0 01134669	8 59	0 0048

unds on condition number: 11.20335, 721.706

Statistics for Removal, Step 14
DF = 1,61

Variable	Partial R**2	Model R**2
D12	0 0013	0 9447
D21	0 0195	0 9264
D22	0 0178	0 9285
D41	0 0013	0 9446
D52	0 0021	0 9439
D81	0 0116	0 9346
D82	0 0199	0 9261
D91	0 0060	0 9400
D92	0 0106	0 9354
D101	0 0069	0 9390
D102	0 0115	0 9345
D112	0 0020	0 9439
D131	0 0136	0 9323
D132	0 0076	0 9381

ep14 Variable D12 Removed R-square = 0 94468631 C(p) = 6 73135521

	DF	Sum of Squares	Mean Square	F	Prob>F
egression	13	1 40892877	0 10837914	81.65	0.0001
rror	62	0.08269622	0 00133058		
otal	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
NTERCEP	0.61735564	0.01361737	1.24987957	939.35	0.0001
21	0.07564201	0.01667022	0.02738334	20.58	0.0001
22	0.07990331	0.01873600	0.02420016	18.19	0.0001
41	0.01285012	0 01002162	0.00212018	1 59	0.2116
52	0.01707295	0.01073979	0.00368505	2.77	0.1011
81	0.05078805	0.01279152	0.02097593	15.76	0.0002
82	0.08151730	0.01717169	0.02998500	22.54	0.0001
91	0.05177473	0.01924864	0.00962691	7.24	0.0092
92	0.09996316	0.02791122	0.01706730	12.83	0.0007
101	0.05988139	0.02036058	0.01150921	8 65	0.0046
102	0.09024898	0 02420290	0.01850088	13 90	0 0004
112	0.01200991	0.00939062	0.00247597	1.86	0.1775
131	0.05178862	0.01260792	0.02317997	17.42	0 0001
132	0.04144325	0.01380851	0 01198550	9.01	0.0039

unds on condition number: 11.09338, 636.8071

BACKWARD selection procedure

Statistics for Removal, Step 15
DF = 1,62

Variable	Partial R**2	Model R**2
D21	0.0184	0.9263
D22	0.0162	0.9285
D41	0.0016	0.9433
D52	0.0025	0.9422
D81	0.0141	0.9306
D82	0 0201	0.9246
D91	0.0065	0.9382
D92	0.0110	0.9332
D101	0.0077	0.9370
D102	0.0124	0.9323
D112	0.0017	0.9430
D131	0.0155	0.9291
D132	0.0080	0.9367

Step15 Variable D41 Removed R-square = 0.94336473 C(p) = 6.08656791

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	12	1.40680859	0 11723405	87.39	0 0001
Error	63	0.08481640	0.00134312		
Total	75	1.49162499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.62373086	0.01270560	1.49383884	1112.22	0.0001
D21	0.08363148	0.01549902	0.03910613	29.12	0.0001
D22	0.08875916	0.01745658	0.03473136	25.86	0.0001
D52	0.01658734	0.01046857	0.00260790	1.94	0.1684
D81	0.04902867	0.01277510	0.01970269	14.73	0.0003
D82	0.08167915	0.01725190	0.03010687	22.42	0.0001
D91	0.04650110	0.01807708	0.00816956	6.07	0.0165
D92	0.09004988	0.02690945	0.01504078	11.20	0.0014
D101	0.06367296	0.02025553	0.01210079	9.02	0.0026
D102	0.09210528	0.02627169	0.01934110	14.40	0.0003
D112	0.01386786	0.00943251	0.00257791	1.92	0.1708
D131	0.05062817	0.01263196	0.02237507	16.58	0.0001
D132	0.04037982	0.01384754	0.01162071	8.50	0.0049

Bounds on condition number: 10.21515, 561.8305

BACKWARD selection procedure

Statistics for Removal: Step 16
DF = 1,63

Variable	Partial R**2	Model R**2
D21	0.0262	0.9170
D22	0.0233	0.9200
D52	0.0017	0.9415
D81	0.0133	0.9300
D82	0.0202	0.9231
D91	0.0055	0.9378
D92	0.0101	0.9332
D101	0.0088	0.9344
D102	0.0130	0.9303
D117	0.0017	0.9415
D131	0.0149	0.9283
D132	0.0077	0.9356

Step16 Variable D112 Removed R-square = 0.94153424 C(p) = 3.73436323

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	11	1.40023067	0.12765733	93.70	0.0001
Error	64	0.08719431	0.00136241		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.42744091	0.01250907	1.59078118	1167.62	0.0001
D21	0.08074441	0.01546021	0.03712387	27.25	0.0001
D22	0.08499798	0.01736555	0.03263985	23.96	0.0001
D52	0.01562829	0.01051630	0.00300885	2.21	0.1422
D81	0.06059924	0.01206275	0.01940919	14.20	0.0003
D82	0.08148233	0.01737478	0.02996178	21.99	0.0001
D91	0.05065976	0.01079393	0.00982117	7.21	0.0092
D92	0.09176198	0.02651581	0.01051985	13.59	0.0005
D101	0.05990565	0.01823499	0.01194091	8.76	0.0043
D102	0.09332696	0.02466487	0.01943524	14.27	0.0004
D131	0.05289130	0.01241237	0.02473016	18.16	0.0001
D132	0.04336399	0.01377486	0.01349798	9.91	0.0025

Bounds on condition number: 9.778013, 473.5523

BACKWARD selection procedure

Statistics for Removal: Step 17
DF = 1,64

Variable	Partial R**2	Model R**2
D21	0.0269	0.9166
D22	0.0219	0.9197
D52	0.0020	0.9395
D81	0.0130	0.9285
D82	0.0201	0.9214
D91	0.0066	0.9350
D92	0.0124	0.9291
D101	0.0080	0.9335
D102	0.0130	0.9285
D131	0.0166	0.9249
D132	0.0091	0.9325

Step17 Variable D52 Removed R-square = 0.93951881 C(p) = 3.65761008

	DF	Sum of Squares	Mean Square	F	Prob>F
Regression	10	1.40122183	0.14012218	100.97	0.0001
Error	65	0.09020316	0.00138774		
Total	75	1.49142499			

Variable	Parameter Estimate	Standard Error	Type II Sum of Squares	F	Prob>F
INTERCEP	0.43083250	0.01241293	1.67177293	1204.67	0.0001
D21	0.08200573	0.01550782	0.03846840	27.68	0.0001
D22	0.08782665	0.01742064	0.03527333	25.42	0.0001
D81	0.06680171	0.01292925	0.01824603	13.15	0.0006
D82	0.08663326	0.01710380	0.03527560	25.43	0.0001
D91	0.05029705	0.01096751	0.00975850	7.03	0.0100
D92	0.09239101	0.02651142	0.01805295	13.16	0.0009
D101	0.06601713	0.02014799	0.01636231	10.35	0.0020
D102	0.09986041	0.02613474	0.02375000	17.12	0.0001
D131	0.05096916	0.01265903	0.02122496	14.74	0.0001
D132	0.04335657	0.01390414	0.01349328	9.72	0.0027

Bounds on condition number: 9.598361, 408.7678

BACKWARD selection procedure

Statistics for Removal: Step 18
DF = 1,65

Variable	Partial R**2	Model R**2
D31	0.0258	0.9138
D22	0.0237	0.9159
D01	0.0122	0.9273
D02	0.0237	0.9159
D91	0.0065	0.9330
D92	0.0113	0.9282
D101	0.0096	0.9299
D102	0.0159	0.9236
D131	0.0156	0.9239
D132	0.0090	0.9305

All variables left in the model are significant at the 0.1000 level.

Summary of Backward Elimination Procedure for Dependent Variable Y

Step	Variable Removed	Number In	Partial R**2	Model R**2	C(p)	F	Prob>F
1	D11	26	0.0000	0.9496	26.0003	0.0001	0.9862
2	D32	25	0.0000	0.9496	24.0071	0.0069	0.9340
3	D102	24	0.0000	0.9496	22.0151	0.0086	0.9274
4	D111	23	0.0000	0.9496	20.0115	0.0174	0.8956
5	D51	22	0.0000	0.9496	18.0503	0.0311	0.8606
6	D101	21	0.0001	0.9495	16.1193	0.0652	0.7995
7	D61	20	0.0001	0.9495	14.1749	0.0626	0.8027
8	D31	19	0.0001	0.9493	12.2938	0.1357	0.7140
9	D62	18	0.0001	0.9492	10.4222	0.1490	0.7010
10	D121	17	0.0003	0.9489	8.7461	0.3789	0.5407
11	D72	16	0.0008	0.9480	7.5433	0.9510	0.3335
12	D71	15	0.0010	0.9471	6.4575	1.0806	0.3010
13	D42	14	0.0011	0.9460	5.5253	1.2690	0.2643
14	D12	13	0.0013	0.9447	4.7314	1.4278	0.2368
15	D41	12	0.0010	0.9433	4.0846	1.5936	0.2116
16	D112	11	0.0017	0.9415	3.7344	1.9194	0.1708
17	D52	10	0.0020	0.9395	3.4576	2.2085	0.1422

BACKWARD selection procedure

Model: MODEL1
Dependent Variable: Y

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	10	1.40122	0.14012	100.971	0.0001
Error	65	0.09020	0.00139		
C Total	75	1.49142			

Root MSE	0.03725	R-square	0.9395
Dep Mean	0.67099	Adj R-sq	0.9302
C.V.	5.48647		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.430833	0.01241292	34.708	0.0001
D21	1	0.082006	0.01550782	5.261	0.0001
D22	1	0.087027	0.01763064	5.062	0.0001
D01	1	0.066002	0.01292925	5.626	0.0000
D02	1	0.086633	0.01710300	5.062	0.0001
D91	1	0.050290	0.01096751	3.653	0.0100
D92	1	0.092291	0.02651142	3.495	0.0009
D101	1	0.066817	0.02016799	3.317	0.0020
D102	1	0.099860	0.02613474	4.138	0.0001
D131	1	0.050969	0.01265903	4.091	0.0001
D132	1	0.043357	0.01390434	3.118	0.0027

Variable	DF	Tolerance
INTERCEP	1	.
D21	1	0.32808895
D22	1	0.37257356
D01	1	0.63692815
D02	1	0.69959005
D91	1	0.37089035
D92	1	0.10430617
D101	1	0.19331211
D102	1	0.16588491
D131	1	0.47881900
D132	1	0.41234574

Appendix (D) SAS Output

Part (VI)

Fitted Model and Diagnosis

Model fitting procedure

del: MODEL1
pendent Variable: Y

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	10	1.40122	0.14012	100.971	0.0001
Error	65	0.09020	0.00139		
C Total	75	1.49142			

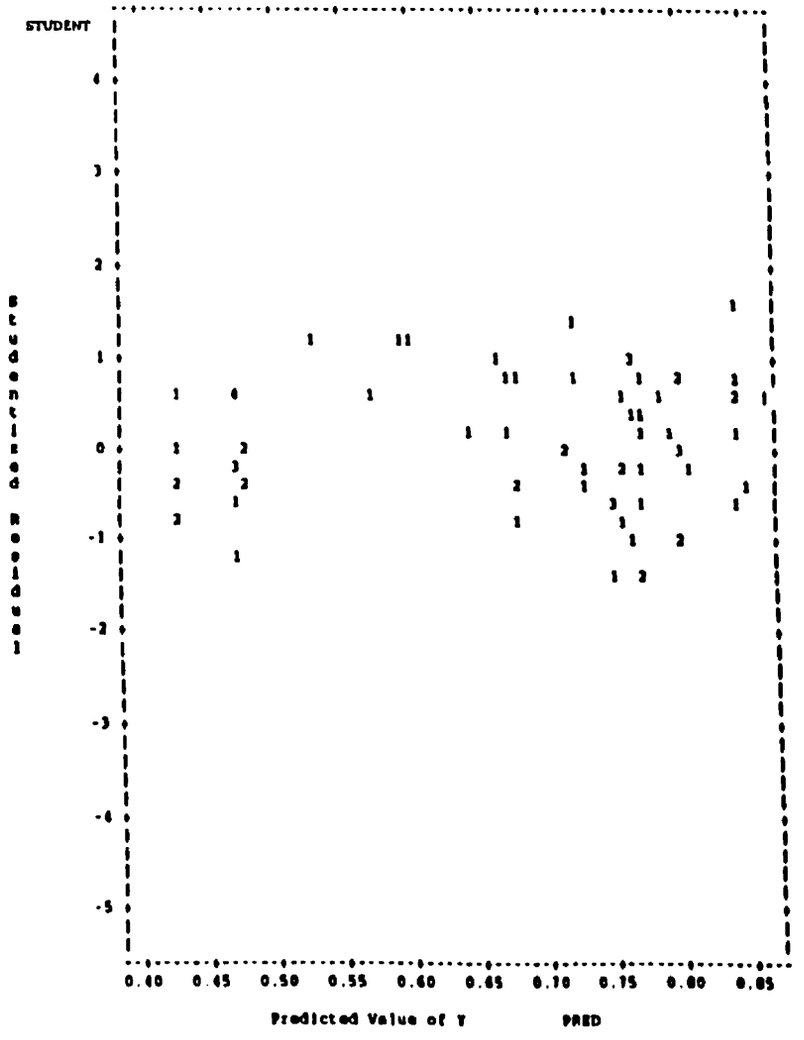
Root MSE	0.03725	R-square	0.9395
Dep Mean	0.67899	Adj R-sq	0.9302
C.V.	5.48647		

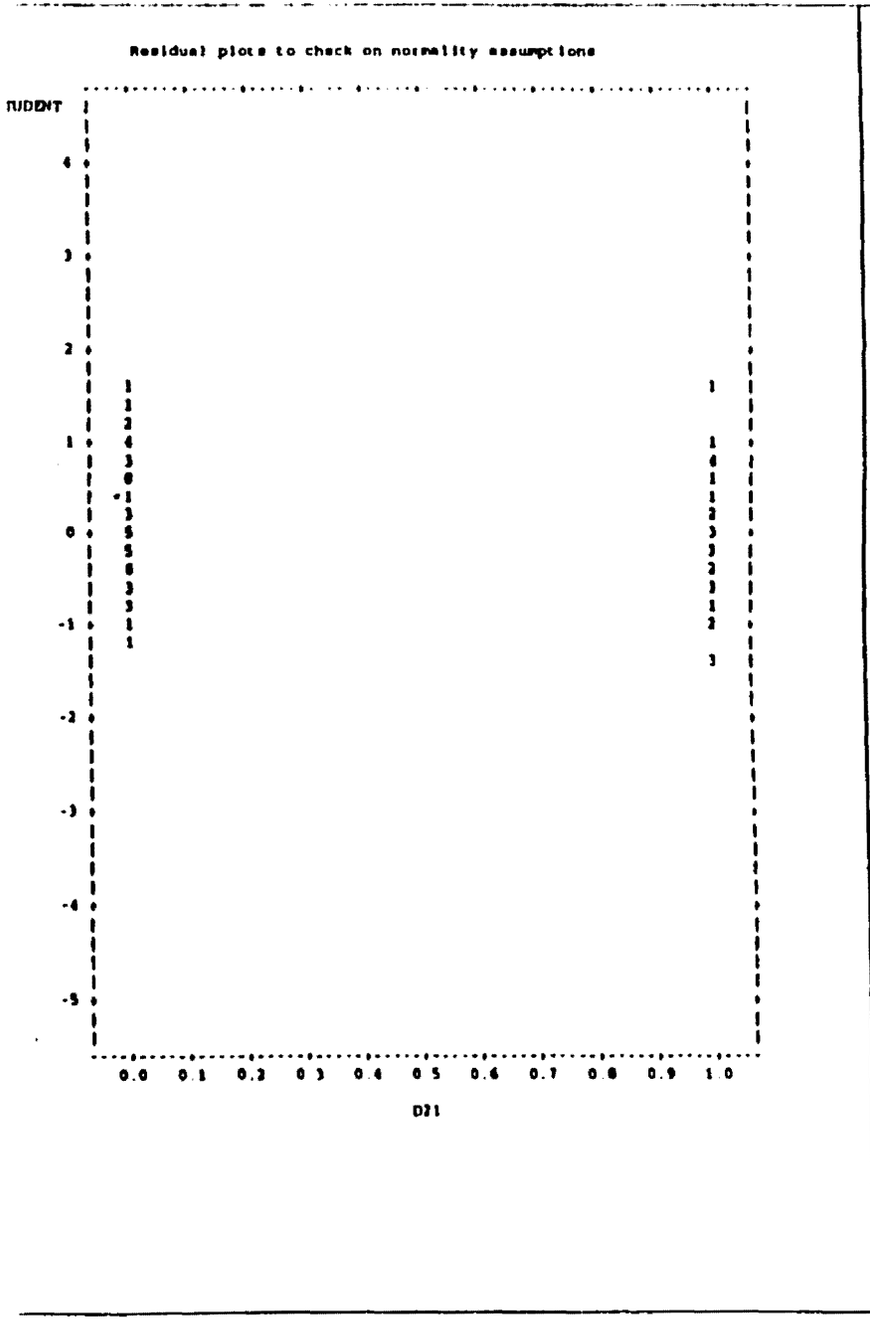
Parameter Estimates

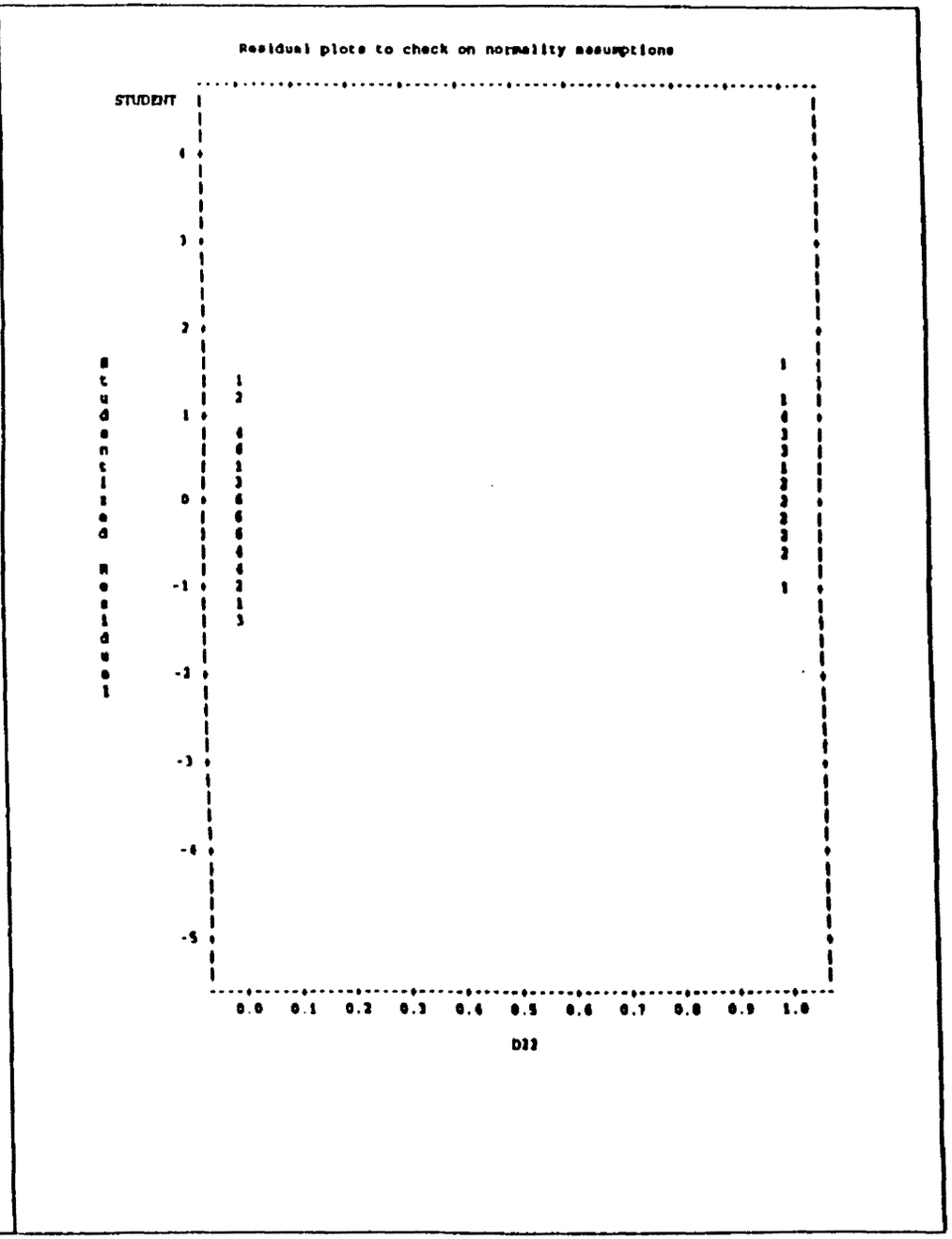
Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.630833	0.01241292	36.708	0.0001
D21	1	0.082006	0.01550702	5.261	0.0001
D22	1	0.087827	0.01742066	5.062	0.0001
D81	1	0.046882	0.01292925	3.626	0.0006
D82	1	0.086633	0.01710308	5.062	0.0001
D91	1	0.050298	0.01896751	2.652	0.0100
D92	1	0.092391	0.02651142	3.485	0.0009
D101	1	0.066817	0.02016799	3.217	0.0020
D102	1	0.099860	0.02413474	4.138	0.0001
D131	1	0.050969	0.01245903	4.091	0.0001
D132	1	0.043357	0.01390436	3.118	0.0027

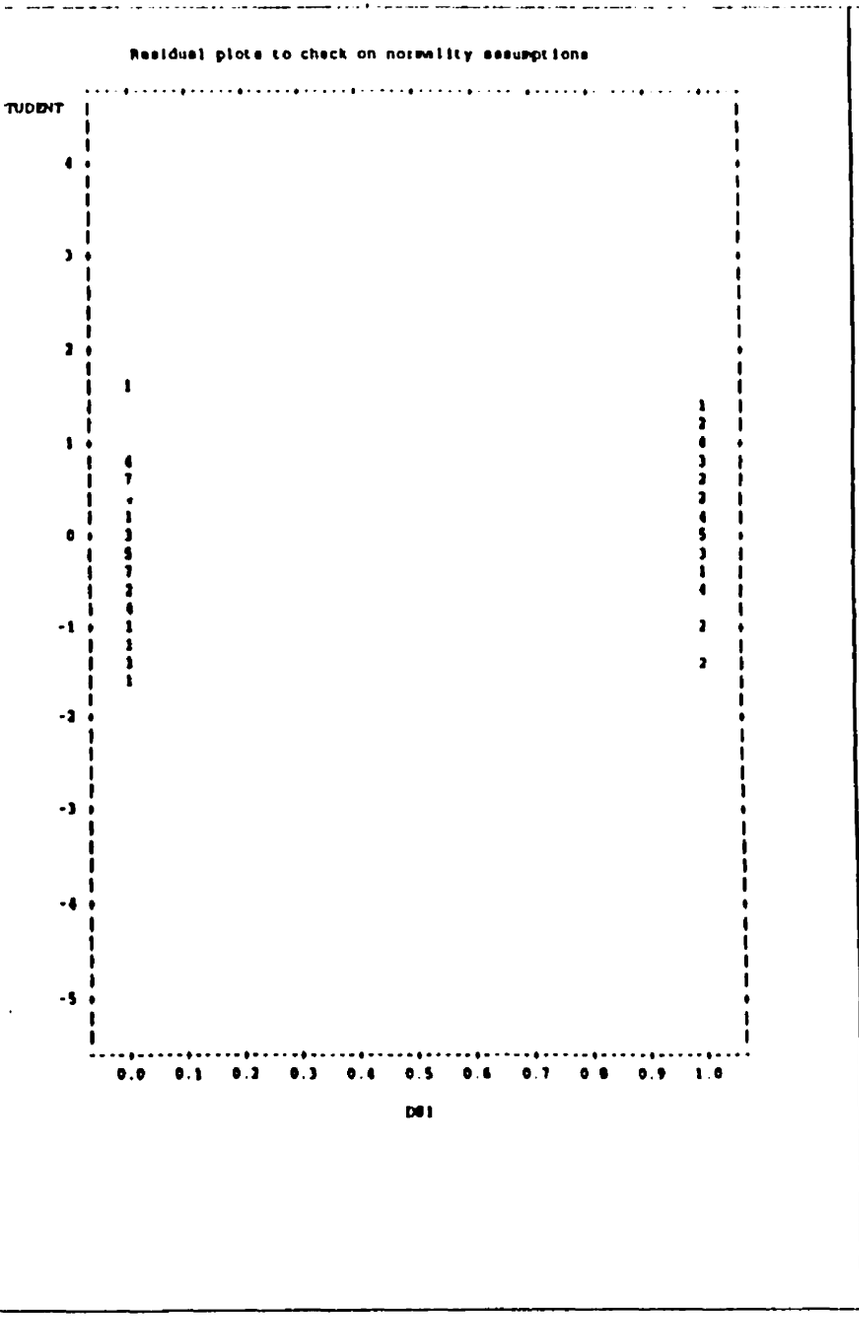
Variable	DF	Tolerance
INTERCEP	1	.
D21	1	0.32000895
D22	1	0.27257356
D81	1	0.63692615
D82	1	0.49959005
D91	1	0.27869035
D92	1	0.10620617
D101	1	0.19331211
D102	1	0.14508491
D131	1	0.67881900
D132	1	0.61236570

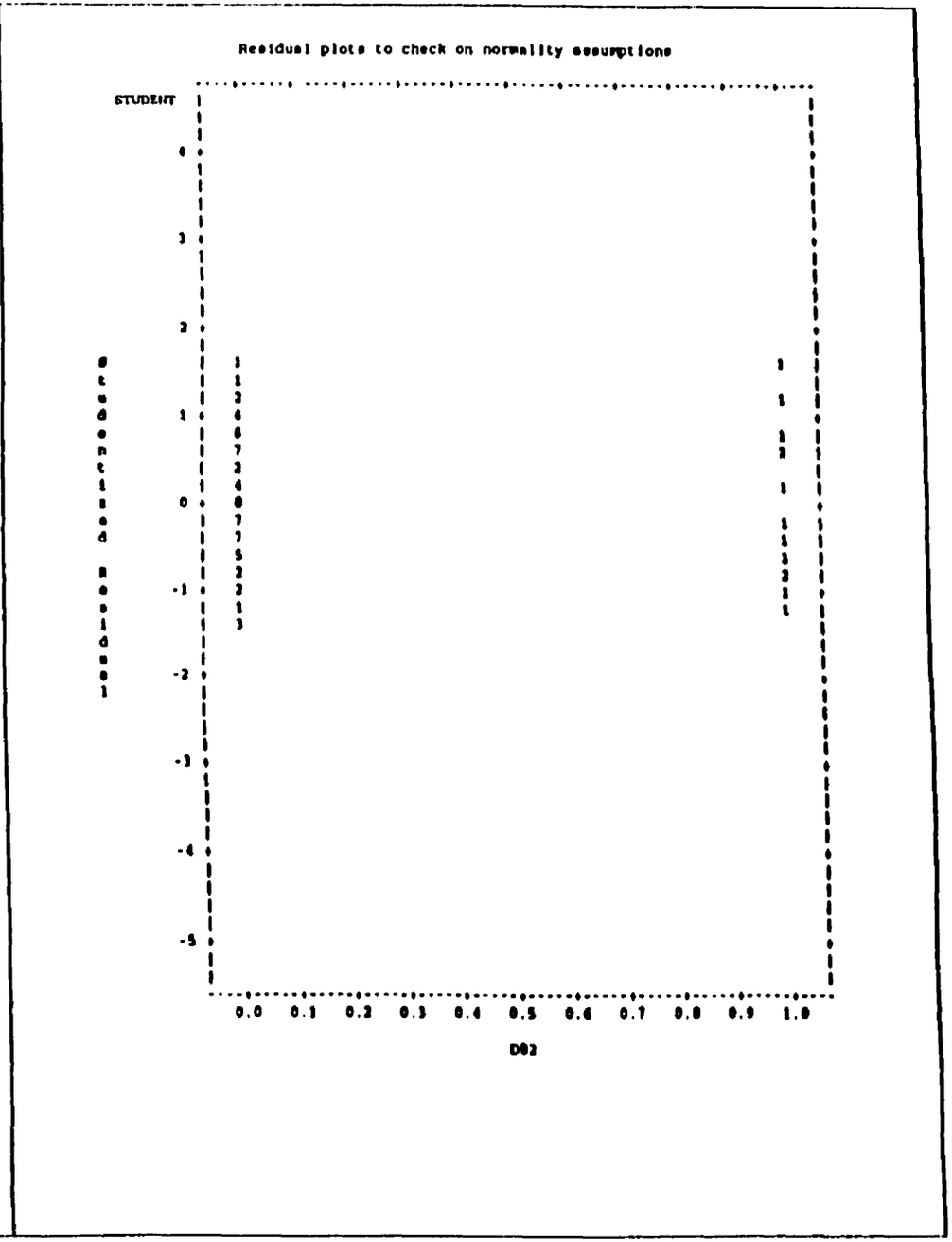
Model Diagnostic
(1) Residual plots to check on normality assumptions

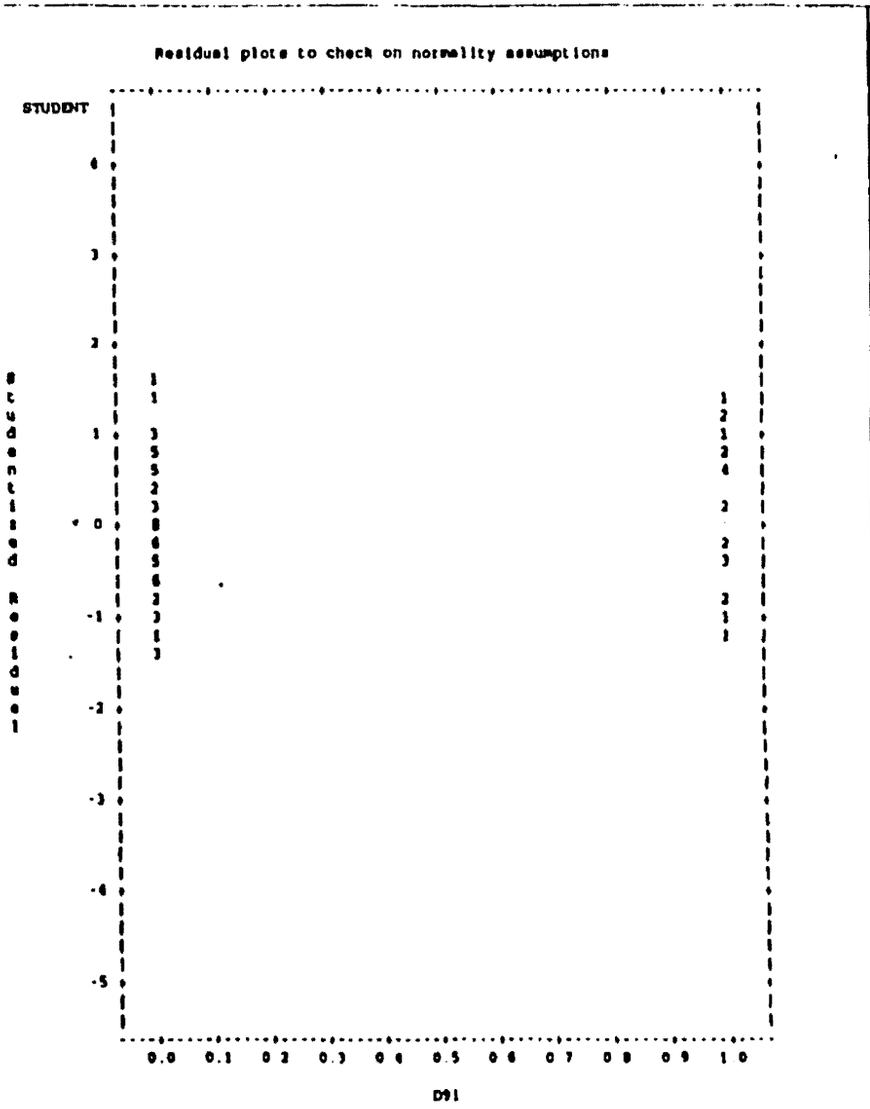


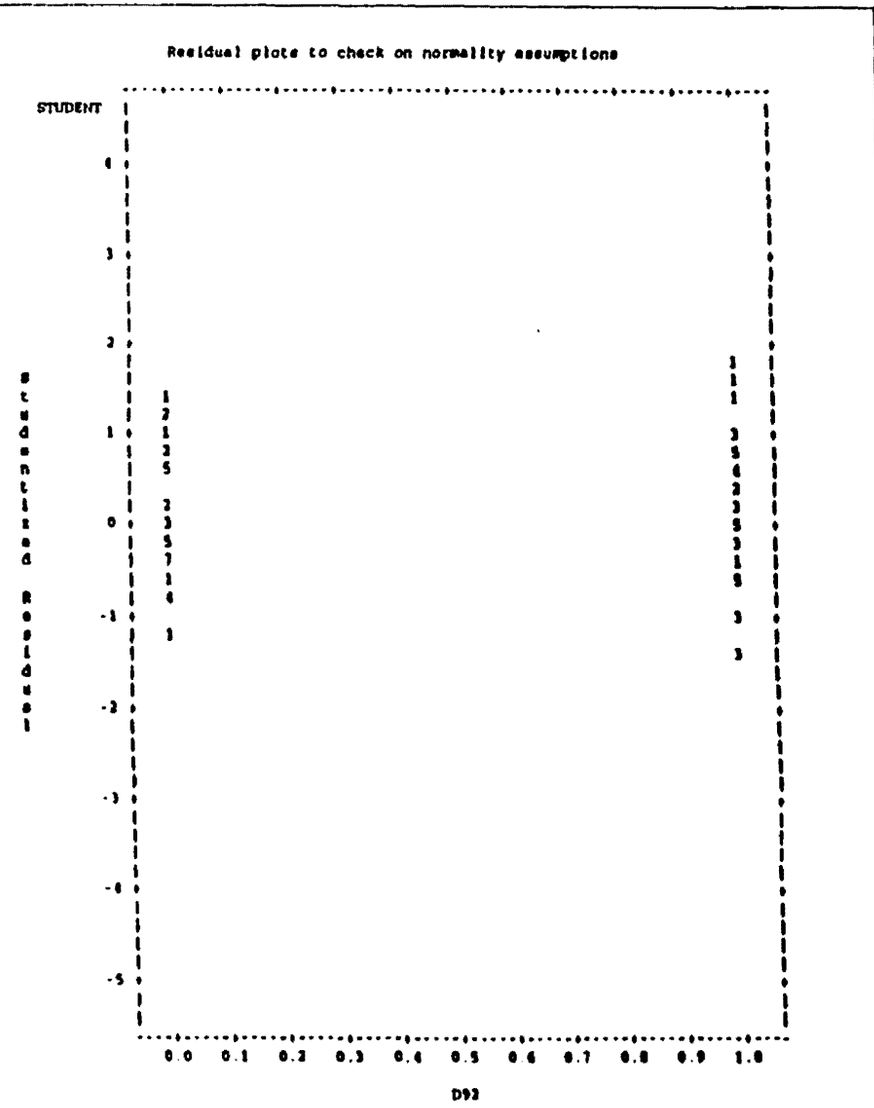

Residual plots to check on normality assumptions
STUDENT
D21

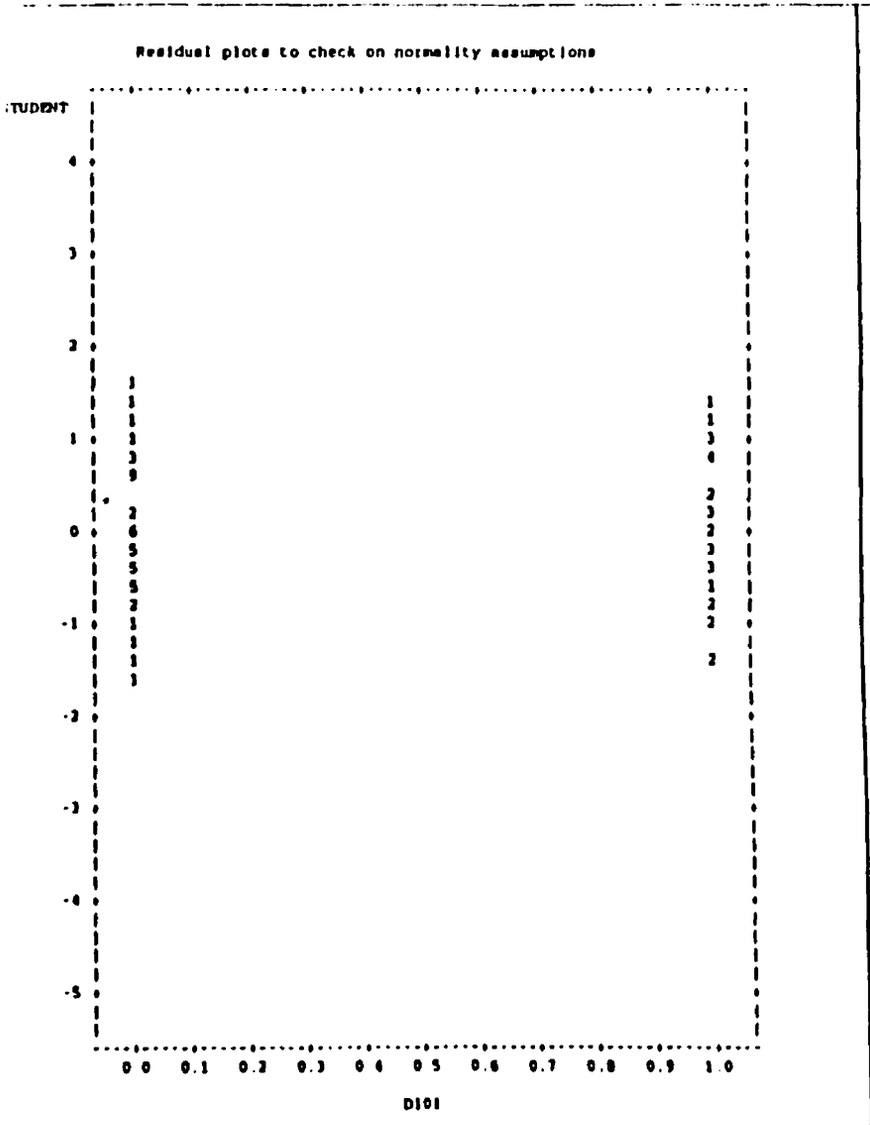

Residual plots to check on normality assumptions
STUDENT
D22

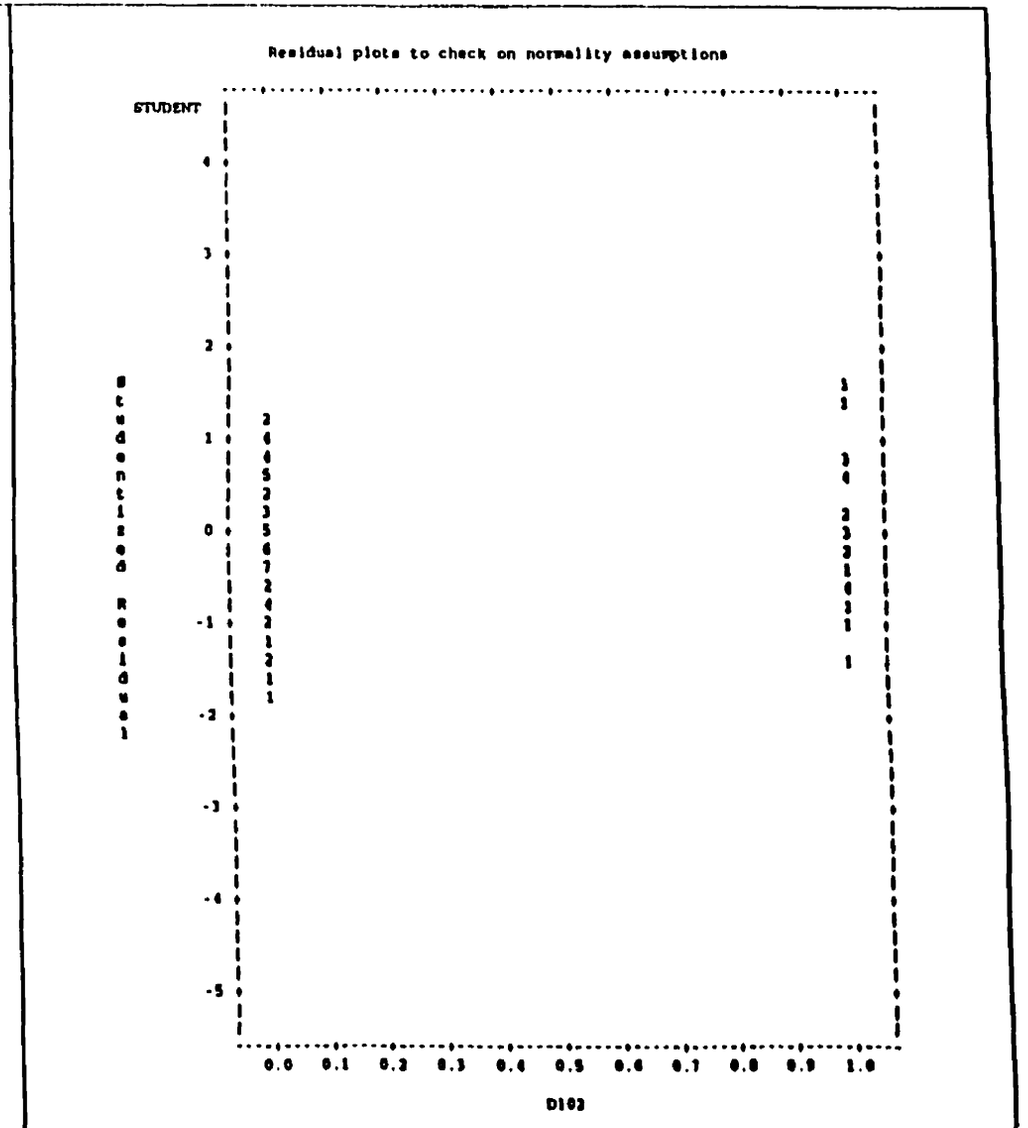

Residual plots to check on normality assumptions
TUDENT
4
3
2
1
0
-1
-2
-3
-4
-5
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
D01

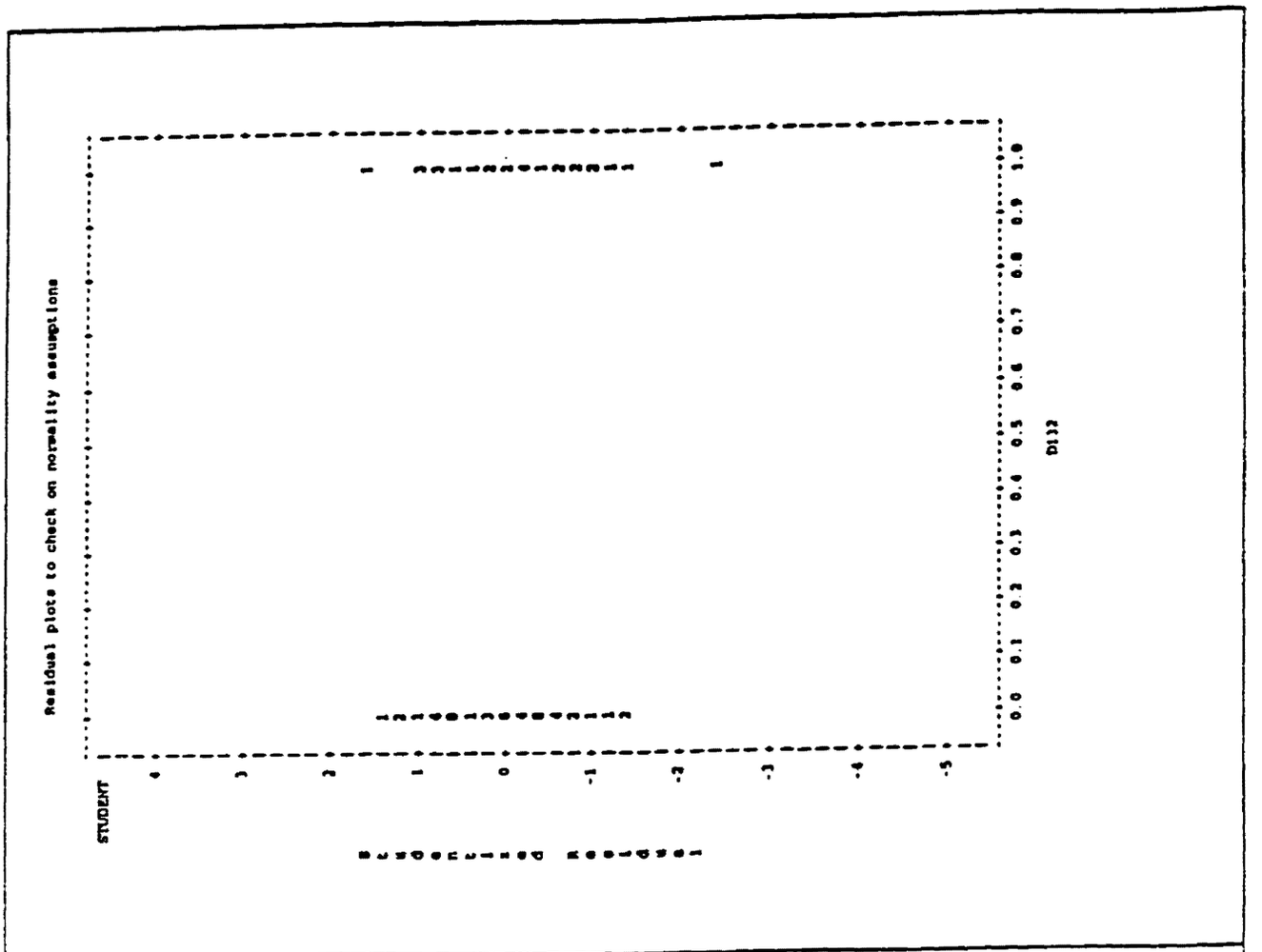

Residual plots to check on normality assumptions
STUDENT
Standardized Residual
4
3
2
1
0
-1
-2
-3
-4
-5
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
D02

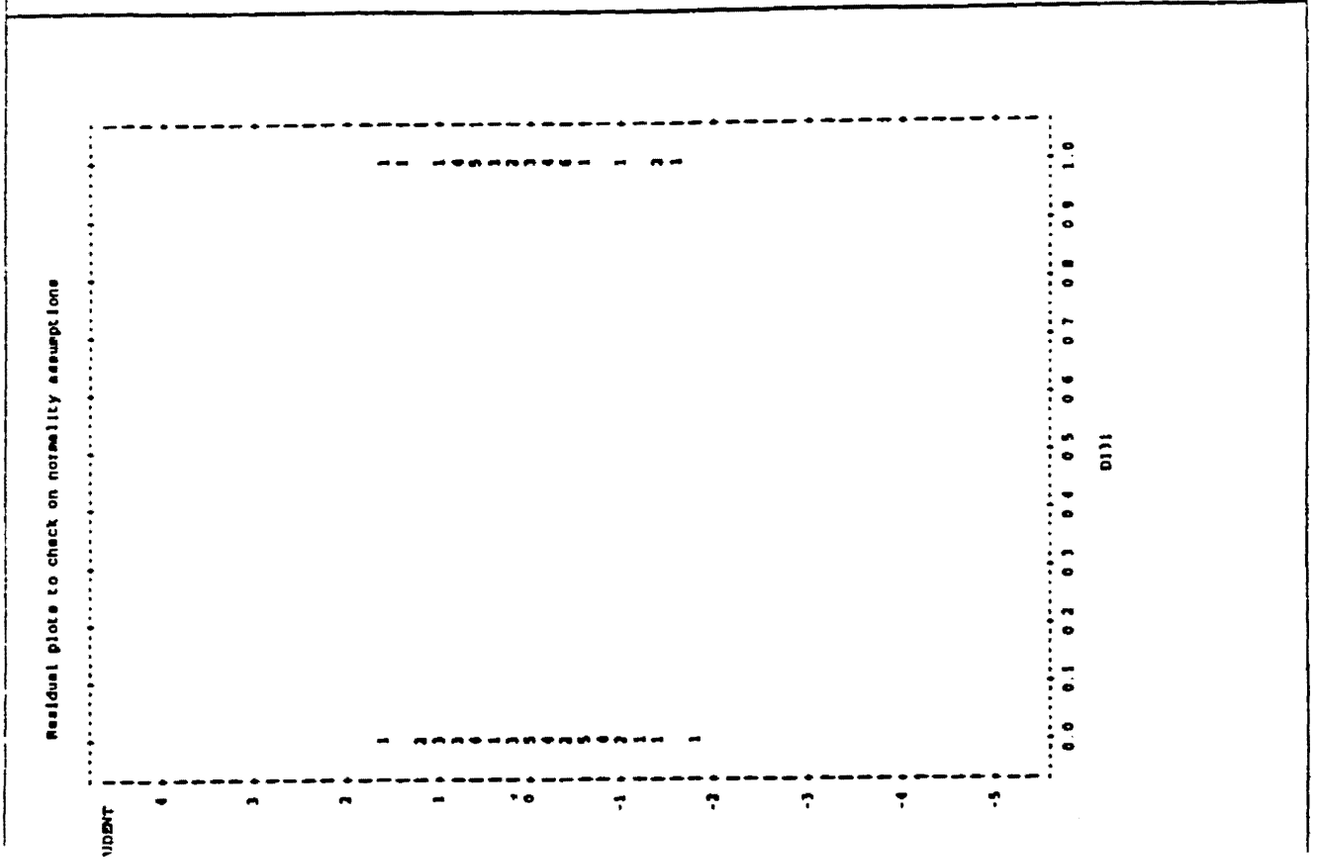

Residual plots to check on normality assumptions
STUDENT
D91

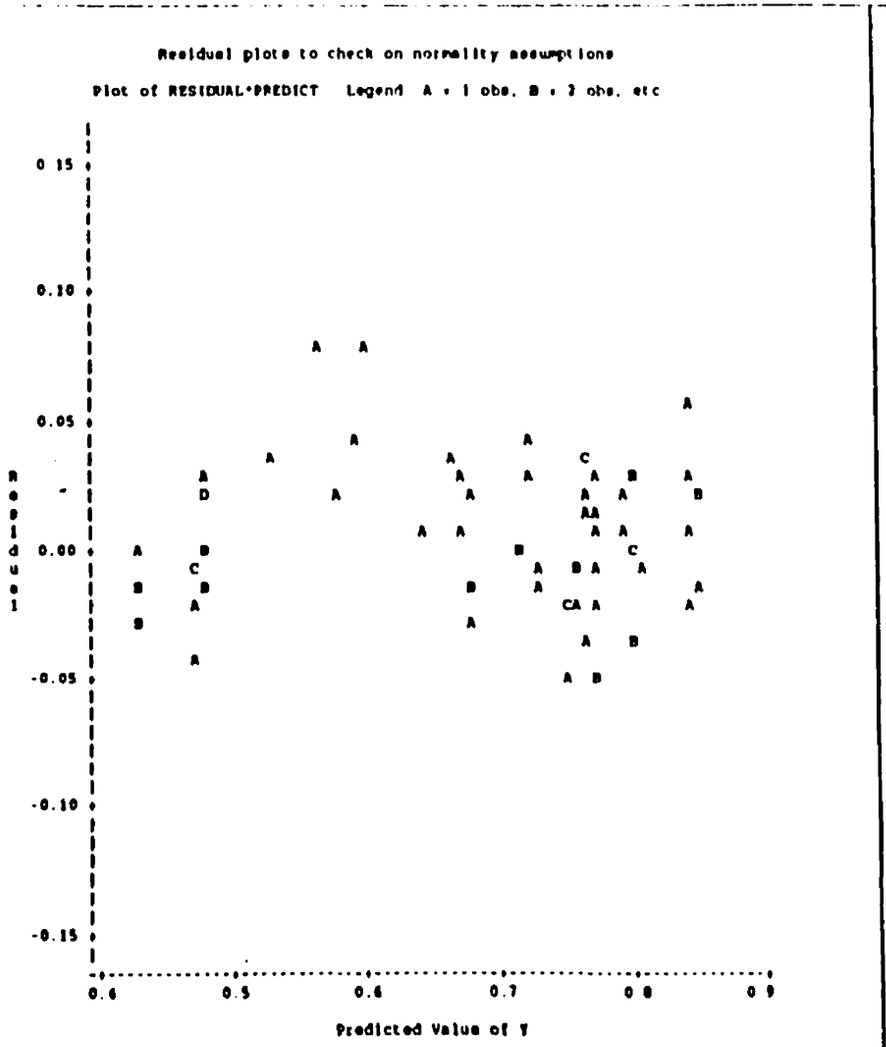

Residual plots to check on normality assumptions
STUDENT
D93

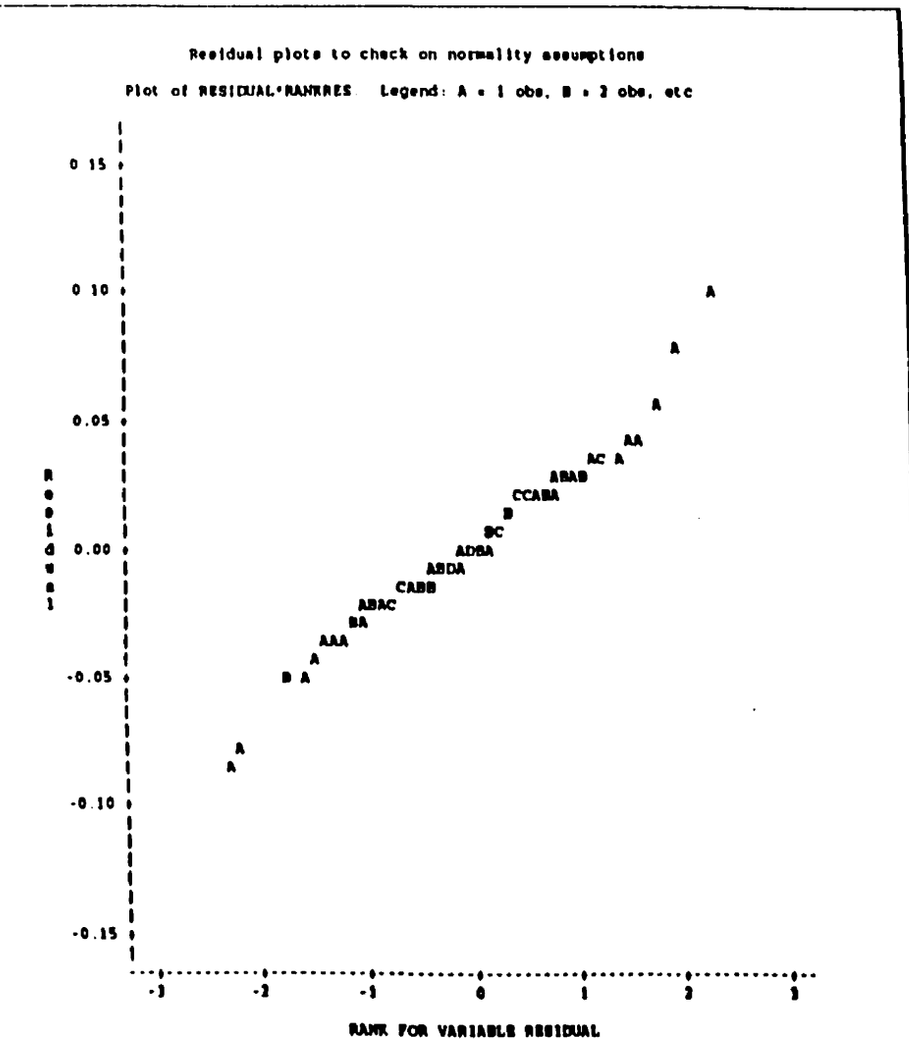

Residual plots to check on normality assumptions
STUDENT
4
3
2
1
0
-1
-2
-3
-4
-5
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
D101

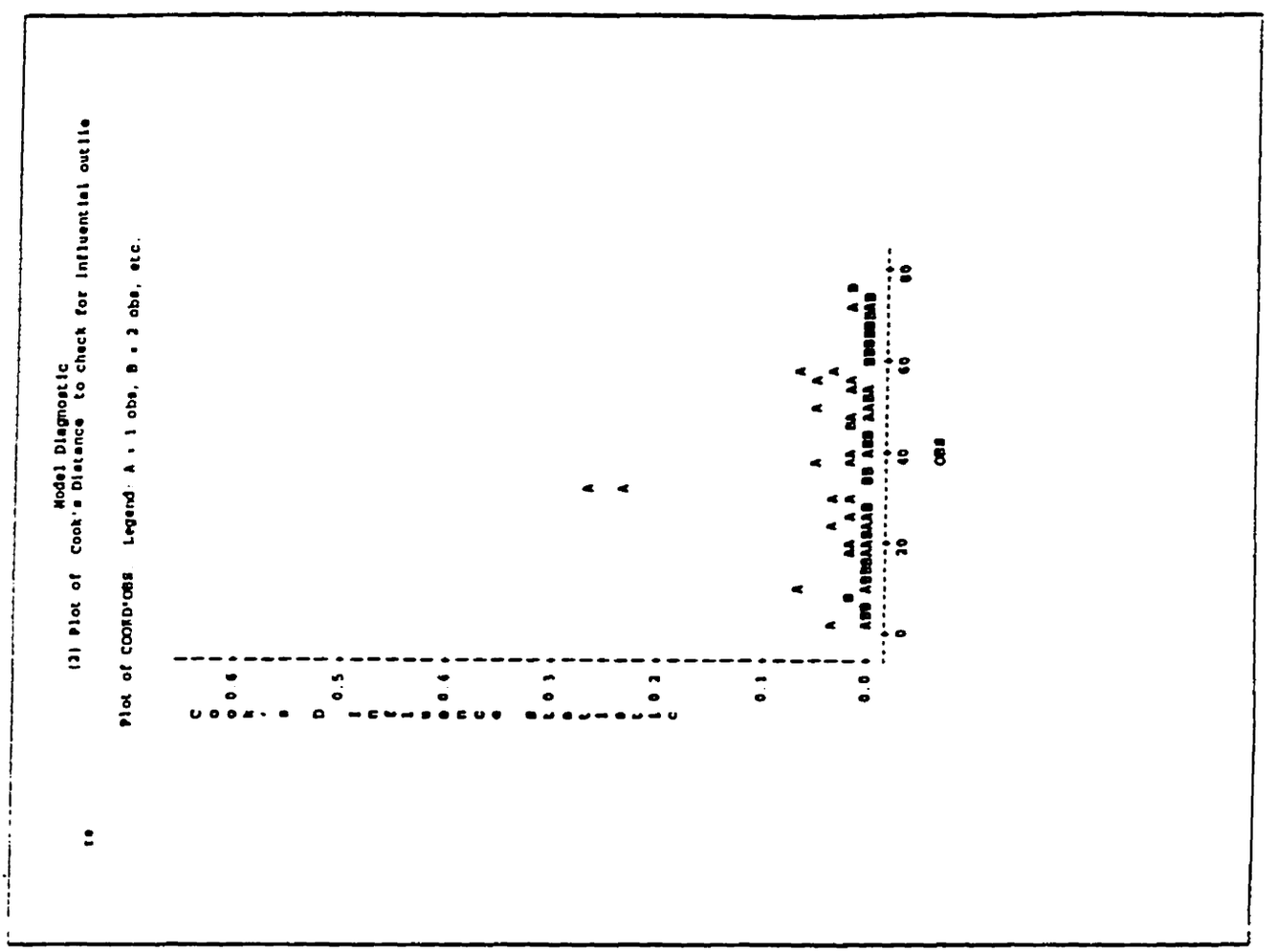

Residual plots to check on normality assumptions
STUDENT
Studentized Residual
4
3
2
1
0
-1
-2
-3
-4
-5
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
D103


Residual plots to check on normality assumptions
STUDENT
D132


Residual plots to check on normality assumptions
D111


Residual plots to check on normality assumptions
Plot of RESIDUAL*PREDICT Legend: A = 1 obs, B = 2 obs, etc
Residual
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
0.4
0.5
0.6
0.7
0.8
0.9
Predicted Value of Y


Residual plots to check on normality assumptions
Plot of RESIDUAL*RANKRES Legend: A = 1 obs, B = 2 obs, etc
Residual
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-3
-2
-1
0
1
2
3
RANK FOR VARIABLE RESIDUAL


Model Diagnostic
(3) Plot of Cook's Distance to check for influential outlie
Plot of COOKD*OBS Legend: A = 1 obs, B = 2 obs, etc.
COOKD
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
20
40
60
80
OBS

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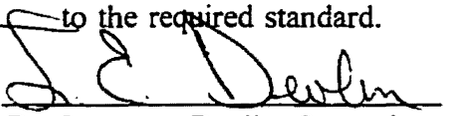
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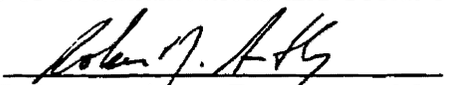
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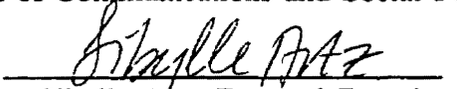
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Abstract

The purpose of this study was twofold: first to identify the language learning strategies (LLS) of seven successful adult female learners enrolled in English as a Second Language (ESL) at the University of Victoria; and, secondly, to describe in what naturalistic life circumstances or situations these strategies are revealed.

The learners were self-selected for the study. All were enrolled in a 410, intermediate level ESL course and ranged from twenty-one to twenty-seven years of age. There were six Asian participants and one Mexican. Experience in ESL study ranged from approximately one year to eleven years.

The choice of female participants was based on convenience; suggestions in existing research about women's differentiated use of LLS; and, the researcher's own career role in association with young women studying ESL. Although gender was not a specific focus in the study, the female researcher and participants share a common phenomenological reality. This prompted questions about assumptions, methods, and findings of the study, as well as its conceptual framework.

Three data collection processes were used to measure learners' reported use of LLS. The first was the Strategies Inventory in Language Learning (SILL) (Oxford, 1989), a fifty item, Likert scaled summative tool measuring LLS preference in six macrostrategy areas. The second and third data collection methods were qualitative. Employing the second method, participants were interviewed twice by the researcher. Using the third methodology, participants kept reflective notes/mini-diary studies for a

period of two weeks.

The strategy category system from the SILL was used to organize the qualitative data from the interviews and reflective notes.

The most significant findings from the study were:

1. The participants used all categories of LLS as measured by SILL, but tended to prefer cognitive, metacognitive, and affective strategies;

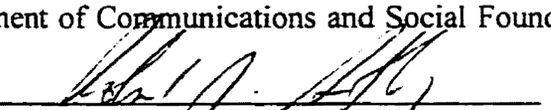
2. ESL appears to be learned in a variety of ways depending on individual psychological and social situational factors; and,

3. Learners optimized multiple life situations—formal and informal; psychological; and, social—to realize their learning goals and aspirations.

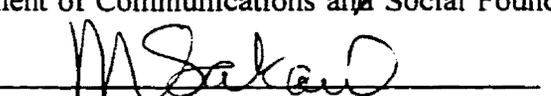
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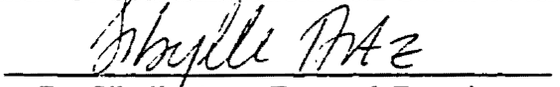
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Table of Contents

Abstract ii

Table of Contents iv

List of Tables x

List of Figures xii

Acknowledgements xiii

Chapter 1: Successful Female Adult Language Learners: Their Strategy Use in Second Language Learning 1

Introduction 1

Conceptual Approaches 3

Problem Statement 8

Purpose of the Study 9

The Professional Experiential Context 11

The Research Questions 12

Definition of Terms 13

Significance of the Study 14

Chapter 2: Professional Literature Perspectives on Adult Language Learners: Their Strategy Use is Second Language Acquisition 16

Introduction 16

Research Challenges in Second Language Acquisition 17

Perspectives on the Nature of Language 17

Expanded Perspective of Language Learning 20

Alternative Approaches to Strategy Use in SLA 21
Good Language Learners 24
Empirical Findings: Strategy Use in Second Language Learning 25
Role of Empirical Research 26
Social Interactionist Theory in SLA 26
Potential for Strategy Use in Second Language Learning 27
Strategy Classification Schemes 30
Concluding Comments 33
Theoretical Framework 34
Chapter 3: Methods Toward Meaning 38
Introduction 38
Design 39
Strategies inventory in language learning (SILL) 39
Semi-structured interviews 42
Reflective notes 44
Selection of Subjects 46
Data Collection 48
Introduction 48
SILL: Data collection 48
Semi-structured interviews (SSI): Data collection 49
Reflective notes (RN): Data collection 50
Theoretical Considerations of Data Analysis 51

Data Analysis Process 52
Data analysis: SILL 52
Data analysis: Semi-structured interviews 53
Data analysis: Reflective notes 53
Data Analysis 54
Quantitative data/SILL 54
Qualitative data 55
Synthesis 56
Triangulation of Qualitative and Quantitative Data 57
Chapter 4: Language Learning Strategies: Orchestrated Occurrences 58
Introduction 58
Learning Experience of Participant 'Yuriko' 60
Description of Yuriko 60
Qualitative Findings 61
Interview findings 61
Reflective note findings 63
Quantitative Findings 70
SILL findings 70
Reflective Synthesis 72
Learning Experience of Participant 'Alexandria' 76
Description of Alexandria 76
Qualitative Findings 78

Interview findings 78
Reflective note findings 79
Quantitative Findings 87
SILL findings 87
Reflective Synthesis 89
Learning Experience of Participant 'Don' 93
Description of Don 93
Qualitative Findings 94
Interview findings 94
Reflective note findings 96
Quantitative Findings 105
SILL findings 105
Reflective Synthesis 107
Learning Experience of Participant 'Tomomi' 111
Description of Tomomi 111
Qualitative Findings 112
Interview findings 112
Reflective note findings 114
Quantitative Findings 121
SILL findings 121
Reflective Synthesis 123
Learning Experience of Participant 'Sony' 126

Description of Sony 126
Qualitative Findings 127
Interview findings 127
Reflective note findings 128
Quantitative Findings 138
SILL findings 138
Reflective Synthesis 140
Learning Experience of Participant 'Hiromi' 145
Description of Hiromi 145
Qualitative Findings 146
Interview findings 146
Reflective note findings 147
Quantitative Findings 156
SILL findings 156
Reflective Synthesis 158
Learning Experience of Participant 'Jessie' 162
Description of Jessie 162
Qualitative Findings 164
Interview findings 164
Reflective note findings 166
Quantitative Findings 175
SILL findings 175

Reflective Synthesis 177

Conclusion 181

Chapter 5: Conclusions and Recommendations 184

Introduction 184

Concluding Observations 186

Recommendations 193

Practice enhancement 193

Theory enhancement 194

Further research 195

References 197

Appendix A: SILL Inventory 216

Appendix B: Semi-structured Interviews 225

Appendix C: Frame for Reflective Notes 230

Appendix D: Outline of Strategy System 232

List of Tables

Table 1: Yuriko's LLS Use and Associated Learning Themes 64

Table 2 66

Table 3 68

Table 4: SILL Inventory Scores for Yuriko 71

Table 5: Synthesis of Findings: Yuriko 75

Table 6: Alex's LLS Use and Associated Learning Themes 80

Table 7 83

Table 8 85

Table 9: SILL Inventory Scores for Alex 88

Table 10: Synthesis of Findings: Alex 92

Table 11: Don's LLS Use and Associated Learning Themes 98

Table 12 101

Table 13 103

Table 14: SILL Inventory Scores for Don 106

Table 15: Synthesis of Findings: Don 110

Table 16: Tomomi's LLS Use and Associated Learning Themes 116

Table 17 118

Table 18 120

Table 19: SILL Inventory Scores for Tomomi 122

Table 20: Synthesis of Findings: Tomomi 125

Table 21: Sony's LLS Use and Associated Learning Themes 131

Table 22 134

Table 23 136

Table 24: SILL Inventory Scores for Sony 139

Table 25: Synthesis of Findings: Sony 144

Table 26: Hiromi's LLS Use and Associated Learning Themes 149

Table 27 152

Table 28 154

Table 29: SILL Inventory Scores for Hiromi 157

Table 30: Synthesis of Findings: Hiromi 161

Table 31: Jessie's LLS Use and Associated Learning Themes 168

Table 32 170

Table 33 172

Table 34: SILL Inventory Scores for Jessie 176

Table 35: Synthesis of Findings: Jessie 180

List of Figures

Figure 1: Information Processing Model 19

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CHAPTER ONE

Successful Female Adult Language Learners:

Their Strategy Use in Second Language Learning

Introduction

The closing decades of the twentieth century have witnessed tremendous growth and change in the knowledge base and requirements for language use throughout the world (Esling, 1989). English has emerged as an international language of science, medicine, and education (Johnstone, 1992).

Coupled with these communication requirements, this century has witnessed globally disruptive, political, and ecological activity which has resulted in a rising number of migrants, refugees, and immigrants requiring language reeducation (Bassler, 1990; Butler, 1991).

Within the field of adult language learning (including second or foreign language learning), the preferred educational approach has reflected a major theoretical shift (McLaughlin, Rossman, & McLeod, 1983; Swaffar, 1989; etc.). Whereas early efforts focused mainly on the role of learning theory and methodology, current efforts have demonstrated an increased interest in the role of the learner, his/her attributes, characteristics, and behaviours. Among these are included human information processing capacity, language learning experience, and the use of language learning strategies (LLS) (Bialystok, 1978; Schmidt, 1990).

Theoretical efforts to explain adult language learning have constituted a complex and confusing area of research due to the inter/intra-disciplinary complexity

of language learning process (Long, 1990). In order to focus and priorize research efforts, it became necessary to delineate the most salient areas of the language learning process (Bialystok, 1978; McLaughlin, et al., 1983), identify pivotal constructs and relationships (Ellis, 1989), and define ambiguous terminology (Stern, 1991; Stevick, 1990).

Historically, theory in adult language learning, most commonly called Second Language Acquisition (SLA), the process of acquiring another language after one's native language (Gass & Selinker, 1994), has been characterized by two different traditions: one linguistic in nature and the other psychological. The linguistic tradition focused primarily on learning methodology and content, including such theoretical constructs as contrastive analysis, comprehensible input, and variability in learning rate (Ellis, 1989; Johnstone, 1992; etc.).

Alternatively, the psychological tradition addressed the learner, his/her characteristics including needs, attitudes, and affective behaviour (Bialystok, 1975; Ellis, 1989; Gardiner & MacIntyre, 1993).

Much of the early emphasis in both research and practice has focused on the traditional, linguistic *rules* aspect of language learning (Jacobs & Schumann, 1992). Thus, resultant theory has largely addressed outcome evidence, the *what* of language learning; that is, learning associated manifestations or products (Cohen, 1990). In the area of strategies related to language learning, it was often teaching strategies or learning materials which received primary research attention (Swaffar, 1989). The processural, learner focused aspects of language learning were largely ignored (Cohen,

1990; Raymond, 1982).

Recent efforts have moved away from the focus on the *what* and toward the *how* of language learning (Cohen, 1990). Increasingly, research and practice has sought to utilize current psychological tradition and theory in understanding the process of language learning and the inherent role of the learner. This perspective assumes an understanding of language as a living, "...creative process with strong genetic roots, something best approached from the stance of cognitive psychology" (McArthur, 1983, p. 35).

Thus as the paradigm for understanding the process of SLA has shifted and become more inclusive, the centrality of the learner's role has increasingly been recognized. Subsequently, the behaviours and attributes, cognitive and otherwise, which characterize and differentiate SLA participants, have attracted the attention of both researchers and practitioners (Reid, 1987; Swaffar, 1987).

One of these areas of learning behaviour that has attracted increasing attention has been learners' use of strategic behaviour in SLA (Canale & Swain, 1980; O'Malley & Chamot, 1990; Oxford, 1985).

Conceptual Approaches

The field of cognitive psychology has suggested a variety of approaches and processes that the human mind uses in interpreting and manipulating incoming sensory information. Eisner (1994) suggested that six basic components be included in a taxonomy of cognitive processes. These were possession of knowledge, comprehension, application, analysis, synthesis, and evaluation. Through these mental

operations or processes of learning, informational input is modified by the learner into knowledge or knowledge structures. Thus input becomes intake and schemata encoding the intake are formed as knowledge. This knowledge can then be stored in long term memory to be retrieved and used when needed as output (Gass, 1988).

The assignment of the language learning process to the domain of cognitive psychology, made some basic philosophical assumptions about the nature of language learning and the role of the learner. It assumed that language learning involves both controlled and automatic processes, depending on task requirements, learner attentiveness, and the ability and experience of the learner (McLaughlin, et al., 1983). It also assumed that the language learning process is multifaceted and interactional (Gass, 1988), involves modification and transformation of incoming language stimuli, and that the language learner is a proactive creator of knowledge.

Anderson (1985) noted that in cognitive learning endeavours there was a difference between novice and expert learners; experts perceived reoccurring patterns in problems or tasks and were able to tailor or strategically link their solutions to fit these patterns. This same ability, to differentiate between the successful and the less successful learner, had been evident in empirical research efforts related to better understanding learners' SLA efforts (Naiman, Fröhlich, Stern, & Todesco, 1978; Rubin, 1975).

Subsequently, strategic insight and behaviour were suggested as a way for language learners to better interact cognitively with incoming knowledge in order to optimize their SLA learning efforts (McLaughlin, et al., 1983). That is, it was posited

that the use of language learning strategies by learners greatly enhanced their chances for success in achieving a successful SLA experience (Naiman, et al., 1978; Stern, 1975).

This was a significant finding because success in SLA had not always been consistent with learners' or teachers' efforts. Practical solutions were needed for "...the perennial complaints about the unsatisfactory state of language teaching, about its ineffectiveness, about the waste of money and energy on something that does not produce commensurate results." (Stern, 1983, p. 24). The possibility that learners' use of LLS, in the process of SLA, could provide some forms of solution to this problem was tempting indeed.

Although the concept of strategy use in language learning has only been described in the past three decades or so, the use of strategy to optimize human endeavours is not a novel idea. Etymologically, our use of the word strategy is said to refer to a "a clever or careful plan" (Barnhart, 1988, p. 1074). Borrowed from the French *strategie*, and referring to the art and planning of military operations, the word may have originated from the Greek word *stetegia* which literally meant the command of a general (Barnhart, 1988).

Historically, the concept of strategy use has been described for many centuries. The monumental sixth century army general Sun Tzu wrote in his classic, *The Art of War,* of the necessity for study, analysis, and rational thought as the basis for the planning and conduct of successful military endeavours (Griffith, 1971). Much later, with regard to the organization and success of Japanese business management, Michael

Deutsch (1983) cited *The Book of Five Rings: A Guide to Winning Strategy* when speaking to American businessmen regarding their understanding of Japanese business processes. He said (of American businessmen), "They need to recognize that in order to meet the special opportunities and challenges of Japan, different strategies are required from those used in other countries." (Deutsch, 1983, p. 12).

In these instances, strategy is suggested as a way in which adversaries, in war or commerce, could better understand and control their thinking and behaviours in order to realize satisfactory outcomes to their endeavours. Inherent was the assumption that the person(s) mobilizing the strategy needed to assess the requirements of the task at hand and decide how to best allocate resources, in order to realize the most success.

It is evident that in all endeavours involving the use of strategic behaviour, the strategist is involved in a complex interactive process with the challenge or task at hand. Initially the strategist must intentionally be oriented toward the problem, proceed by continuously choosing from a number of possible solutions, and finally combine or orchestrate these choices to produce a final solution.

The potential efficacy of this ability had been posited theoretically in the field of learning generally (Dansereau, 1985, Entwistle & Ramsden, 1983), and reported empirically by SLA researchers.

Perhaps because the basic understanding of the SLA process was so nebulous, and the theoretical base somewhat fractured between a linguistic orientation and a cognitive psychological orientation, resultant research efforts related to LLS use

diverged in a variety of directions.

The outcome was that there are "...almost two dozen L2 strategy classification systems." (Oxford, 1993a, p. 182). Nevertheless, it has been suggested that research related to the use of language learning strategies in the SLA process can be grouped in five general areas. These include:

1. Linguistically based strategy systems dealing with language monitoring, inferencing, formal and functional practising (Bialystok, 1978), various types of communication strategies like paraphrasing or borrowing (Tarone, 1977), and the concept of communicative competence (Canale & Swain, 1980);

2. Systems based on psychological functions such as cognitive and socio-affective strategies (Marton, 1983; O'Malley & Chamot, 1990);

3. Systems based on typologies describing characteristic behaviours of successful language learners (Naiman, et al., 1978; Rubin, 1975; Stern, 1975);

4. Systems based primarily on particular learning skills such as vocabulary learning, reading comprehension, or writing (Cohen, 1990); and,

5. Systems based on different types of learners related to their learning styles (Sutter, 1995) or strategy-style linkages (Ehrman & Oxford, 1989; Ely, 1989).

(Oxford, 1993)

Further to the above, other researchers such as Krashen (as cited in Stern, 1984), took the stance that strategies occurred in a *natural progression* in the role of language acquisition, while Ellis (1985) suggested that strategy combinations are hierarchically related, in a psycholinguistic sense, such that they emerge as linguistic

structures, becoming increasingly more complex. He also posited that attempting to identify learner strategies was somewhat like "...stumbling blindfolded around a room to find a hidden object." (Ellis, as cited in Towell & Hawkins, 1994, p. 226).

It is evident from the foregoing that the research field related to strategy use in SLA is fraught with ambiguities and conflicting perspectives. Thus the use of the term *strategy* in SLA by Cohen or Ely would be similar to Oxford's use of the term, but less like the use of the term by Krashen or Canale and Swain.

Nevertheless, it can assuredly be said that SLA is a complex, multifaceted, interactive endeavour and learning/acquisition occurs in many different ways, some of them episodic and unplanned. LLS use has emerged consistently as one factor among others (for example, personality and motivational factors) important in understanding the language learning process (Naiman, et al., 1978; Reid, 1987). It has transpired over time that LLS use in SLA merits research focus, if for no other reason than that second language learners seemed better prepared for the process and were predictably more successful, if equipped with the resourcefulness that strategic behaviour seemed to avail.

Problem Statement

The field of strategic learning behaviour in the field of SLA abounds with inconsistencies. There have been theoretical shifts, such as the shift from emphasis on linguistic form and content, to an emphasis on the role of the learner in the generative construction of language.

Researchers have also noted a persistent lack of clarification regarding concepts

and strategy typologies (Oxford & Cohen, 1992), inconsistencies related to terminology use (Stevick, 1990), and ambiguous, ambivalent research goals (Gass, 1988). These inconsistencies pose obvious dilemmas for focused empirical work in the development of a congruent SLA theory base.

Thus, although many definitions, criteria, and typologies have been used to conceptualize the way in which LLS are operative in language learning, satisfactory explanation and understanding of strategy use remain elusive at a theoretical level. At the classroom level, teachers need a more informed understanding of both teaching and learning conditions that result in optimal successful SLA.

Existing research seems to suggest that learning strategies are significant in the role of successful second language learning (Bialystok, 1978; Cohen, 1990; Wenden, 1987a). What remains uncertain is an informed understanding of *what* learning strategies are used by successful language learners, and perhaps even more significantly *when* and *how* they are used (Gass & Selinker, 1994; Rubin & Thompson, 1994; Wenden, 1986).

Purpose of the Study

Long (1990) suggested that an explanatory theory of SLA should first be interactionist (recognizing both learner variables and environmental variables). Secondly, he suggested that a satisfactory SLA theory would need to specify which learner and environmental factors are of constant significance, and which are less constant and/or interactive with other variables, including when and how this occurs.

The purpose of this study is to contribute to a more informed understanding of

LLS use by successful adult female language learners. For example, what strategies do learners use in their language learning? Do strategies include informal behaviours linked to formal learning experiences? Is it possible for learners to conceptualize and articulate these concisely? Are learning situations important in prompting and using successful strategies? By examining these kinds of questions it may be possible to better understand the use of learning strategies by the successful adult female language learners who are the subjects of this study.

Although gender was not specifically a focus in this study, it should be noted that gender is a significant factor in the women's use of language (Tannen, 1990). For example, it has been reported that women use more LLS, both qualitatively and quantitatively, than men (Oxford & Nyikos, 1989). It has been posited that LLS use may be related to various particular female attributes including physiology of the brain (Caine & Caine, 1991), purpose of language use (Tannen, 1990), context of language use (Green & Oxford, 1995), etc. Nevertheless, since gender was one variable which remained constant in this study, it was not specifically investigated relative to learners' use of LLS.

One of the barriers to the utilization of innovative and creative teaching and learning processes in the field of SLA, is the problem of linking theory to practice. Studies like the present one might be an asset in providing such a linkage.

It has been suggested elsewhere that research studies using multi-method, multi-factorial approaches involving a variety of data collection techniques, both qualitative and quantitative, may prove useful in language learning research (Oxford & Cohen,

1992). Extensive longitudinal, cross-sectional (O'Malley & Chamot, 1990), and cross-cultural (Oxford, 1995) studies are needed to produce consistency in our expanded understanding of strategic processes used by language learners. The current study is a small research effort oriented toward a generally enhanced understanding of language learning strategy use through the examination and reporting of patterns of strategy usage particular to a group of adult females involved in SLA.

The Professional Experiential Context

Sometimes in professional teaching practice, an observation of, or reflection on, an apparently ineffectual methodological approach can serve as a cue to reflective thought. As such, the very focus on something that does not seem to support learning, prompts one to ask substantive questions regarding the possible nature or process of a more effective method. The thoughts leading to the following two research questions evolved in much that way.

Some years ago, while guiding language learners attempting to master a listening comprehension task, I became aware that in fact the task offered a limited range of solution possibilities. It was a static, traditional exercise attempting to teach adult language learners listening and comprehension skills in a language laboratory setting. It confined them to a rigid protocol, predetermined by the teacher and the lab instructor.

However, as the task progressed, it became evident that not all learners were following the *authorized* approach. Despite cautionary requests from me, their teacher, and the language laboratory instructor, some learners persisted in doing what seemed

to enable them to capture the sounds and meaning inherent in the learning material. Further, it seemed that the learners trying their own, alternative methods were achieving a higher level of task success (comprehension) than some others in the class who were being compliant.

When reflecting on this observation, I was prompted to analyze the components of that learning situation: the non-compliant learner behaviour, the lesson plan, the material, the learning context, etc. This reflection resulted in a number of thoughts. For example, what were these learners trying to do by following their own approaches to the listening material rather than the one authorized by the teachers? Did these more self-directed learners have their own particular, more effective ways of organizing and understanding the material? What if these behaviours really were associated with success in developing listening comprehension skill? Could they be observed in other areas of language learning and would it be possible to identify them and the situations in which they occurred?

The following research questions address limited aspects of both the *what* and *how* of strategic behaviour in language learning. In particular they examine the use of strategies by seven successful adult female language learners.

The Research Questions

1. What are language learning strategies used by this respondent group of successful adult female second language learners? and;

2. In what naturalistic life situations are these revealed?

Definition of Terms

Second Language Acquisition (SLA): the process of acquiring another language after one's native language has been learned (Gass & Selinker, 1994).

Language Learning Strategies (LLS): activities, often conscious, one engages to facilitate and support the growth of proficiency in the SLA process. For the purpose of this study, such strategies include those suggested in Oxford's (1985) taxonomy. They are:

Direct Strategy Class (interact directly with linguistic material to be used as when the learner reorganizes or reinterprets linguistic structures). The macrostrategy categories in this class are: a) memory strategies—used to encode, recognize, and retrieve language information into memory (i.e., imagery, grouping, etc.) (Thompson, 1987); b) cognitive strategies—involve manipulation or reorganization of linguistic/task oriented material to facilitate its assimilation into existing knowledge structures (O'Malley, 1990); and, c) compensation strategies—strategies used to overcome gaps in learners' developing knowledge proficiency by the use of clues (contextual and linguistic) to infer meaning, stalling to maintain ongoing negotiation, and circumlocution to facilitate discourse with native speakers (Oxford, 1985).

Indirect Strategy Class (strategies that contribute indirectly to facilitate SLA by facilitating learning through planning and organization, empathetic and positive affective behaviours, etc.): a) metacognitive strategies—used to organize, monitor, and self-direct learning activities (Flavell, 1979; Wenden, 1987a); b) affective strategies—used to recognize and control attitudes and emotions, manage anxiety; and,

c) social strategies—strategies used to create and maintain social interaction with proficient speakers of the target language (Oxford, 1985; Wong-Fillmore, 1976).

Significance of the Study

The current field-based study is significant because it addresses an area of second language learning which offers potential for an expanded and refined conceptualization of the strategic learning behaviours (i.e., LLS) of successful language learners. It also offers the possibility of identifying and examining life situations in the learning process, potentially amenable to strategy use and supportive of other developing/less successful language learners.

As extended learning and self-directedness are now realized as critical factors in the process of second language learning (Scarcella & Oxford, 1992), both the nature and location of individual learners' LLS have become increasingly relevant to research in the field. As Anita Wenden (n.d.a) said,

> Learning takes time, and it is not always possible for learners to achieve the level of communicative competence that will enable them to function without difficulty outside the classroom within the time period set aside for the course. Secondly, in setting objectives and outlining tasks, it is impossible to anticipate the many different contexts in which the learners' professional and personal responsibilities will place them once they leave. Their needs change and vary (pp. 4-5).

Therefore, in order to fully benefit from structured learning experiences learners need to acquire learning skills and knowledge about the learning process. One area of skill suggested by Wenden and other researchers (Oxford & Cohen, 1992; Sharkey, 1995) focuses on learners' informed use of LLS as a way of achieving autonomy and success in second language learning. Thus, the current study is significant because such efforts, however limited in scope, *cumulatively* contribute to an experienced knowledge base from which meaningful SLA theory can be realized.

CHAPTER TWO

Professional Literature Perspectives on Adult Language Learners: Their Strategy Use in Second Language Acquisition

Introduction

Many adult learners involved in SLA are studying English as a Second Language at universities and colleges in Britain, Australia, the United States, and Canada. These learners come at considerable cost in terms of time, money, and psychological energy to study English, hoping to achieve improved opportunities in terms of educational, employment, and social opportunities. Some are deemed successful in their endeavours, and are able to pursue their dreams. Others are not as successful in their English language studies, and suffer disappointment and distress as well as the loss of material resources (Lightbrown & Spada, 1995; Stern, 1983).

Thus, the process of Second Language Acquisition has become an integral part of the transformational learning process of many adults relocating to alien linguistic milieus. Adult SLA, unlike the usual course of a child's first language acquisition process, has not always proven to be a successful, predictable process (Scarcella & Oxford, 1992; Stern, 1983).

There is a plethora of literature relating to the language learning process, language learning variables, individual learner attributes, the role of *innatist* (genetic) factors versus the role of social interaction (Gass, 1988), neurocognitive factors (Schumann, 1994), and the role of individual learning attributes or characteristics including learners' use of language learning strategies.

It is therefore necessary to initially priorize those research aspects that seem most pertinent to the present study, in particular in research relevant to the process involved in adult second language acquisition. (Second language acquisition in this context refers to the learning of any language after the learning of one's native language, and may include the learning of a third or fourth language) (Gass & Selinker, 1994).

Research Challenges in Second Language Acquisition

The ultimate goal in research related to second language learning is to better understand how language is acquired and the operative mechanisms and processes which contribute to that acquisition (Gass, 1988). Realization of this goal has been frustrated by major controversies in the field of second language learning regarding the role of the biological and experiential substrates operative in the process. Much of the discussion "...was carried out in such a polarized way that it was hard not to get the impression that everything was either due to innate abilities *or* to experience." (Wode, 1994, p. 326).

A variety of research efforts addressing both experiential and biological factors flourished separately, and it was difficult to achieve theoretical proposals sufficiently expansive to address a comprehensive understanding of the processes involved in second language acquisition (Gass, 1988; Long, 1990).

Perspectives on the Nature of Language

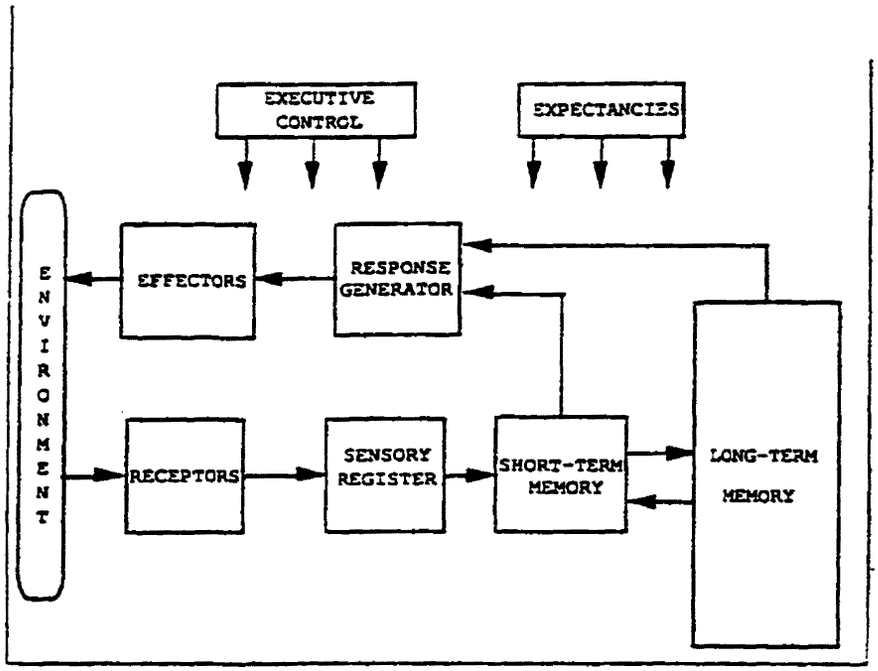
Research claims purporting genetic, innate characteristics and processes (The Innateness Theory) to explain SLA were primarily investigated within the academic

realm of linguistics (Stern, 1991).

Early efforts to understand the nature of language learning were based on B. F. Skinner's (1938) behaviourist paradigm. Skinner assumed that all human behaviour, including language learning, resulted from a conditioning process whereby organisms, including man, responded to particular stimuli.

Support for the *innatist* perspective evolved in an acceptance of what is called the Stagewise Theory (O'Malley & Chamot, 1990, p. 80). This theory assumed that second language acquisition was a largely predictable process, at least somewhat constricted by universal, developmentally-determined processes (Pinker, 1994). Thus, behaviourist psychology using a deductive/analytical approach sought to address SLA as an aspect of habit formation (Raimes, 1983; Stern, 1983). Meanwhile the experiential perspective, which assumed that SLA occurred as a result of a human learning process, was being investigated within the realms of cognitive psychology (Gagne, 1974; McLaughlin, 1987). In Gagne's world of learning, humans were active processors of information. He suggested that there existed two interactive processes, executive control and expectancy, which significantly affected a human learner's ability to facilitate language learning.

Figure 1. Information Processing Model



Model employed by information-processing theories of learning and memory. [from R. M. Gagne, 1974, Essentials of learning for instruction]

A significant aspect of Gagne's (1974) paradigm was his suggestion that through the two processes of executive control and expectancy, learners could affect the outcome of their own learning behaviours. That is, the learner's behaviour would be a function of choices or strategies which could be mobilized to meet specific learning goals. Inherent in this model of learning was the assumption that the human learner, through these control processes, could continuously refine his/her learning process, thereby learning how to learn (Gagne, 1974).

Expanded Perspective of Language Learning

In 1978, a descriptive, explanatory model of second language learning which included a multiplicity of interactive variables including *implicit knowledge, explicit knowledge,* and *other knowledge* was proposed (Bialystok, 1978). She was seeking to address the issue that not all communication could be explained by innateness models (i.e., Krashen's Learning Acquisition Model) (Brown, 1987). Also, Bialystok (1978) suggested a role for language learning strategies (practising, inferencing, and monitoring) which demonstrated a salient role for active learner involvement (i.e., cognitive and metacognitive activities) related to SLA. Thus, Bialystok's (1978) model represented an important transitional device, as it addressed the limitations of purely innatist theories in explaining language learning. By demonstrating an "...implicit/explicit continuum with connecting inferencing processes...." (Brown, 1987, p. 190), Bialystok was able to suggest possible explanations for the complexity of second language acquisition.

Further, Bialystok suggested a reorientation in understanding the learner and

learner's role in the learning process. She suggested that some aspects of the language learning process were *obligatory*, while others were *optional*. She proposed that the learner's use of these *optional* categories served "...as means for exploiting available information to improve competence in second language." (Bialystok, 1978, p. 76). In text, she described the learner's use of inferencing as a mode of hypothesis formation "...in which some information is used to generate an explicitly linguistic hypothesis about a previously unknown meaning or form in a second language." (Bialystok, 1978, p. 78). This was an early explanatory effort aimed at understanding how learning strategies might be operationalized, in order to realize second language as a constructivist process, in an increasingly socio-interactive, psychological sense (Agnew & Brown, 1989; Neimeyer, 1993).

Alternative Approaches to Strategy Use in SLA

At the same time as these linguistic researchers were expanding ideas about second language acquisition, some linguists began to examine SLA from a slightly different perspective (Canale & Swain, 1980; Hatch, 1983). They observed it was unlikely that a direct transference of morphemes from the first language occurred (Scarcella & Oxford, 1992) in the process of SLA. Rather, it might be more useful to consider both the role of morpheme acquisition, etc., *and* learner variables such as native language, status, goals, ages, language proficiency levels, etc. (Gass, 1988).

The construction of communication systems of language was hence described as having both grammatical and communicative approaches (Canale & Swain, 1980). The grammatical approach of SLA was organized on the basis of linguistic or

grammatical forms (phonological forms, syntactical patterns, lexical items). The communicative approach was organized on the basis of communicative functions (apologizing, describing, inviting).

Thus, within a framework called the Communicative Competence Theory (Canale & Swain, 1980), it was suggested that language learners needed to develop competence in four areas in order to achieve success in speaking. These four areas were grammatical competence, sociolinguistic competence, discourse competence, and strategic competence. This theory was important because it addressed the interactive nature of language (grammatical, sociolinguistic, discourse, and strategic). However, the term 'strategic competence', with its focus on interactive communication strategies, used the term strategy quite differently from the way in which Bialystok (1978) had suggested. That is, Bialystok's use of strategy focused more on the nature of learners' use of LLS to facilitate language learning, and less on their role in realizing communication goals.

Aspects of this phenomenon were later described as the "...social interactionist theory...." (Gass, 1988, p. 17), which assumes that language and social interaction cannot be separated, and that the multifaceted, interactive nature of the process is important in understanding skill development in second language acquisition (Gass, 1988). Social interactionist theory also assumed that cognition and language were crucially context bound and could best be understood from that perspective.

Early research in cognitive psychology relating to second language skill acquisition, spoke of the learner from an information processing perspective

(Anderson, 1982; McLaughlin, Rossman, & McLeod, 1983). The information processing perspective assumed that learners actively impose cognitive schemata on incoming data in an effort to organize the information (McLaughlin, et al., 1983). It was also assumed that the learner had a limited capacity system, that the process of selecting critical information for further processing was important and occurred in the act of noticing/attending, and that attention could be controlled (Tomlin & Villa, 1994).

Consciousness and noticing (Tomlin & Villa, 1994) are two important cognitive strategies which are particularly relevant to SLA. It is critically important that the learner gain skill in precisely differentiating among the various linguistic structures (feature analysis, lexical items, etc.) in order to develop both fluency and precision in the target language. Further, the ability to create structure through grouping, classification, and organization of linguistic structure, aids the learner in creating meaningful personalized learning structures that are more effectively encoded and retrieved (O'Malley & Chamot, 1990).

This inclusion of multiple external contextual factors, *and* the hermeneutical role of the adult second language learner, suggested the possible role of a *constructivist* mode of knowledge structuring in second language acquisition (Dulay, Burt, & Krashen, 1982; Wittrock, 1974).

Thus, the language learner interacted constructively with the learning environment, both internal (Murphy, 1989) and external (Stern, 1983). The external environment could be considered to be the learning locale. The internal environment

included the learner's knowledge about language, including cognitive experiential level, beliefs and values, affective states, cultural background, etc., which contributed to language learning as a "hermeneutical" experience (Murphy, 1989).

However, while acknowledging this multiplicity of interactive factors that seemed critical to language learners' possible modes of organization and SLA success, the actual learning acquisition *process* remained ambiguous.

Good Language Learners

By 1987, it had become evident to researchers and teachers that "...no *single* discipline or theory or model or factor will ever provide a magic formula for solving the mystery of second language acquisition." (Brown, 1987, p. xii). It was necessary to work toward developing a broadly-based theory of second language acquisition which would guide practice and further research efforts.

In this vein, research efforts in a variety of areas emerged. One of the promising areas that emanated from this research highlighted important, inter-individual variations among language learners. Utilizing the empirical data reflecting distinguishing aspects of successful language learners, some observations and analyses were posited.

There appeared to be attributes and strategies related to the second language learning process/SLA, which successful learners possessed and less successful learners did not. Researchers and educators began to describe the characteristics which seemed to identify "good language learners" (Flavell, 1979; Rubin, 1975; Stern, 1975; Wenden, 1986). The evidence from these studies lent credence to the emergent role of

the learner as a problem-solver and creator of knowledge in the field of SLA.

Naiman, Fröhlich, Stern, and Todesco (1978) began their descriptive research by acknowledging acceptance of the major problems facing second language learners. Stern (1983) had suggested that these were important in delineating possible solutions. The significant problems seemed to include:

1. The disparity between the inevitable presence of the native language and other languages as a reference system, and the inadequacy of the new language system as a frame of reference;

2. The dilemma related to attending to the linguistic forms *and* the message to be conveyed; and,

3. The choice between rational and intuitive learning (Stern, 1983).

Empirical Findings: Strategy Use in Second Language Learning

Naiman, et al., (1978) suggested that in addressing these dilemmas, some learners were more successful than others. This led to their research question: "Do good learners tackle the learning task differently from poor learners, and do learners have certain characteristics which predispose them to good or poor learning?." (p. 2). Findings from their interviews with "good language learners" led them to believe, that in a general sense, there were five distinguishing traits which characterized the good language learner. For example, it seemed that:

1. They assumed an active approach to the learning task, purposefully seeking out learning opportunities;

2. They made the assumption that language was a system and used a variety of

comparison and inferencing techniques to optimize this approach;

3. They were conscious of the dual roles of language as both a mode of communication and a mode of socio-cultural interaction;

4. They realized that there were affective demands within the language learning task and were able to successfully manage this area of challenge; and,

5. They were able to monitor their developing language learning system, used inferencing in attempts to validate the adequacy of their linguistic performance, and asked for corrective feedback from native speakers (Naiman, et al., 1978, p. 14-15). Later research efforts confirmed that Naiman, et al., (1978) had captured in a global way the essence of learners' "...strategies later to be classified by researchers as: cognitive, metacognitive and affective." (O'Malley & Chamot, 1990, p. 4).

Role of Empirical Research

Gradually, empirical and descriptive studies suggesting a difference existed between successful language learners and less successful language learners emerged. It seemed that the more proficient, for example, good language learners, might be doing something different or special in their learning endeavours (Stern, 1985; Rubin, 1985). Those findings "...anticipated what cognitive psychology was realizing independently, that competent individuals are effective because of special ways of processing information." (O'Malley & Chamot, 1990, p. 2).

Social Interactionist Theory in SLA

The cognitive theory component of social interactionism proposes language learning as *one* aspect of human learning. Social interactionist theory also includes the

role of individual learner characteristics in the process of SLA. As such, it is possible to perceive a multifaceted, interactive process of SLA, within which exists a significant role for *both* the innate attributes of the learner *and* his/her experiential/cognitive level of language learning. This has shaped a more comprehensive understanding of the language acquisition process, with the potential to refocus, refine, and expand research efforts.

Language learning strategies occur as a component of cognition in social interactionist theory. Social interactionist theory assumes that the areas of language, cognition, and social interaction cannot logically be separated without distorting the way in which linguistic and interactive skills develop (Gass & Selinker, 1994). This perspective is reflected in Stern's (1983) model for second language acquisition and in a revised socio-educational model (Gardiner & MacIntyre, 1993) in which various constructs important to SLA are located with reference to various other interactive factors. Among the constructs included interactively in these models is that of second language learning strategies.

Potential for Strategy Use in Second Language Learning

The construct of cognitive psychology has been used to conceptualize a variety of aptitudes and processes that the human mind uses in interpreting and manipulating incoming sensory information. Eisner (1994) suggests six basic components be included in a taxonomy of cognitive processes. These are possession of knowledge, comprehension, application, analysis, synthesis, and evaluation.

Through these mental operations or processes of learning, sensory input is

thought to be modified by the learner into knowledge or knowledge structures. Thus, input becomes intake, and schemata encoding the intake forms knowledge (Gass, 1988). This knowledge can then be stored in long-term memory to be retrieved and used when needed as output (Bialystok, 1978; Gass, 1988). The particular mechanisms used to manipulate the incoming information, and later to retrieve and apply it, have been generally referred to as cognitive learning strategies (Dansereau, 1985; O'Malley, 1990).

It has been suggested by Naiman, et al. (1978) and other researchers that adult language learners' use of strategies facilitate the language learning process in a variety of ways. These include: promoting an ambience of active learner control and self-directedness when approaching learning material (Reid, 1987); increasing the time on task (Wenden, 1987b); increasing the depth of focus in relationship with learning material (Schmidt, 1990); self-assessment (Holec, 1987); and, the facilitation of introspective thought (Faerch & Kasper, 1987); etc. All of these appear conducive to reception, refinement, retention, and retrieval—the processes thought to be salient in the second language learning experience.

However, despite positive research support for language learning strategy use (Cohen, 1987; Oxford, 1985), a paradigmatic shift (Raimes, 1983; Swaffar, 1989) in conceptualizing the language learning process was necessary to more fully validate strategy use. As the field of second language acquisition sought to address language learning interactively, it was particularly critical to address not only the role of cognition in the learning process, but to also note an expanded role for the learner in

the sense of humanistic psychology. This role of the learner emphasized the uniquely human attributes of the learner, the need to respect the freedom of the learner, and the need to regard the dignity of the learner as a human being (Moskowitz, 1980).

As the role of the learner was acknowledged as a creator of knowledge, and as second language acquisition was recognized as a constructivist process, it became increasingly important to validate ways in which the learning process could be facilitated and supported. The use of language learning strategies, in developing learner autonomy in the language learning process, seemed to be appropriate to this goal (Wenden, 1987b).

Coupled with a heightened level of respect for this learner's basic humanity, an appreciation of the adult language learner's associated responsibility for furthering his/her own learning process has evolved (Oxford, 1990a). The more successful or expert language learner seems to have a better understanding of this role and the level of responsibility he/she has for their own learning activities (Swaffar, 1987; Wenden, 1987a).

Thus behaviorally, the more successful language learner is often characterized by an ability to utilize learning strategies particularly appropriate to their personal attributes, needs, and goals in the language learning process (Reid, 1987; Scarcella & Oxford, 1992). It seems that language learners at all levels use some learning strategies (Vann & Abraham, 1990), individual learners may use strategies on a continuum of increasing precision and focus (O'Malley, 1990), or may use the same strategy in adaptively different ways depending on the task requirements (Mohan,

1986).

It was noted, however, that some learners are not consciously aware of the strategies they use, or selectively use those which are considered to be less helpful, noncommunicative, and mundane (Nyikos, 1987). Others are aware of a wide range of strategy use, but they employ these strategies in a "...random, unfocused, almost desperate manner," such that they are of little value in successfully completing the task at hand (Vann & Abraham, 1989, as cited in Oxford & Cohen, 1992, p. 2).

It has been posited that associated phenomena, such as learning style (Reid, 1987), sex and maturation (Oxford & Crookall, 1989), and level of literate proficiency (Schumacher & Nash, 1991) may influence adult language learners' choice of strategy. However, the relationship between strategy use and proficiency is complex (Ehrman & Oxford, 1989), and some learners do not profess conscious strategy use at all. Viewed differently, strategies may reflect a level of reflective thought that is found primarily in adult learners (Brookfield, 1990; Mezirow & Associates, 1990). There are many complex explanations for all of the related factors which influence the use of LLS. However, it is beyond the scope of this study to examine these factors (i.e., learning styles) individually or interactively.

Strategy Classification Schemes

A number of sophisticated taxonomies and inventories have been developed by researchers to describe language learning strategies, and facilitate their identification (i.e., Bialystok, 1978; Mohan, 1986; O'Malley & Chamot, 1990; Rubin, 1981). Some were based on differentiation between *cognitive*, *metacognitive*, and *affective* strategies

(O'Malley & Chamot, 1990). Others referred to *direct* and *indirect* categories (Rubin, 1981). Still others focused on the understanding of *communication strategies* (Bialystok, 1978). Many of these categories overlapped, and were difficult to operationalize in a meaningful manner.

Subsequently, Rebecca Oxford (1985) attempted to build on some of these earlier classification schemes by suggesting two broad categories (see Appendix D). She chose to focus her taxonomy and scheme on *Direct* and *Indirect* Strategies (Oxford, 1985), which she modelled on Dansereau's primary and support strategies for learning (Dansereau, 1985).

Direct Strategies referred to those which directly involved language and required mental processing of the language (Oxford, 1985). For example, strategies in which the learner, despite gaps in knowledge, used synonyms, guessing manoeuvres, etc., to successfully communicate meaning would constitute a direct compensation strategy (see Appendix D).

Conversely, Indirect Strategies were said to be those that support and manage language learning (Cohen, 1990; Oxford, 1985). A strategy in this category might include consciously paying attention to explicit aspects of a review, or planning to overview material, with the aim of linking novel material with the conceptually familiar.

Those two major, general classes were further divided into a total of six groups capable of connecting with, supporting, and assisting one another in the understanding of learning strategy classification (see Appendix D). A significant aspect of Oxford's

(1985) work related to her ability to integrate the theoretical underpinnings of the learner strategy literature, with practical suggestions for aiding language learners in strategy use (Cohen, 1990; O'Malley & Chamot, 1990). From this taxonomy, Oxford developed an assessment tool called Strategies in Language Learning (SILL), which has been used extensively and cross-culturally to evaluate learners' perceptions of their language learning strategy use (Cohen, 1990; O'Malley & Chamot, 1990; Oxford & Burry-Stock, 1995). To date, SILL appears to be the only language learning strategy instrument that has been tested extensively in multiple ways. That is, it has also been tested extensively for utility, validity, and reliability and has been used in forty to fifty major studies involving approximately nine thousand language learners worldwide (Oxford & Stock, 1995). The instrument has been adapted for LLS testing in various language learning contexts.

The Strategies Inventory in Language Learning (version 7.0) is a fifty question, Likert scale instrument that is used to assess the preferences of language learners for particular types of learning strategies. The strategy categories which are included have been derived from existing theoretical and empirical research (Oxford, 1990).

The SILL (version 7.0) offers the learner a choice of five options of Likert scale responses (ranging from "almost never true of me" to "always or almost always true of me"). The instrument is divided into six subscales or factors relevant to the strategy categories. It thus assesses the frequency of use of language learning strategies in the six macrostrategy categories that were described by Oxford (1985). These macrostrategy categories include memory, cognitive, and compensation

strategies (Direct Strategy Class) and metacognitive, affective, and social strategies (Indirect Strategy Class).

Concluding Comments

A review of the literature has led this researcher to believe that empirical testing and refinement has borne out the authenticity and utility of Oxford's approach. Academic support for this position may be found. For example, research using the SILL tool has identified new data related to gender, age, and level of knowledge characteristic of strategy use in language learning (O'Malley & Chamot, 1990); and, "...validity of the SILL rests on predictive and correlative links with language performance." (Oxford & Stock, 1995, p. 32). A unique aspect of Oxford's taxonomy is her focus on affective strategies, and a further strength is her admonition that teachers become facilitators or guides encouraging learners to take more responsibility for their learning (Applebaum, 1993).

This latter perspective reflects an understanding of adult second language acquisition as a mode of adult learning. The learners' attributes, perspectives, and behaviour resonate a capacity for self-directedness (Knowles, 1975) and critical reflection (Brookfield, 1990). These are two learner characteristics evidenced in the successful use of language learning strategies (Faerch & Kasper, 1987; Rubin & Thompson, 1994) and presage an enhanced understanding of the ways in which successful, adult, second language acquisition may be realized.

In conclusion, any research efforts aimed at enhancing a theory of second language acquisition should meet at least two basic criteria, that of being relevant to

learners' target communicative needs, and justifiably useful in terms of psycholinguistic requisites (i.e. input processing abilities) (Long, 1990). Language learning strategies, though not fully understood, and subject to hypertaxonomizing (Gass & Selinker, 1994; Oxford & Cohen, 1992), seem to hold promise in both of the above areas.

Theoretical Framework

Despite many levels of approach to second language acquisition, certain lines of evidence are useful in understanding this complex phenomena, operationally. One such line of evidence has been presented, in the research, describing the use of language learning strategies by learners in the process of SLA.

Language learning strategy research has been fruitful, partially because learner behaviours, as exhibited in empirical findings (Naiman, et al., 1978; Rubin, 1975; Stern, 1975), supported the theoretical underpinnings that have evolved in later research efforts (Bialystok, 1978; O'Malley & Chamot, 1990; Oxford, 1985).

However, as the paradigm conceptualizing SLA shifted from a product (language) centred position, to a process (learning) position, the relationship of the learner to the learning process had to be redefined (Gass, 1988; Raymond, 1982; Reid, 1987; Swaffar, 1989). The role of the learner, including learner attributes, was emerging as a pivotal research consideration in better understanding how success in SLA could be achieved. It became evident that SLA research efforts should focus on some of the issues that had surfaced in empirical studies (Bialystok, 1978; Naiman, et al., 1978; Rubin, 1975; Stern, 1975), as well as theoretical linguistic questions. That

is, what were the main challenges facing adult learners involved in the process of SLA, and what were some learning behaviours that seemed successful in addressing these challenges? Cumulatively, what relevance did the challenges and behaviours have for the learners as persons (Stevick, 1990), and what significance were these actions in the SLA research efforts?

Theoretical efforts had moved the SLA process into the realm of cognitive science, and described second language learning as a complex cognitive process. Initially, this cognitive learning conceptualization perceived the learners primarily from a basic, limited capacity, processing perspective (Anderson, 1987). However, it became increasingly evident that this was a necessary, but not sufficient, condition for understanding the process whereby successful SLA occurred.

By 1988 many researchers had accepted the position that second language acquisition was a multi-faceted endeavour (Gass & Selinker, 1994) in which *innate, cognitive,* and *socio-interactive* factors were important in various ways, at various times. Precisely how this is realized operationally, in terms of mental activities and learning processes, remains unclear.

Inherent in this understanding of learner attributes, as foci of consideration, there emerged the perception that, in SLA, the learner processed incoming language information and behaviours in terms of a variety of significant, individual, learner variables. Some learners seemed to be more successful in managing the processing and utilization of language input in SLA than others.

Options abound in understanding why some adult language learners are more

successful than others in the SLA process. The use of LLS seems to be one way of understanding a problem-solving approach available to aid learners in managing their language learning challenges. There seem to be variant forms in which the use of this strategic approach supports the language learners' reception, refinement, retention, and retrieval (processes thought to be salient) in the language learning process.

However, not all researchers who have investigated the use of language learning strategies have found consistency, credibility, or usefulness in the construct as a way of expanding their understanding of the ways in which learners successfully manage the process of SLA (Nyikos, 1987; Reiss, 1983). An important consideration seems to be the ability of the language learner to tailor the use of strategic behaviour to match personal learning style, level of language competency, task requirements, etc. (Oxford, 1993; Reid, 1987). However, there are other factors such as affect which are not well understood or investigated (Phillips, 1990) that may prove pivotal to the process of SLA.

The role of language learning strategies in SLA has been investigated by a number of researchers who have created complex and sometimes confusing categories and taxonomies in an effort to conceptualize and describe the construct (Bialystok & Sharwood-Smith, 1985; Oxford & Cohen, 1992).

A review of the literature germane to these efforts, has led this researcher to believe that the taxonomy and research approach, advocated by Rebecca Oxford, presages possibilities for better understanding learners' use of language learning strategies. That is, though still evolving (Green & Oxford, 1995), Oxford's approach

has potential for identifying, describing, and reflecting on language learners' strategy use and the contexts in which it is evidenced (Oxford & Cohen, 1992).

Oxford suggests the role of LLS use both in *direct* interaction with the language to be learned, and in *indirect* behaviours which support and manage language learning. The value of Oxford's work has been recognized by other learning strategy researchers (Cohen, 1990; O'Malley & Chamot, 1990). The purpose of the current study is to examine the use of language learning strategies by successful adult female language learners.

The evidence, that has evolved for this researcher, has resulted in the belief that learner use of strategic behaviour may be a fruitful area of SLA investigation. Therefore, the focus of this study will be to examine, reflect upon, evaluate, and describe the presence of language learner strategies and the situational locale of their occurrences in the particular SLA environments evidenced in the research data.

Through a review of pertinent literature and personal contact with professional language strategy researchers (Cohen, Sutter, Oxford, and Wenden), an evolving theoretical framework, as previously described, will form a philosophical and theoretical framework for the interpretation and explanations of the findings of the current study. The following chapter "Methodology: Methods Toward Meanings" will describe and discuss this methodological framework.

CHAPTER THREE

Methods Toward Meaning

Introduction

A primarily qualitative research design was chosen for this study, relative to the purpose of the study, and the researcher's personal interest in the role of the adult learner in the SLA process. However, historical information available on possible design approaches (Chamot, 1987; Rubin & Thompson, 1994), and the somewhat amorphous developmental level of theory related to learning strategy use in SLA, were also factors in design selection.

Research in education has at times attempted to understand the complex qualities of human learning through the line of cybernetic models and scientific paradigms. However, it may be argued that it is equally relevant to shape and interpret educational research, based on the concept of connoisseurship embedded in an artistic paradigm (Eisner, 1977). Connoisseurship assumes a refined level of tacit knowledge and experience embodied in the researcher/connoisseur enabling him/her to discern subtle qualities, and perceive complex nuances, related to the research data. It is this ability to recognize and interpret the qualities and relationships that thus emerge in the connoisseur's inductive process, that serve to bridge the findings with their relevance in addressing research questions (Eisner, 1994).

Qualitative research allows for an in-depth, detailed description of the subject matter. This approach is particularly relevant for the study of relatively uncharted human behavioral phenomena. Rich or deep descriptions (Bogden & Biklen, 1992;

Patton, 1987) are useful in generating theory through the inductive process of reasoning from facts or cases (Merriam, 1988).

Qualitative methodology facilitates descriptions of reality from the informants' subjective perspective. It is assumed that those involved (both researcher and informants) have particular knowledge, experience, and perspectives significant to an enhanced understanding of the research focus (Grotjahn, 1987; Patton, 1987). Thus, the phenomenon being researched may be revealed, and understood, more authentically and insightfully.

In an attempt to better understand perspectives of existing researchers who focus on language learning strategy use, the writer initially made personal contact with several such researchers. Oxford (1990) had suggested this would be possible and had included contact addresses.

Personal responses were received from Andrew Cohen, Anita Wenden, Will Sutter, and Rebecca Oxford. These included a compact disc describing Sutter's work and some associated findings; a letter with literature references from Cohen; literature references and relevant textual reports from Wenden; and, telephone contacts, textual reports, and a note from Rebecca Oxford.

These contributed to a personally encouraging research perspective, as well as a broader knowledge base from which to plan the methodological approach to this study.

Design

Strategies inventory in language learning (SILL).

The Strategies Inventory in Language Learning (version 7.0, ESL/EFL 9c,

Oxford, 1989) is a fifty question, Likert scale assessment tool that assesses learners' use of language learning strategies (LLS).

Initially, I was interested in finding a useful, valid mode of evaluating learners' language learning strategy use in the classroom. I was also looking for a means of raising learners' consciousness related to their strategic language learning behaviour. O'Malley and Chamot (1990) stated that the SILL had been widely tested and seemed to have utility in the area of understanding learners' use of language learning strategies. Pursuing this lead, I contacted Rebecca Oxford who faxed me a copy of an article, at the time in press, which evaluated the worldwide use of the SILL (Oxford & Burry-Stock, 1995).

The short version of the SILL (version 7.0; ESL/EFL 9c, Oxford, 1989) used in the present study was reviewed extensively in the aforementioned article. At the time of publication, the SILL had been used in forty to fifty studies, including a dozen dissertations and theses, and had been tested in a variety of countries and languages around the world. It was estimated that approximately 8,000 to 9,000 language learners had been involved in these studies and that SILL appears to be the only language learning strategy instrument that has been extensively tested for reliability and validity in multiple ways (Oxford & Burry-Stock, 1995). In addition to the original English version, the EFL/ESL SILL has been translated into a variety of languages including Arabic, Japanese, Russian, and Thai.

In designing the SILL in 1989, a factor analysis process was used to organize subscales of strategy groups reflecting categories of behaviour related to language

learning behaviour as proposed in Oxford's (1985) typology of language learning strategies (i.e., Direct and Indirect classes containing six macrostrategy categories). On the basis of this structure, the SILL questionnaire items are divided into six different categories. These include: memory strategies (9 items), cognitive strategies (14 items), compensation strategies (6 items), metacognitive strategies (9 items), social strategies (6 items), and affective strategies (6 items). A short set of directions to the student including a sample item and a scoring worksheet are included in the SILL package (Appendix A).

Aside from the extensive testing that had been done to ensure its reliability, etc. (Ehrman & Oxford, 1990; Green & Oxford, 1995; Oxford & Nyikos, 1989) the SILL addresses at least three other important issues. These include: helping the learner assess use of affective and social strategies which, though important in the learning process, are often not addressed; helping the learner focus attention on personalized use of LLS through the use of a tool on which to record answers and calculate scores relative to each strategy subscale and their overall average; and, making it possible to extensively assess the use of cognitive language learning strategies, deemed important in analyzing, synthesizing, and information in the language learning process. In the framework of this study, the scoring was done by myself, the participant-observer, both in the interest of time constraints, and in terms of non-obtrusiveness into the classroom process.

The SILL inventory has been pretested with a group of four female Hispanic speakers to ascertain its utility in terms of linguistic and conceptual understanding for

learners at a 410 intermediate level of ESL proficiency. Generally speaking, utility had already been established, although the ease with which the task was accomplished and the time required to complete the questionnaire varied somewhat in much the same way that it did with the participants in this study.

Semi-structured interviews.

Some researchers have favoured the use of group interviews (i.e., Chamot, 1987). However, it has been found that individual interviews yield more precise, specific findings, and allow each learner an opportunity to participate at the same level (Haastrup, 1987). For this reason, it was decided that each informant would be interviewed twice, individually. The interviews, each of which consisted of two parts (see Appendix B).

The first section of the initial interview focused on questions of a general nature, thought to be significant, related to participants' learning activities, beliefs, and informal learning activities (Wenden, 1987a). The second part centred on specific task focused contexts, in which learners were asked to describe precisely what strategic behaviour they would utilize in approaching and managing specific language learning requirements (Chamot, 1987). When the interview schedule was pre-tested with one Asian intermediate female ESL learner, it consisted of questions related to language learning activities, but did not have a life situational component. While the initial format worked well in identifying successful language learning behaviours generally, some researchers believe that task focused activities yield more insights, precision, and detail to the learners' focus on their strategy use (Chamot, 1987; Wenden, 1987).

Therefore, in designing the interview schedules used in this study, a specific, task-related, life situational component was included in the latter part of both interviews. The questions were based on formatting used by two researchers who had utilized interviews in examining language learning strategies (Chamot, 1987; Rubin & Thompson, 1994).

Due to the participants' developing English language proficiency, the text form of the semi-structured interview was presented as a guide during each interview session. It was hoped that this would improve the informants' level of cognitive and linguistic control over the content, lessen possible anxiety, and improve the chances for accurate and complete information that would better inform the research questions.

With the permission of the informants, the interviews were audio recorded. In order to capture both the intent and meaning of the participants' statements, a direct transcription of each interview was planned. The use of verbal self-report in SLA research has been fraught with criticism. It is felt that respondents in self-reporting may be influenced by factors that have little to do with the reality of their actual behaviour, etc. (Cohen, 1994); in terms of historical material there is always the possibility of memory lapses, blurring, or inaccuracy. Self-report, which involves the transcription and analysis of interview data, etc., is a somewhat time-consuming process and in large studies may become prohibitively expensive. However, when learners' perceptions and interpretations of their current and personalized behaviours are the focus of self-reports, the resultant data may be quite focused, individualized, and reveal measures of reality not available through other methodological approaches

(Cohen, 1994). Because of the conceptually personalized nature of the research questions which formed the foci of this study relative to the predetermined small size of the research group, it was decided to pursue the use of self-report data through the process of individual interviewing.

Reflective notes.

In planning the initial design of this study it was hoped that classroom learning logs could be used as an integral part of the study. In reality, at least three dilemmas arose in connection with this plan. First, learners in the 410 classes had only initiated learning log use at the beginning of the term in their class and the whole process was still somewhat innovative. Secondly, the researcher was concerned about the obtrusiveness of the research process and the ramifications of this for all concerned. That is, there would be both practical and conceptual differences of journal/log documentation between those involved in the study and others (male learners/non-participant females, etc.). Finally, the logistics of actually entering the research site were somewhat ambiguous as the researcher was not a teacher in the English Language Centre program. In the light of these dilemmas, it was decided to try to find another way to access this level of insight into participants' personalized perspectives on their SLA learning behaviours.

The researcher decided that a way of creating a mini-diary data collection process was to ask each participant to make notes of their learning behaviours over a two week period of term time. It was realized that in creating the structure of what the researcher has called reflective notes (see Appendix C), an inherent bias might be

created toward certain types of responses. However, the researcher felt it was necessary to try to focus participants' attention on language learning processes rather than a simple annotation of daily activities.

The process of writing in a learning diary or log has proven valuable in helping learners pay conscious attention to their learning strategies (Rubin & Thompson, 1994). It also seems to facilitate learners' evaluative focus and enables the manipulation/refining of language learning strategies, particularly when noting them with reference to a particular learning task or learning situation (Naiman, et al., 1978; Rubin, 1987; Scarcella & Oxford, 1994).

At the suggestion of a committee member, the researcher also kept a reflective journal of her own experiences during the research process. This has served to capture immediate dilemmas, questions, and insights related to the research process. The journal enabled the researcher to record insights and to reflect on experiences and phenomena generated by the research process. Increasingly, one is reminded of the tentativeness and uncertainties of assumptions sometimes made, and the necessity to remain open to alternative realities and expanded options.

In the search for underlying meaning and rationale in qualitative, reflective research, the evolving data becomes not simply an aspect of a research project, but a relevant, integral aspect of one's professional and personal stance. In somewhat the same way that language is seen as a generative process (O'Malley, Chamot, Stewner-Manzanares, Kupper, & Russo, 1985), the evolution of the reflective researcher/practitioner in the qualitative research process may also reflect a generative

process.

Selection of Subjects

It has been suggested that a number of variables, including gender, cognitive style, and personality, influence the way in which learners utilize language learning strategies in the SLA process (Ehrman & Oxford, 1989). In an effort to hold one of these constant, it was decided to study only female language learners.

Informants/participants for this study were learners from the intermediate level 410, English as a Second Language class at the English Language Centre, University of Victoria. They involved themselves in this study by responding to a request for volunteers, presented by the Teacher-Administrator at the English Language Centre. The request presented learners, registered in the program, with an opportunity to participate in a study examining the learning strategies of successful adult female language learners.

Participants were selected from a population of intermediate language learners. It is felt that an intermediate proficiency level in a second language is necessary to enable learners to reflect upon and discuss their learning behaviour (Chamot, 1987). That is, while some language learners at advanced levels of language learning use strategies, their automization of the LLS prevents conscious identification, verbalization, and discussion of their introspective learning activities (Haastrup, 1987).

It was stipulated that the research population should represent *successful* female language learners. Success was measured by achievement of a score of between 41 and 49 (scaled) points on the Secondary Level of English Proficiency (SLEP)

(Alderson, Krahnke, & Stansfield, 1987). Designed to measure ability in spoken and written English, the SLEP test is a multiple-choice placement tool commonly used for assessing ESL students. Validity and reliability of the test have been demonstrated in data gathered from test centres around the world since 1980 (Alderson, et al., 1987).

In a more general sense, all of these women could be considered successful learners in that they had all completed tertiary education, the minimum being junior college graduation. Two of the women were professionally trained and had been employed for between one and seven years. Two of the women had studied one Asian language in addition to English, two had studied one European language and one was studying an Asian language at the time of the research study. As such they might be considered somewhat experienced language learners. One woman had experience in editing books on regional economic theory written by her father. As such, her level of literacy and experience in literacy endeavours exceeded that reported by other participants. All the women were between twenty-three and twenty-nine years of age.

Success was also deemed to be evident by the learners' involvement in specific language learning experiences. Although this included attendance of a formalized, educational ESL program (University of Victoria English Language Program), it was anticipated that learning would also include other forms of less systematic, structured learning (i.e., homestay language experience in formal cross-cultural language activities, etc.). Successful language learners have been shown to seek out both formal and informal learning experiences as a means of self-directed involvement necessary for developing communicative ability (Pearson, 1988; Reid, 1987).

Data Collection

Introduction.

The data for this research study were collected using three data collection processes (SILL inventory, semi-structured interviews, and reflective notes) throughout November, 1994.

The required documentation pertaining to the research project had been approved by the Human Subjects Committee, University of Victoria, and the research approach was discussed with the graduate supervisor and the committee prior to commencement of the data collection process.

Initially each informant was contacted by telephone, followed by a letter to clarify the purpose of the study and the anticipated research protocol. The first meeting with the research participants took place in the English Language Centre, a site known and available to us, through arrangement by the Teacher-Administrator at the English Language Centre.

SILL: Data collection.

The SILL assessment tool consisted of fifty questions. It took participants approximately thirty to thirty-five minutes to complete. At the onset of the administration of the tool it was reiterated that the results of the test were confidential and would in no way influence learners' marks, nor would classroom teachers have any contact with the information. Having already clarified these guidelines in my telephone conversation and introductory letter, I had not anticipated this need for reassurance. However, there seemed to exist a sense of apprehension as we were

about to embark on the completion of the SILL. This SILL data collection process provided an individualized score for each learner related to her use of LLS in each of memory, cognitive, compensation, metacognitive, affective, and social strategy categories, as well as a score which reflected her average reported use of LLS related to all six of the categories.

Although the SILL inventory is designed so that learners can score themselves, I decided that in terms of the purpose for which the inventories were collected, and time constraints, I would score the inventories myself. Scoring is done by noting the level of Likert value for each question (1 to 5, where 1 represents almost never used. and 5 represents always or almost always used), and adding the total score for each section. Each strategy category (memory, cognitive, etc.) was then factored in terms of the weighting of its section. This provided a score reflecting the learner's preference for use of that category of strategy. Finally, all the factored values are cumulatively scored to devise a final value which represented the learner's overall average use of all six LLS categories represented in the SILL tool.

Semi-structured interviews (SSI): Data collection.

At our first meeting, in addition to completing the strategy assessment tool (SILL), each participant spoke briefly about herself, her interest in learning English, and asked questions about the research process. When the timing for the interviews was discussed at the first meeting, it became evident that a convenient time for participants to meet with the researcher was during their lunch break from 12:30 and 2:30 pm. The majority of the interviews took place during this time slot, with the

schedule arranged to accommodate other commitments of the participants. There were a total of fourteen interviews as each participant was interviewed twice. Each interview lasted about twenty minutes. One student was interviewed at the MacPherson Library because the facility at the English Language Centre was in use during our allotted time, and another student was interviewed at the home of her host family. The semi-structured interviews were audio taped with the permission of each participant.

The textual forms of both Interview I and Interview II were used to support the interview process. These were semi-structured interviews and as such not all participants' responses adhered completely to the written format.

Reflective notes (RN): Data collection.

In the third method of data collection, respondents were requested to keep 'reflective notes' in which they wrote about self-selected learning activities. It was hoped that this reporting process would encourage respondents to annotate language learning efforts in a reflective, focused manner so that their particular language learning strategies would be more evident to the researcher. Finally, it was anticipated that the note-taking process would serve to give voice to the respondents' personalized language learning strategies "...freely and intentionally chosen." (MacIntyre, 1994, p. 185).

The learners were asked to make an entry each day for a two week period on the format provided. One respondent declined participation in this activity.

Of the learners who completed this data collection process, entries varied from

three short entries to fourteen entries, some reflecting use of a single strategy and others comprised of chains of language learning strategies linked with respondents' personal feelings, beliefs, and learning experiences, etc.

Theoretical Considerations of Data Analysis

In reducing and analyzing qualitative data it is possible to use primarily inductive methods to generate themes useful for the organization of data. It is also possible to use preexisting category systems, although this may present some dilemmas. In choosing a category system, one must ensure that there is conceptual compatibility between the research questions and the theoretical perspective inherent in the preexisting category system. That is, the researcher was asking a question about the conceptual nature of participants' language learning strategy use; was Oxford's (1989) SILL category system congruent with the goals of the research questions?

Secondly, was the category system sufficiently inclusive to capture most learning strategies that might emerge? The latter issue addresses an important dilemma in using a borrowed system such as Oxford's. That is, one may tend toward data selection to fit the preexisting categories and miss conceptualizing and organizing other categories to capture idiosyncratic and unique data.

However, in terms of the design of the whole study, the research questions asked, and the nature of Oxford's categorization system, the researcher decided that it would be possible to use this preexisting typology of language learning strategies to understand and thematically locate learners' use of language learning strategies present in the qualitative data. Oxford's system has the potential to address the first research

question, at least partially, and to accommodate analysis of the second research question. In this sense, it seemed possible to use Oxford's system for both inductive and generative purposes in the data analysis.

The researcher also felt that in terms of triangulating the data, the general use of the same categorization system would facilitate comparison of findings in both qualitative and quantitative data areas.

Based on the admonition that there is a need for efforts to establish a more definite research-theory perspective in strategic language learning behaviour and "...the beginnings of systematicity in the categorization schemes for strategies, so that new investigators need not gather information blindly...." (Skehan, 1989, p. 82), the researcher decided to use Oxford's categorization system in understanding the research data in this study. The data was analyzed in three stages.

Data Analysis Process

Data analysis: SILL.

Initially, the researcher scored the seven SILL inventories and organized the findings into lists reflecting each participants' reported use of language learning strategies and rank order of the strategy categories. Each one of these lists was placed on individualized legal sized folders, colour coded to remind the researcher of the individual learner whose data was represented therein. These folders are subsequently referred to as 'Summary Sheets'.

Each one of these folders has on it:

1. The participant's SILL mean value for each of Oxford's strategy categories;

and,

2. A value representing the participant's frequency of strategy use for each of the six categories.

Data analysis: Semi-structured interviews.

Each of the audio tapes were listened to twice and then transcribed. I then took the learners' transcriptions and, in the framework of the question asked or the conceptual nature of a learner's statement, cut up one copy and allocated the data to that each Summary Sheet.

The more generally situated quotes related to the learner's musings/reflections and some of the researcher's own field notes relative to that participant were allocated to the area of the learner's Summary Sheet which was initially titled General Reflections.

Data analysis: Reflective notes.

The reflective notes existed from their inception in the situational frame created by the individual participants/writers. It may be argued that some of the learners' reports in this area resemble incidents rather than specific language learning strategies. Nevertheless, they are aspects of language learning behaviour which involved each participant in the selection of language learning experiences to reflectively record and annotate in her own voice. As such, the notations offer insights on language learning areas which individual language learners chose to isolate or comment on. Thus, the *notes* enhanced an understanding of the ways each participant perceived, organized, and interpreted the meaning of LLS using their experiential SLA background.

It is known that what people believe to be true or significant is more important than the objective reality (Fetterman, 1988). Extrapolated to the framework of this study, it may be said that a language learner could be expected to attend to and report aspects/incidents of reality which she believed to capture meaningful aspects of her language learning behaviour. The active process of paying selective attention has been designated an important metacognitive strategy which orients the learner toward meaningful reflective interaction with the task at hand (Chamot, 1990; Schumann, 1995). Further, it has been suggested that some incidents in adult learners' lives are pivotal and may even constitute *critical incidents* (Roth, 1990). As such, they serve to focus the learner's attention on conceptual understandings critical to the advancement of their learning process (Roth, 1990).

In conclusion, this data collection process served at least three important purposes. Initially it challenged learners to examine their personalized language learning processes. Secondly, it enabled learners to express specific and personalized learning needs. Finally, in writing reflectively learners were given an opportunity to generate personalized strategic solutions to their SLA endeavours and in doing so to reveal their use of LLS.

Data Analysis

Quantitative data/SILL.

Each participant had completed a SILL (version 7.0) summative inventory. The researcher scored each one of these and rank ordered the findings to provide quantitative evidence of the reported use of the learners' use of language learning

strategies. The ranked scores are displayed in a figure at the conclusion of each learner's vignette in order to provide one aspect of understanding relative to the first research question. This display of the rank ordering of strategy use in both qualitative and quantitative findings made the findings more transparent.

Qualitative data.

Initially the researcher took one copy of each learner/participant's text containing her qualitative data (interview data and reflective note data) and allocated it to her summary sheet. This located the language learning strategies in the situations in which they had been elicited (interview data) or generatively conceived (interview data and reflective note data).

In deciding how each emergent strategy might be categorized, the strategy was examined in order to allocate it to the Direct or Indirect Strategy Class. Having decided which class the language learning strategy occupied, the conceptual nature of the macrostrategy category (i.e., cognitive) and the allied microstrategy set (i.e., naturalistic practice) were identified.

In order to more clearly elucidate the learner's use of language strategies, the researcher prepared a vignette or summary statement on the strategic language learning behaviours of each of the seven research participants.

Hence the researcher examined, analyzed, and labelled each strategy that was perceived in the participant's qualitative data. These frequencies of each macrostrategy category were then tabulated, rank ordered, and displayed in each participant's vignette.

Initially each vignette included a brief demographic overview of the learner as a person, including cultural background, language learning experience, personalized beliefs, values, and goals related to SLA, etc. Also included in the vignette was a section on the analysis and findings reflective of each learner's three data collection processes. During the data analysis process, themes and topics gradually evolved to capture life situations in which learners reported their particularized language learning strategies. These themes served to answer research question number two which asked in what life situations learners' language learning strategies would be present. Thematic areas not clearly provided for the Oxford (1989) taxonomy are discussed in the following chapter. In order to better display and understand the emergent themes found in the qualitative data, a table was included showing the macrostrategy categories and related themes. Quotes illustrating examples of language learning strategies used were placed in the relevant box on the appropriate tables. The thematic relationships were examined in which the language learning strategies were juxtaposed with the user's language learning strategies, as they emerged in the qualitative findings. The penultimate table in each learner's section was used to display the quantitative findings from the SILL inventory.

Synthesis.

Each learner in this study may be considered holistically a particularized example of language learning strategy use in the SLA process. Therefore, it was necessary to examine each learner's strategies documented in the data in order to gain insights to inform the two research questions.

Triangulation of Qualitative and Quantitative Data

In terms of qualitative and quantitative findings for each participant, the researcher wrote a synthesis reflecting perceptions of the learner's use of language learning strategies. This included analysis of findings from all three data collection processes.

The final table of each learner's vignette displayed a synthesis of rank ordered preference of each LLS category (Oxford, 1989) as it occurred in the qualitative (SSI and RN) findings and as it occurred in the quantitative SILL findings.

A concluding statement reflected on triangulation of the findings and a reflective synthesis of all the research findings as they related to the research questions.

CHAPTER FOUR

Language Learning Strategies: Orchestrated Occurrences

Introduction

This chapter is intended to provide the reader with some insights into ways in which the seven women who participated in this study used language learning strategies (LLS) to accomplish their goals in learning English as a second language.

Initially, broad demographic characteristics of the participant group are presented. Then an individualized profile, of each participant's strategy use in their language learning experience, is discussed. Each learner has been assigned a pseudonym. The findings presented in the participants' individual profiles were derived from three data collection processes. These were semi-structured interviews (SSI), reflective notes (RN; mini-diary studies), and the Strategies Inventory in Language Learning (SILL). The individual participant profiles are presented in a vignette describing each learner's perspective on her language learning behaviours.

Initially, the frequencies of language learning strategies derived from qualitative findings from the semi-structured interviews and the reflective notes are reported separately in text. Examples of these qualitative findings are presented in three tables per participant, where the woman's language learning strategies are juxta positioned against the learning situations in which they occurred. The seventeen themes which emerged from the qualitative data (semi-structured interviews and reflective notes) were: Understanding English Speakers and their Culture; English as a System of Language; Difficulties and Confusion; Extra Practice; Understanding Grammar;

Studying Grammar; Learning Pronunciation; Most Important Activity in Learning English; Being Understood; Understanding/Learning New Words; Getting Main Idea and Details; My Most Difficult Learning Task; Remembering a Successful/Unsuccessful Language Learning Experience; Getting Help; Am I Making Progress?; Relevant or Less Relevant Learning Activities; and, Preparing for a Challenging Task. Each example of LLS is encoded with SSI or RN to indicate the data source.

By referring to the three tables it is possible to see the seventeen themes which emerged from the qualitative data. It is also possible to see the life situation locale for each language learning strategy use reported by the learner. The frequency of each participant's reported SILL use of language learning strategies, and its rank order is recorded on the penultimate table in each learner's vignette. In the final table, the findings from the two qualitative data collection methods, reported separately in text, have been fused and are found under the heading "Qualitative Evidence."

Finally, a section titled Reflective Synthesis collates and discusses the findings in terms of each learner/participant.

All of the participants in this study were volunteers; the sole remuneration given to each was a copy of the book *How to Be a More Successful Language Learner* (Rubin & Thompson, 1994). Both by self-selecting to become a part of this study and by their expressed interest in discussing and explaining their language learning process, each woman demonstrated her interest in better understanding her SLA process.

Learning Experience of Participant 'Yuriko'

Description of Yuriko

Yuriko is a twenty-three year old woman from Japan who has been studying English for nine years. She graduated from Junior Women's College in Japan, but began her English studies in a private language school shortly prior to entering junior high school.

Yuriko is the first member of her family to formally pursue English studies abroad. She speaks about English language study saying her family was "not interested ...but I am interested because my brother's wife ...taught me ...some alphabet, the basic English, ...so I was very interested in English."

She speaks of her plans to go to California from Victoria saying, "Too many Japanese ...I have many opportunities to speak Japanese here ...my English getting worse." She talked about her plans of living with her friend in California as a means of developing cultural and linguistic understanding of English speakers.

Yuriko spoke about beliefs regarding her SLA experience saying, "I don't ...think me don't have to ...um ...ashamed ...because I'm learning English ...that the most important thing, I think." (taking emotional temperature/affective; self-evaluation/metacognitive).

She continued saying, "Studying English ...also I can learn that country's customs or culture ...some phrases from old history. I can read the phrases ...but I don't know [what] that mean ...I want to know about them. I like that one ...so I want to know the history." (planning learning/metacognitive; taking emotional

temperature/affective; empathy for culture/social).

With reference to better understanding English speakers Yuriko said, "Talking to Japanese, we don't say my feeling, but in Canada you don't do that [the implication being that Canadians overtly expressed their feelings] ...so if I can speak more ...and I can say what I am thinking ...I want to do that." (arranging and planning learning/metacognitive). (Yuriko seems to say here that you have to permeate the thought mode of native speakers, both by understanding and expression of thought, in order to better access meaning and being, in their experiential and linguistic world.)

Qualitative Findings

Interview findings.

In the interview data describing Yuriko's strategic behaviour in language learning activities, she used primarily metacognitive and cognitive LLS. Twenty instances of cognitive strategy use were noted. Cognitive language learning strategies were most often evident when related to specific linguistic/language learning material (i.e., understanding syntax, creating structure of words by finding their spellings, etc.). These were most evident in the themes: "English as a System of Language," "Understanding Grammar," "Learning Pronunciation," etc.

Metacognitive strategic learning behaviour, on the other hand, was more pervasive and was evident throughout various aspects of Yuriko's learning experience, both naturalistic and formal. Twenty-six instances of metacognitive strategy use were noted. These were chiefly noted in the life situations of "English as a System of Language," "Difficulties and Confusion," "Extra Practice," "Remembering a

Successful/Unsuccessful Language Learning Experience," "Planning for a Challenging Task," "Am I Making Progress," and "Most Important Activity in Learning English."

Social learning strategies were Yuriko's third most preferred strategy category. Twelve instances of social learning strategies were evident in the data. Social strategies enable Yuriko to interact with native speakers, to negotiate meaning in various formal and informal situations, and ultimately better understand the target language culture. Social learning strategies were primarily noted in the themes: "Understanding English Speakers and their Culture," and "Extra Practice."

The use of affective learning strategies was evidenced in the qualitative data in twelve instances. Affective strategies seemed very important in aiding Yuriko to understand, accept, and cope with feelings and responses related to her SLA experience. Affective strategy use was noted in the themes: "Difficulties and Confusion," "Understanding/Learning New Words," and "Extra Practice."

The use of memory strategies was vividly described by Yuriko when she talked about the ways in which she created pictures and images in her mind in order to create structures and support recall of linguistic material. The use of memory strategies was noted nine times in the interview data. Memory strategies were most evident in the themes: "Getting the Main Idea and Details," "Understanding/Learning New Words," "Learning Pronunciation," etc.

Compensation strategies were the least often strategy category reported in the qualitative data by Yuriko in strategic behaviour in SLA endeavours. Compensation strategies were used by Yuriko in learning situations where she used linguistic and

situational clues, to help her guess the meaning when she lacked the actual linguistic control/proficiency sufficient to understand or express the conceptual tasks. There were eight instances in which use of compensation strategies was noted. Compensation strategies were most often evidenced in the themes: "Difficulties and Confusion," "Getting Extra Practice," Understanding/Learning New Words," etc.

Reflective note findings.

Yuriko's reflective note findings evidenced two instances of metacognitive strategy use. One occurred in the theme: "Difficulties and Confusion." The other occurred in the theme: "Extra Practice." Cognitive strategy use was evident in two instances and there was one instance of social strategy use in the theme: "Extra Practice."

Tables 1, 2, and 3 which follow display instances of Yuriko's language strategies as they were reported in the qualitative data. Table 4 displays Yuriko's rank ordered SILL scores. Table 5 displays a synthesis of the rank ordered LLS scores, both quantitative (SILL) and qualitative (RN and SSI).

Table 1

Yuriko's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory						
Cognitive		"In Japan ...say subject and at the end is a verb ...I learned German ...very different grammar style ...so very hard ...also English." (SSI)		"At a basketball game at UVic ...Canadian students sat behind me ...talking ...I tried to understand ...I couldn't understand ...because they used many slangs." (RN)	"Basic grammar is important because ...I learned that form but I make many mistakes ...so ...'she must be rich ...and she might be rich' ...very different meaning ...if I make a mistake that's trouble." (SSI)	
Compensation				(Studying with my conversation partner) "If I don't understand a word ...I will ask 'please repeat ...spell that word.'" (SSI)		
Metacognitive					"I have learned that grammar point already ...but I have forgot (laugh) ...that's meeting ...kind of review for me ...if I feel bored ...I just do exercise ...and read information ...explanation." (SSI)	

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Affective			"Sometimes [on the phone] have to listen very carefully ...but get mixed up ...get key points ...maybe ...confuse or panic ...I just say to me 'calm down ...calm down' (laughed)." (SSI)	"My first time [host family correct me] I was very nervous ...but I wanted to learn correct English." (SSI)		
Social	"I feel difference between Canada and Japan ...people's feelings ...people's thinking ...everything are different." (SSI)			"So I say to my family 'well, okay, ...of course please correct my mistake. Okay, try to practice with everybody." (SSI)		

Table 2

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory	"Maybe that's a mistake ...but I guess anyway ...in my mind ...I have a kind of word ...and divide it from stress ...I ask you to repeat again ...sometimes I record ...record and listen my pronunciation." (SSI)			"I imagine ...some situations in my mind ...make pictures ...and I try to remember the thought." (SSI)		
Cognitive	"I want to learn the spelling ....I want to write down." (SSI)					
Compensation	"I ask you again to please repeat that again." (SSI)			"I just read through ...I don't know if that right but I guess ...I know the situation ...sometimes ...can't understand yet ...I look up." (SSI)		
Metacognitive		"The most important thing ...prepare attention ...participate ...in class." (SSI)				
Affective				"Of course I am studying English ...so I have to use English ...so use English dictionary ...but if trouble to understand ...so I check Japanese dictionary ...so that is much helpful for me." (SSI)		

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Social						

Table 3

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory					
Cognitive					
Compensation				"My favourite activity is to watch movies ...because they speak ...uh ...daily conversation ...so that's very useful for me ...movies have screens so if I don't understand ...what she or he is saying ...but I can imagine ...I can guess." (SSI)	

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Metacognitive	"That is a difficult question ...may I will ...when I go back home ...go home ...I will rewrite ..and read again ...remember the vocabulary ...maybe I will check my mistake." (SSI)		"I have many opportunities to speak Japanese here ...too many Japanese here ...English getting worse." (SSI)		"Today is busy day because I have presentation ...all English day me ...this morning I try to speak English ...because I have to think something in English ...because ...sometimes speak Japanese ...my brain does not work very well ...in my brain there are many, many Japanese words ...so that's not good ...I'm afraid I can't explain very well." (SSI)
Affective					
Social					

Quantitative Findings

SILL findings.

On the SILL inventory, using Oxford's mode of scoring, Yuriko's highest score was in the category of social strategies, although cognitive and compensation strategies were also in the high range of use. Metacognitive, affective, and memory were in the medium range of use. Yuriko's use of all language learning strategies at a moderate to high level of use suggests she is a strategic language learner and that she is both aware of her strategies and able to priorize them.

Table 4

SILL Inventory Scores for Yuriko

SILL Evidence Rank Order Strategy Use	Score
1. Social	4.2
2. Compensation	3.7
3. Cognitive	3.7
4. Metacognitive	3.4
5. Memory	3.2
6. Affective	3.3

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Reflective Synthesis

In understanding the findings it should be remembered that my level of subjectivity in understanding Yuriko's use of her language learning strategies may be different from hers. I had a small slice in her life as a language learner to examine and to analyze. Although I attempted to capture the realities of her use of strategic learning behaviour in SLA, there may be aspects of my perspective that prevented me from achieving this in the most precise manner (I am reminded by her quote, "Everything is different ...people's thinking etc.").

Yuriko reflected on the dilemma of facing linguistically and socially confusing situations and how she intentionally mobilized LLS to help her gain control linguistically (using compensation strategies, i.e., asking for repetition, when she lacked the precise language to accomplish her tasks; seeking practice to better understand English as a language and a culture; planning, monitoring, and evaluating her learning efforts; using her visual and cognitive orientation to maximize her language learning experience while listening to messages that her somatic being shares with her affective being). This may be one of the most interesting aspects of Yuriko's LLS behaviour in the light of John Schumann's (1994) recent assertion that, "...the brain, affect and cognition are distinguishable, but inseparable." (p. 231). The findings from Yuriko's case suggest this.

One of the areas referred to by Yuriko in her reflective notes when she says "in my dream," etc., suggests how significant the unconscious mind may be in both processing language and influencing learners' insights/feelings about their language

learning experience. Such insights might be understood within Oxford's affective strategy category of "listening to your body" in which the learner must pay attention to the feelings that their somatic being provides, in better understanding themselves as language learners, as well as their efforts in language learning. However, there may be no category of language learning strategy in Oxford's system which adequately and accurately captures the essence of this aspect of learning.

From both a research and a practice perspective Yuriko reminds us that it is not the brain or the body in isolation that partake in the SLA process, rather it is the whole being of the SLA participant in relationship (Norton-Pierce, 1995) with the target language speakers and their cultural reality that create and recreate the learning process (Brown, 1994).

As I reflect on Yuriko's strategic learning efforts, the findings remind me that this woman seemed, on both a conscious and subconscious level, to mobilize modes of being as modes of learning. That is, she seemed able to plan and use her life experience to optimize her SLA experience. This is one of the attributes of being a self-directed learner for whom all life is learning. Yuriko understood that the world of Japanese and English speakers was completely different, but did not feel disempowered.

This is an important consideration, especially for adult learners who come to the process of SLA with a mature personal construct (Cranton, 1992). Many experience a loss of self in a linguistic code far removed from their native language (Murphy, 1989). Yuriko used her language learning strategies to ensure this did not

happen to her.

Table 5

Synthesis of Findings: Yuriko

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Metacognitive	28	1. Social	4.2
2. Cognitive	22	2. Compensation	3.7
3. Social	13	3. Cognitive	3.7
4. Affective	12	4. Metacognitive	3.4
5. Memory	9	5. Memory	3.2
6. Compensation	8	6. Affective	3.3

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

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Learning Experience of Participant 'Alexandria'

Description of Alexandria

Alexandria (Alex) is a twenty-seven year old woman from Mexico. She graduated from business college and worked as a professional financial consultant in Mexico City. Alex spoke of reading and editing book drafts for her father, an economist, who has authored several books related to the emerging economies of Latin America. Two of Alex's sisters, who live in the United States, are fluent in English. When interviewed, Alex had been studying English for nearly a year in Victoria and said, "I study a little bit before in Mexico." Alex reported that when she came to the English Language Centre program, her sister from California came to stay with her host family for the first two weeks "to give me a little hand."

Alex expressed a pragmatically high valuation of English when she said: "Now is very demanding in my country and everybody has to speak another language ...to find better jobs or better opportunities."

Despite her enthusiasm for participation in the study, she decided that she did not have time to keep the reflective notes. In the interview Alex expressed definite ideas about the ways in which she perceived herself as an adult ESL learner in a formalized program, saying: "In my opinion the program at UVic is ...is easy ...I think that they don't understand the students ...I don't know if they don't realize that you are ...you are a person ...and you ...have been alive for years and years ...and you know many things." (self-evaluation/metacognitive; discussing feelings/affective).

Alex's high literacy level in Spanish and her inquisitive reflective nature were

evident in the interview discussions. Her language learning strategies included a variety of cognitive, analytic processes in which she used her attentive, analytical ability to focus on, and derive meaning from, a variety of English expressions. For example, she analyzed idioms ("ring the bell"); reflected cross-linguistically on words ("one day in the soap opera she used 'in my second thought';" "in fact ...amputation ...we say ...amputatage"); and focused her attention on precision in naturalistic English language use (i.e., "because he was using good proper English").

With reference to how long it would take to learn a language Alex said, "I think if you are learning a language ...it's forever. ...And I think it's ...we are Mexican people and we want to learn ...and we are ...not very shy and sometimes ...we are ...we know we are ...making mistake ...but I think everybody that ...want to learn another language ...is going to make ...mistake." (taking risks wisely/affective; monitoring/metacognitive). "...because if you are learning another language ...there are many things new for you ...in that language ...but that doesn't mean they don't know nothing." (encouraging statements/affective).

Alex revealed herself as a proactive, energetic language learner. She mobilized extensive and diverse LLS to avail herself of opportunities for English language learning. Rubin (1975) and Naiman, et al. (1978) had suggested a number of attributes which characterize good language learners, many of which were evident in Alex's language learning.

Qualitative Findings

Interview findings.

The data from Alex's interviews revealed thirty-six instances of cognitive language learning strategies. These were primarily evidenced in the themes: "English Language as a System," "Understanding/Learning New Words," "Extra Practice," "Learning Grammar," "Getting Main Idea and Details,".etc. Several times in the interview she analyzed expressions and did contrastive analysis between words in Spanish and English.

Metacognitive language learning strategies were evidenced twenty-six times in the interview data. Alex used metacognitive strategies in the themes: "Understanding English Speakers and their Culture," "Understanding/Learning New Words," "Understanding Grammar," "Extra Practice," "Relevant or Less Relevant Learning Activities," etc. These were learning activities that required globalized planning, organization, and evaluation than Alex evidenced so clearly in her many and varied learning activities.

Social learning strategies were noted in twenty instances. They were present primarily in the themes: "Understanding English Speakers and their Culture," and "Extra Practice," and "Getting Help." These situations required that Alex plan and execute social contact with proficient native speakers in a variety of locales.

The use of affective language learning strategies were noted ten times in the interview data. Alex used affective strategies to note both positively and negatively the way she was feeling about her language learning in the themes: "Relevant or Less

Relevant Learning Activities," " Remembering a Successful/Unsuccessful Language Learning Experience," "Am I Making Progress?," "Difficulties and Confusion," etc.

Alex's interview data yielded nine instances of her compensation strategies use, primarily in the themes: "Difficulties and Confusion," "Understanding/Learning New Words," "Being Understood," etc.

Memory strategies were overtly noted four times in the interview data and this occurred in the themes: "English Language as a System" and "Understanding/Learning New Words."

Reflective note findings.

There was no qualitative data from the reflective notes process because Alex did not keep the notes.

Table 6

Alex's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory		"Sometimes you remember ...something ...sometimes you forget ...maybe underline some sentence ...important ...I think same way you learn in Spanish." (SSI)				
Cognitive		"She's trying to learn Spanish and I'm trying to learn English ...and sometimes I ask her ...okay ...for me deceptionate is like ...it's like you expect a little bit more ...and you don't have that ...for her it's like 'disappointing' ...so if you take that word from dictionary ...similar in English ...not exactly the same." (SSI)		"I remember when husband [host father] and friend were talking about Forest Game ...Gump ...movie and they say ...he used 'otherwise' with this and this ...I went to my bedroom ...I start to make a note because he wasn't making a mistake." (SSI)	"I think grammar is very helpful ...it shows you have to speak ...maybe I'm answer the exercise ...try to understand the meaning in Spanish ...there's only one rule ...and I think you've got to practice." (SSI)	"I'm ...I'm answer the exercise ...use the grammar book ...find the meaning in Spanish." (SSI)
Compensation						

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Metacognitive	"If you want more and more challenge, you have to do it by yourself ...because if you are learning another language ...many things are new for you ...doesn't mean you don't know nothing ...but you have to learn the way they think." (SSI)			"You have to ...the challenge is for you ...is to try to do real situations ...you have to go there and try to do it." (SSI)	"I think meanings good ...because it show you okay ...how to write ...sometimes you say okay 'did you every have this' ...is like an auxiliary ...you start to understand grammar." (SSI)	"I am the person who always pay attention in class ...when somebody talking ...I always have eye contact ...focus ...all ears ...grammar shows you how you have to speak." (SSI)
Affective			"Sometimes you feel frustrated ...it's horrible ...because you try to explain yourself ...and nobody understand you ...maybe that was because I was very anxious ...to learn many, many things ...now I know the only way I can try to learn to ...improve my English is to study." (SSI)			

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Social	"Try to be with people that speak the new language ...try to hang around them." (SSI)			"When host mother pick the telephone ...I hear the answer ...it's helpful to me ...maybe next time I'm going to ask [answer] telephone like that ...So ...okay, try to practice with everybody."		

Table 7

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory				"Sometimes I turn on TV only to listen ...sometimes I don't know the meaning and sometimes I'm watching TV I used to say ...ah ...that was a word we saw at a class ...a word." (SSI)		
Cognitive				"For me helpful to watch TV ...they are talking in the show ...you can take notes ...sometimes you can watch the same show ...you can't catch the word in your first time ...that show ...but you catch the second time around." (SSI)	"I do the exercise ...and then I start to ask 'what does that mean?' ...my teacher says I'm inquisitive ...or something ...but I'm like that ...because like 'exclusive ...exclusive' ...I need to know ...I'm persistent ...I repeat ...write exclusive ...exclusive ...exclusive." (SSI)	

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Compensation	"They say one ...you say it again ...sometimes ask them to repeat ...and up [louder] in order to hear and write for each one [word] ...and repeat ...and then write ...in Spanish." (SSI)		In the situation of being incomprehensible to a native speaker Alex said, "I will try ...myself ...speak slowly ...let him [doctor know] I am a Mexican ...they pay a little more attention." (SSI)	"If you hear a new word ...ask for pronunciation ...say again ...practice ...maybe you are missing something ...try to draw a little diagram ...make words a little darker ...you can write conversation ...put it in context." (SSI)		
Metacognitive		"Say ...listen ...the most important thing for me to do ...listen ...take it in ...or sometimes ...choose some sentence ...look at the book ...write down the correct way ...I copy them ...that's the way it has to be." (SSI)		"Look at the picture ...the person ...direct eyes ...I always ...when someone is talking with me ...keep the eye contact in my class ...and I always sit in the front." (SSI)	"But I think ...mm ...everybody ...study English ...they are able to read ...but the problem, the problem is to speak." (SSI)	
Affective						
Social				"Okay ...try to practice with everybody ...when I have an opportunity ...even if it's Japanese or Taiwanese and maybe they don't understand each other ...you have to speak ...with your hands ...they don't speak your language and you have to try and do it." (SSI)		

Table 8

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory					
Cognitive	"Maybe you have to repeat the story over and over ...I think it's the same way you remember in Spanish ...you remember ...you forget ...sometimes I underline the sentence ...cause for me important ...what is this meaning ...of the story ...make a summary ...you learn ...I guess it's the same way I study in Mexico." (SSI)				
Compensation					
Metacognitive					

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Affective	"In the beginning when I was watching TV ...I would ...oh ...one word ...that word ...and I'm pay attention in every single word ...and three months later ...when show is over ...I start to realize ...I was able to understand ...every single detail and I was really happy ...it was like a jump ...I was very, very happy." (SSI)			"Okay it has to be something I was really interested in ...I was really interested in her life [Nellie McClung] ...so I read and read." "I like to watch many videos in class and discuss videos with teacher, not just the students ...sometimes [talking other students] is wasting time ...because you are only making mistake ...I don't like that." (SSI)	
Social		"I am talking with my conversation partner ...we help a lot one another ...sometimes I ask her okay ...for me 'deceptionate' is like ...um ...or amputatage ...sometimes they mean totally different." (SSI)	"I think now is better for me because ...I ...I'm ...I understand more things ...at the beginning was very hard ...because everything is new ...for you ...very hard to understand ...sometimes ...[laugh] I give up ...when I wake up ...say 'I'm going to do it' ...I'm that kind of a person ...keep going and going ...and never give up." (SSI)		

Quantitative Findings

SILL findings.

On the findings of Alex's SILL inventory there were two learning strategy categories (social and compensation) which measured in the highest range of use (always or usually used). The scores for the other four macrostrategy categories of LLS use fell in the medium range of use (sometimes used).

Table 9

SILL Inventory Scores for Alex

SILL Evidence Rank Order Strategy Use	Score
1. Metacognitive	4.6
2. Social	4.4
3. Cognitive	3.4
4. Memory	3.2
5. Affective	2.8
6. Compensation	2.7

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

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Reflective Synthesis

As the SILL inventory suggested, Alex was a sophisticated and seemingly experienced user of language learning strategies. Findings from Alex's interview data revealed a high personal and familial valuation of the English language. Positive beliefs and values toward the target language and its speakers seem to be predicative of a heightened level of both extrinsic and intrinsic motivation (Brown, 1994), and enhanced potential for success in language learning (Mantle-Bromley, 1995).

Alex spoke of her extensive reading experience in Spanish. It has been reported that learners with the advantage of a high level of literacy skills in their native language show an enhanced ability to deal with literacy and developmental language skills in the target language being studied (Weinstein-Shyr, 1993).

The findings from the interview data and the SILL inventory suggest that Alex used extensive metacognitive, cognitive, and social LLS. Her high level of persistence (Tremblay & Gardiner, 1995) would suggest that she had the intrinsic motivation necessary to support diverse and ongoing strategic learning activities in the face of confusion and frustration associated with learning English and being in an unfamiliar culture. Alex evidenced the realistic framework of beliefs and values about the nature and duration of language learning that has been reported to be conducive to success in language learning (Mantle-Bromley, 1995).

This area of beliefs and attitudes may be more important than has been previously recognized, not only in facilitating the tolerance of ambiguity (Ely, 1989), but also in the actual cognitive activities of paying attention and noticing (Tomlin &

Villa, 1994) that is critical in language learning. Learners who use language learning strategies evidence more ability to control and monitor their own learning, thereby contributing both globally and locally to their language learning process (Felder & Henriques, 1995).

The interview findings showed that Alex's accurate and congruent referential framework and her high level of commitment were associated with extensive use of language learning strategies. This seemed to facilitate the energy and the skill necessary to foster learner autonomy for Alex. As she said, "If you want more and more challenge ...I think you have to do it for yourself." That is, although Alex used her ability and her language learning strategies to focus on discrete and distinct aspects of language, she had a much larger personalized vision of the language learning process. Although she often reported using translation as a cognitive learning strategy, she sought to understand meaning as well as linguistic form, and used her conceptual Spanish knowledge in interpreting and better understanding her English language learning experiences.

Alex demonstrated her ability to tolerate ambiguity and to take risks, both attributes that have been associated with proficiency in SLA (Naiman, et al., 1978). She exhibited a high degree of self-esteem, and both reflected on and questioned the relevance and validity of aspects of her learning experience. By doing this she took a proactive and self-directed approach to the process, strategically evaluating her learning process and acquiring from it the aspects of knowledge that were most helpful for her as a learner. This powerful combination of a positive attitude associated with

extensive, pervasive language learning efforts, including the use of language learning strategies, seemed to be both supportive and facilitative of Alex's language learning efforts.

Table 10

Synthesis of Findings: Alex

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Cognitive	36	1. Metacognitive	4.6
2. Metacognitive	26	2. Social	4.4
3. Social	20	3. Cognitive	3.4
4. Affective	10	4. Memory	3.2
5. Compensation	9	5. Affective	2.8
6. Memory	4	6. Compensation	2.7

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

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	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

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Learning Experience of Participant 'Don'

Description of Don

Don is a twenty-nine year old Taiwanese woman who trained and worked as a professional pharmacist in Taiwan. She had learned some English in junior high school and high school, studying English in Taiwan for a total of about six years before going to Japan. Prior to coming to Victoria she had worked in Japan for nine years as a software programmer.

In the context of her family, Don spoke of one older sister who majored in English in university, but uses it little as she lives in Taiwan. When Don came to participate in activities associated with this study she was always cooperative and often smiling, but seemed somewhat tense.

Speaking of her personal goals in learning English she said, "I don't know the future ...but maybe if I can speak English well, maybe the job is good for me ...or I thinking for Taiwan business ...the future may be like Hong Kong so English is ...maybe the future ...if you want good job." (arranging and planning learning/metacognitive). She concluded saying, "So it, now I just thinking ...if I just, just speak Japanese ...but I can't speak English maybe it's my minus." (self-monitoring/metacognitive).

Reflecting on her English language experience she said, "In junior [high] school ...I very like English ...and uh ...high school." (making positive statements/affective; focused attention/metacognitive). "But one time I don't like English ...the teacher about pronunciation and English ...I don't know ...my junior high school is DJ

pronunciation ...but go to high school...so when I tested I write ...DJ pronunciation and ...ah ...I got it wrong ...but new word and pronunciation ...I can't get my point ...so usually ...effort, effort ...my English and Chinese translation or choice ...or something ...results not so good." (taking emotional temperature/affective; analyzing expressions/cognitive; self-evaluation/metacognitive).

When I asked her how long she thought it would take to learn another language Don said, "If you are living there ...learning English ...every day ...maybe just to spend your two or three years ...conversation not deep ...just shur ...surface ...the simple sentence ...but if you want deeper ...make something ...do something ...or something like slang ...I don't know ...every day you repeat ...reading and writing ...just a short time to remember." (analyzing contrastively/cognitive; self-evaluating/metacognitive; practising/cognitive).

Don reported many areas of challenge in her SLA process which seemed overwhelmingly difficult. Much of her energy was focused on memorization as a mode of learning English, and she failed to demonstrate interest in the meaning or function of English.

Qualitative Findings

Interview findings.

Findings from the interview data for Don proved to be perplexing and unexpected. Although her life experience suggested that she was a somewhat experienced language learner, the data from her SSI and RN did not display the presence of supportive language learning strategies. She did not reveal

'preunderstanding' (Gadimer, as cited in Svanes, 1987) or particular interest in target language culture or speakers. Don spoke in terms of her goals from an instrumental perspective (Dörnyei, 1995) (i.e., she seemed to be primarily motivated by extrinsic factors related to future employment and had somewhat unrealistic ideas about the duration of study that language proficiency would require).

Don evidenced the use of metacognitive strategies twenty-nine times in the interview data. These strategic behaviours were in the themes: "Difficulties and Confusion," "Extra Practice," "Understanding Grammar," "Most Important Activity in Learning English," "Am I Making Progress?," etc. Many of the instances focused on self-evaluation and self-monitoring and resulted in Don's reaching such conclusions as, "Sometimes just reading dialogue ...I see ...I see." (seems to indicate that she understands at this point). "But when you want to use it ...gone. It makes you feel not good, now very scared or frightened."

Fifteen instances of cognitive learning strategies were noted in Don's interview data. These involved strategies such as translating and using resources (dictionaries) in order to strategically facilitate her language learning endeavours. They were primarily evident in the themes: "Understanding/Learning New Words," "Understanding Grammar," "Getting Help," "Difficulties and Confusion," etc.

Memory strategy use was noted ten times in the interview data. Microstrategy areas used included visual imagery, placing new words in context, and practising and were used in the themes: "Difficulties and Confusion," "Understanding/Learning New Words," "Learning Pronunciation," etc.

The overt use of affective strategies was noted seven times in the interview data. They were used mainly in the themes: "Getting Main Ideas and Details," "Most Difficult Learning Task," "Extra Practice," "Am I Making Progress?," and "Relevant or Less Relevant Learning Activities." In terms of affective strategy use, these behaviours seemed to reflect Don's rather confused and despondent efforts to express her SLA difficulties, rather than serving to strategically strengthen her language learning abilities.

Social learning strategies were specifically mentioned in six instances in the interview data and were found in the themes: "Extra Practice" and "Understanding Grammar." Compensation strategies were noted four times, primarily in the themes: "Getting Main Idea and Details," "Extra Practice," and "Learning Pronunciation."

Reflective note findings.

Don made twelve entries in her reflective notes (four more than made by any other participant in the study). Of these, eight were anecdotal (i.e., "all day in house to do housework, washing clothes;" "nothing/nothing special") and did not relate specifically to LLS.

Two of the entries which proved more revealing in terms of strategy use follow:

"Today I need to prepare for Monday's presentation (five minutes) ...the topic is free. I am very bothered with topic. I don't know what topic is good. Think ...answer is lifes."

"I'm very nervous for today's presentation, that when I finished it classmate

asked me some questions about 'life', very deeply. I can't answer very well. I thought too bad anyway, it's finished."

There were five metacognitive learning strategies and one affective learning strategy noted in the reflective note data.

Table 11

Don's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory			"So sometimes I can't memorize too much in so a little bit ...I have to make sentence ...so my results aren't good." (SSI)	"If I use ...memorize a good ...many ...many ...vocabulary ...maybe ...maybe I will talk with you in English ...uh ...just ...that my mind is very strange." (SSI)		
Cognitive			"But I got to Japan ...almost forgot ...forgot my English ...my pronunciation very near Japanese English ...sometimes I can't speak English ...my mind is thinking ...which one is correct." (SSI)	"Sometimes in the bus we talk ...or listen ...usually listen radio ...sometimes watch TV...." (SSI)		"Maybe first I will use Chinese dictionary ...remember Chinese word...and if I use Japanese dictionary... remember...Jap... Japanese word...and English meaning...I use them both...uh...English meaning...but I cannot use well...I can't use my self ...time...so I had not enough time...learning English." (SSI)
Compensation						

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Metacognitive	"I think learning English not ...in your room ...you need to go out ...so you need to do or to think ...study in the room and then use it." (SSI)		"When I read some article I couldn't understand one word ...the purpose is to read the sentence ...but when I find a difficult word ...I'm afraid of ...I can't understand it ...article." (SSI)	(Regarding a field trip to Goldstream Don said), "More ...more ...they help ...help you learn English but not 100% ...it's pass but not perfect." (SSI)	"After time ...after time ...I would try to understand something about grammar ...sometimes I use a little time to ask the teacher is this correct ...just a little." (SSI)	
Affective			"Today I need to prepare for Monday's presentation ...the topic is free ...I am very bothered with topic ...I don't know what topic is good ...think ...answer is lifes." (RN)			

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Social				(Regarding conversation partner) "Just meet him three times ...my conv ...English conversation ...maybe he say something ...I don't know the meaning ...he feel sorry ...or how to express ...maybe I need two or three months to cover [recover] ...it makes you feel not good." (SSI) "Every Saturday I go downtown shopping ...or something ...and talk to sales girl ...vocabulary too small ...can't express very well." (SSI)	"If I hear the ...I will try...If I can't understand I will ask my friend ...or example ...think example write ...not good results." (SSI)	

Table 12

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory	"Maybe the first ...I memorize the pronounces ...the spelling ...[demonstrated segmenting the word phonetically]." (SSI)					
Cognitive	"I know because every word is new ...I think ...I thought TV is better than radio ...you will see the action ...of this time seeing the world in context ...you can memorize quickly ...you should use the word ...or look up meaning ...make sure you can the pronunciation ...you can repeat." (SSI)			"If I have a dictionary I maybe try to find a word in it ...but if nothing [no dictionary] ...I maybe I just thinking about it before ...after the point ...listening maybe you can get not 100% ...just got 50% you know the words ...so you can try your mind ...the con ...context?" (SSI)		
Compensation			"Use my body language ...just my body language ...or try to do anything ...to understand my mean ...writing?" (SSI)		"Ya ...if I can't speak very well ...maybe draw a diagram and if I have time ...I listen ...make a memo ...or some point of word ...five children ...or ...after and I can answer." (SSI)	

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Metacognitive		"Ah the most important thing ...sentence ...grammar ...ah conversation ...so you can continue ...any time ...anywhere." (SSI)				"Sometimes I can't memorize ...so a little bit ...I have to make sentence ...so sometimes ...my results aren't good." (SSI)
Affective					"First I say the main idea of that story ...ask more ...there maybe nothing [laughed]." (SSI)	"Difficult ...I just think ...how ...how to say ...sometimes ...I ah [laugh] um ...not interesting ...so sometimes very boring ...so sometimes wants us to imagination ...but I was thinking ...not necessary to question ...to answer ...because you can see the true ...the thing [seemed to indicate that the exercise in describing the details of a picture were not very motivating or stimulating]. (SSI)
Social						

Table 13

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory					
Cognitive		"But I find how to say ...watching TV with my mother ...talking about ...usually find a chance ...to speaking at out that ...then try to memorize ...after I found out with dictionary ...usually I don't have enough time ...so must enter my room ...homework." (SSI)			
Compensation					
Metacognitive			"Ah ...interesting in life ...around life. You can use English to speak ...because now I can't speak good sentences for conversation ...so sometimes I say ...'Oh maybe I can't hear ...can't hear too much ...and now very scared or frightened ...maybe I'm not sure I can speak good." (SSI)		

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Affective			"Very afraid in class ...almost every student ...maybe good grammar ...so I can't follow them ...so now very scared ...I can't believe I'm in 4 ...410 class ...maybe I want to go to 3 class for basic English ...sometimes simple sentence ...I want to repeat." (SSI)		
Social					

Quantitative Findings

SILL findings.

On the SILL inventory Don's scores for social, compensation, and cognitive LLS strategies were in the medium (sometimes used, 2.5 - 3.4) range. Metacognitive, memory, and affective strategy scores were in the low (generally not used, 1.5 - 2.4) range. These scores suggest that Don is not an experienced user of LLS at the present time.

Table 14

SILL Inventory Scores for Don

SILL Evidence Rank Order Strategy Use	Score
1. Social	3.2
2. Compensation	3.0
3. Cognitive	2.5
4. Metacognitive	2.4
5. Memory	2.3
6. Affective	2.2

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Reflective Synthesis

The findings from Don's qualitative data evolved in an interesting and somewhat unexpected way. Of all the women in the study, she was the only person who had experientially lived and worked in two language environments before commencing her studies in ESL. The scores on the SILL tool show that Don's use of language learning strategies occurred at a consistently medium to low level of use.

This was a revealing and perplexing case study in the use of language learning strategies. Vann and Abraham (1990) speak of unsuccessful language learners who pursue strategy use in a random, desperate manner with limited focus on the task at hand. Oxford (1990a) cautions that the use of metacognition in the form of self-monitoring is important, but that the learner who becomes "obsessed" (p. 161) with correcting every speech difficulty will not enhance their communicative ability.

Noting the frequencies of Don's preferred language learning macrostrategy categories in the qualitative findings, it initially appeared that her use of strategies, both in terms of quantity and complexity, might have resulted in her being a strategically successful language learner. However, on closer examination, much of Don's reflection and hypothesis generation focused on somewhat fragmented, random, and inflexible LLS use. Coupled with inappropriate beliefs about the nature and duration of a successful language learning experience, Don seemed, at the time, ill prepared to cope with her SLA experience.

Many of her strategies involved dealing affectively with situations in which she had, or was, experiencing difficulties in learning English. This seemed very

discouraging for her, and appeared to result in a high level of anxiety and distress (i.e., "makes you feel not good," "feeling very scared," etc.). Thus, her use of metacognition was more of the nature of "...perverted metacognition in which the learner is self-critical, overly anxious, and focused on reaching perfection." (Oxford, 1990b, p. 443).

Although she spoke of the necessity to experience "life in order to better learn English," she seemed to lack the knowledge or skill to coordinate her language learning goals with supportive, successful strategic language learning activities. That is, much of her learning effort was focused on acquiring language form. Learners who believe they can acquire language through acquisition of sufficient vocabulary items fail to provide sufficient attention to function and meaning, and are not well prepared for communication tasks (Vann & Abraham, 1990). Some of the language learning strategies which Don used (i.e., translation, memorization) may have added to the level of confusion that she experienced, as she seemed to lack definite or specific plans for their appropriate application. Although translation can be useful in enabling learners to quickly grasp complex concepts in early learning, its use as a frequent LLS is too time consuming and is often ineffectual when used in a communicative language setting (Oxford, 1990a).

I wondered if Don had scored artificially high on the SLEP placement test, thereby being assigned to an inappropriate level of classroom proficiency. Also, experientially, in dealing with two language systems which used idiographic orthographies, and working in a professional field which used algorithms

(pharmacy/computer programming), Don may have come to this English language learning experience cognitively prepared to deal with memorization tasks (algorithms, formulas, etc.), but not well prepared to deal with an interactive, communicative language classroom.

In conclusion, the findings suggest that Don may have been suffering from cultural shock, depression, general distress, and/or cognitive overload. There was limited evidence of her ability to use LLS to positively support her SLA activities. However, she may have been in the early stages of LLS use and assessment in another year may show quite a different profile in her use of language learning strategies.

Learners such as Don alert researchers and teachers to the idiosyncratic and unusual ways learners may shape the use of LLS. Such learners alert us to the significance of not simply counting frequencies as an indication of LLS use, and highlight the usefulness of qualitative research in better understanding in-depth, essential aspects of LLS use.

Table 15

Synthesis of Findings: Don

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Metacognitive	33	1. Social	3.2
2. Cognitive	15	2. Compensation	3.0
3. Memory	10	3. Cognitive	2.5
4. Affective	8	4. Metacognitive	2.4
5. Social	6	5. Memory	2.3
6. Compensation	4	6. Affective	2.2

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Learning Experience of Participant 'Tomomi'

Description of Tomomi

Tomomi is a twenty-three year old Japanese woman who has been studying English for eleven years. A graduate from Junior Woman's College, she began her English language studies in junior high school. Tomomi said of her parents, "Can speak English ...just a little bit." She said of herself, "I'm the first one ...overseas studies."

With reference to better understanding Canadian culture and the English language Tomomi said, "Sometimes my host family ask me about my culture ...so ...sometimes ...ah ...our culture is different ...so we talk about that ...if I know the culture ...the Canadian culture ...I can talk a lot ...I need to know about another country's culture ...because we can communicate more." (developing cultural understanding/social; setting goals and objectives/metacognitive). She continued, "I want to use English at universities ...in work ...to speak another language." (setting goals and objectives/metacognitive).

Speaking of how long it takes to learn another language Tomomi said, "I don't know about that ...English and Japanese is completely different ...so it is hard to say many things ...totally different ...totally different ...in ...in you know, character, character is different ...English ...just letters ...noun and adjective in exchange ...sometimes make me very tired." (analyzing contrastively/cognitive; listening to your body/affective).

In the situation of strategically managing the pronunciation task, Tomomi

initially related the process step by step as it would transpire in the class: "Presentation from news article ...new words from that article ...learn ...write ...word ...definition ...teacher pronounce ...several time ...then we repeat." (focusing attention/metacognitive; notes/cognitive; practising listening/cognitive; repeating/cognitive). This made me think of what O'Malley (1990) refers to as developmental cognitive stages in which the learner, on her way to the associative stage and later the autonomous stage, first passes through a descriptive understanding stage of task focus.

Tomomi's findings reminded me that language learning and the use of LLS was an incrementally complex process. Although many of Tomomi's strategies appeared to be in the processes of development and refinement, her interview and reflective note findings evidenced a positive orientation toward LLS use.

Qualitative Findings

Interview findings.

Findings evident in Tomomi's qualitative interview data showed that she priorized the use of cognitive and metacognitive language learning strategies in her SLA endeavours. Thirty-nine instances of cognitive strategies were noted. They were mobilized in a variety of activities involving note-taking and practising. The creation of structure and her experiential language practice using cognitive LLS enabled Tomomi to increase her knowledge about the English language through knowledge compilation (O'Malley, 1990), and to create a structure framework within which to retain this knowledge. Cognitive learning strategies were noted primarily in the

themes: "Extra Practice," "Understanding English as a Language System," "Understanding/Learning New Words," "Studying Grammar," "Difficulties and Confusion," "Learning Pronunciation," "Getting Main Idea and Details," and "Remembering Success."

Metacognitive LLS use was noted in twenty-two instances in the SSI. Microstrategies in this category included self-monitoring, arranging and planning learning, etc. These microstrategies facilitated Tomomi's awareness of learning activities and their potential level of efficacy in supporting her language learning. The insights which she generated through her use of self-monitoring provided her with corrective feedback, useful to the modification of her hypothesis, about the form and function of the English language. Her ability to plan her learning activities ensured a high level of ongoing practice in learning situations both formal and informal. Metacognitive strategy use was noted mainly in the themes: "Most Difficult Learning Task," "Extra Practice," "Difficulties and Confusion," and "Most Important Activity in Learning Activity in Learning English."

In the SSI findings, social learning strategies were Tomomi's third most preferred macrostrategy category. These social learning strategies were noted thirteen times, and enabled Tomomi to cooperate and interact with native speakers for an enhanced level of interactive language learning experiences. Social learning strategies were noted in the themes: "Extra Practice," "Understanding Grammar," "Difficulties and Confusion," "Learning Pronunciation," "Most Important Learning Task," "Extra Help," etc.

Tomomi noted the use of affective strategies in ten instances in the interview data. Affective strategies were used primarily to help her remain in touch with the physical response of her body to her language learning experience. Affective learning strategy statements occurred in the themes: "Understanding English as a Language System," "Most Difficult Learning Task," "Am I Making Progress?," and "Difficulties and Confusion."

The use of memory strategies was noted ten times. Memory strategies aided Tomomi's language learning through the creation of visual memory to encode meaning, and were noted primarily in the themes: "Learning Grammar," "Getting Main Idea and Details," "Difficulties and Confusion," and "Understanding/Learning New Words."

Compensation strategies were noted seven times in the interview data. They included strategic responses such as circumlocution, adjusting the message, and abandoning the topic in situations in which Tomomi's developing English language proficiency was not adequate to meet the situational/linguistic requirement. The use of compensation strategies was noted mainly in the themes: "Difficulties and Confusion," "Getting Main Idea and Details," "Extra Practice," and "Understanding/Learning New Words."

Reflective note findings.

Tomomi made six one to two sentence entries in her RN data. In her two most complex entries, she used metacognition to set the descriptive frame of her learning experience. She then proceeded to note a cognitive process necessary to complete the

learning task or challenge. Finally, she concluded the explanation of her strategic endeavour by expressing the way in which the learning activity impacted her affectively (i.e., makes me very confused ...tired).

There were seven instances of metacognitive strategy use. They were present in the themes: "Difficulties and Confusion," "Getting Main Idea and Details," "Extra Practice," "Relevant or Less Relevant Activities," etc.

There were two instances of cognitive LLS in the RN data. They were present in the themes: "Difficulties and Confusion" and Understanding/Learning New Words." In the RN data, two instances of affective strategy use were noted. One was evident in the theme "Understanding/Learning New Words" and the other in "Difficulties and Confusion." No compensation, social, or memory strategies were noted in the RN data.

Table 16

Tomomi's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory						"I remember the form ...I have already learned in high school ...I just remember the form." (SSI)
Cognitive		"English and Japanese is completely different ...so it is hard to say many things ...totally different ...in you know ...character is different. English ...just letters ...noun and adjective in exchange ...sometimes makes me very tired." (SSI)				"Ah ...I just practice ...from the text book ...I always keep ...the paper ...In writing that sentence ...and if I have time to see that paper I check it." (SSI)
Compensation						"After I finish my homework I want to watch TV ...sometimes I can't understand all so ...I try to [indicates gesturally as if connecting the known with the unknown]." (SSI)

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Metacognitive	(Speaking of her host family) "We talk in the evening ...how ...was your school or something ...sometimes ask me about my culture ...because we can communicate more." (SSI)		"Today I had real success in presentation from news article. It took a long time to decide order of presentation and explain about presentation. I felt confuse." (RN)	"I try to speak a lot in the classroom or if I have a chance to speak with native speakers ...to speak a lot." (SSI)		
Affective			"Sometimes makes me confused [presentation] ...sometimes makes me very tired." (SSI)			
Social					"First read the whole question ...if I don't understand that from first ...we pass that ...and after ...do all of them we take ...I think question again. If I don't understand what that question said ...I ask the teacher ...what does that mean?" (SSI)	

Table 17

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory						
Cognitive	"I ...I repeat ...copy it down ...repeat ...but next day or learning the word ...write it down several times ...sometimes I pronounce that." (SSI)			"First I read through all the story without the dictionary ...then read again ...then I check the word I don't know ...then I check the dictionary." (SSI) "Sometimes this kind of word makes me confused ...sometimes I forgot ...very easy ...sometimes I completely forgot that word." (SSI)		"Speak ...speech ...talking with other people ...conversation partner ...meet with regular students ...meet with my club ...weekend ...lunchtime." (SSI)
Compensation			(To increase native speakers' comprehension) "I try to repeat ...repeat ...repeat back many times ...I change my way of saying ...maybe write it down." (SSI)	"First I say the main idea of that story ...then look at person, ask more ...then ...I think ...then maybe nothing." (SSI)		
Metacognitive						"Challenge ...challenge is to make a presentation ...we can't read ...just explain ...remember some part ...and speak ...sometimes it makes me confused." (SSI)

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Affective						
Social	"My host family correct my pronunciation. Sometimes my pronunciation ...not correct ...so they can't understand ...so then I repeat many times ...if pronunciation wrong they correct me." (SSI)					

Table 18

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory	"I think sometimes ...if I feel that is important ...I always write it down ...so then go back home ...or if I have time ...I try to look that again ...to review that again." (SSI)				
Cognitive					
Compensation					
Metacognitive					
Affective			"Ah ...is so ...mm ...so now ...I am getting used to it ...before ...I listen just ...ah what he says ...one sentence ...I think ...I can never think next word ...so I can answer." (SSI)		
Social		"I say to my host family ...my English have many mistakes ...so please correct my English ...don't want to practice mistakes." (SSI)			

Quantitative Findings

SILL findings.

On the SILL inventory, using Oxford's mode of scoring, Tomomi's highest score was in the cognitive macrostrategy category, although metacognitive and affective strategies were also evidenced in the high range of use.

Memory, social, and compensation strategies fell in the medium level of use range on the SILL inventory. The score for the use of compensation strategies was lowest in frequency, nearly approaching the low level range of use.

Table 19

SILL Inventory Scores for Tomomi

SILL Evidence Rank Order Strategy Use	Score
1. Cognitive	3.8
2. Metacognitive	3.5
3. Affective	3.5
4. Memory	3.4
5. Social	3.3
6. Compensation	2.6

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Reflective Synthesis

Tomomi began her reflection on language learning by acknowledging that understanding culture and the Canadian people played a prime role in facilitating her language learning. The relevance of positive attitudes toward target language culture has been reported to be predictive of success in language learning (Phillips, 1992). She spoke of the difference in the structure between Japanese and English, and the difficulties that presented for her as a learner. Tomomi spoke and wrote about cognitive strategies she used to practice in many, varied life situations. She also spoke of taking notes which she could use to encode and support her developing linguistic knowledge. In this way she was able to continually revise and refine her hypothesis regarding the nature of the English language and to facilitate associated knowledge compilation (O'Malley, 1990), in addition to mobilizing use of language in naturalistic practice. Learners who combine naturalistic practice with bedrock strategies (memory, cognitive, and compensation) have been reported to be successful in their language learning endeavours (Green & Oxford, 1995).

Her metacognitive strategic ability enabled her to reflect on the efficacies of her cognitive behaviours and to plan and redirect her learning efforts when appropriate. This ability to delineate specific learning requirements appropriate to a given task or endeavour, and to combine, mobilize, or tailor the allied language learning strategies (Green & Oxford, 1995), seem to be a distinguishing factor between successful learners and those who are less successful (Vann & Abraham, 1990).

Tomomi's use of affective strategies to acknowledge feelings and bodily

sensations may have served to buffer her against the psychological effects of ambiguity and fatigue which often accompany language learning efforts. In my contact with her, Tomomi's ability to express her feelings seemed to reassure her that she could legitimately take time-out to acknowledge her feelings, and thereby to perhaps protect her self-esteem. It has been suggested that learners who acknowledge their negative feelings or attitudes are better able to develop techniques and strategies to control and modify them (Oxford, 1990). It has also been suggested that learners who are able to manage their affective frustrations may well reduce their level of language anxiety, thereby increasing the amount of energy available for cognitive endeavours (MacIntyre & Gardiner, 1991).

The findings from her SILL inventory suggest that Tomomi would be a moderately experienced user of LLS. Further, the ways in which she realized her ability to mobilize a heightened and complex level of cognitive strategy use were evident in the descriptive data of the interviews and notes. Here it is possible to see the situational locale, and the interactive use of Tomomi's cognitive and metacognitive strategies. It was also possible to see the particularized flexibility of organization and mediation of affective and compensation strategies.

In conclusion, Tomomi's coordinated and orchestrated use of a variety of LLS served to support cognitive and metacognitive strategy use, conserving Tomomi's cognitive energy level and protecting her self-esteem. This proved to be a powerful combination of LLS in Tomomi's language learning endeavours.

Table 20

Synthesis of Findings: Tomomi

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Cognitive	41	1. Cognitive	3.8
2. Metacognitive	29	2. Metacognitive	3.5
3. Social	13	3. Affective	3.5
4. Affective	12	4. Memory	3.4
5. Memory	10	5. Social	3.3
6. Compensation	7	6. Compensation	2.6

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Learning Experience of Participant 'Sony'

Description of Sony

Sony is a twenty-eight year old Taiwanese woman. A graduate from a commercial college in Taiwan, she worked with computers before coming to Victoria. Speaking of her family she said, "They're all native speakers ...I'm the first one ...to went abroad to study English." Her interest in learning English related to her future goals of which she said, "I can try to be an English teacher ...to teach children." (setting goals and objectives/metacognitive).

Sony presented herself as a proactive, reflective user of language learning strategies in a variety of situations. For example, in relation to language skill development Sony wrote, "How can I improve my listening? Although, I'm not good at speaking and writing. But I think people can understand what I talk or write. But if I can't understand what they say, how I could answer them?" (planning learning/metacognitive; self-evaluation/metacognitive; self-monitoring/metacognitive).

In another instance, reflecting on a lesson related to functions, Sony wrote: "I don't feel like the ways she teaches ...price, landscape, sight the whole trip. But she didn't check whether all the adjective were suitable, and she didn't make assure whether we could understand all of them. She just asked us to copy in order to describe our tour package. I didn't think it was useful. We have to find the meanings of them by ourselves. We could learn from it but we spent more time to learn less." (taking emotional temperature/affective; self-monitoring/metacognitive; self-evaluation/metacognitive).

These entries availed an opportunity to see how Sony, as an adult language learner, alerts one to the necessity for a meaningful and useful learning situation, corrective feedback, and the need to use time efficiently. They also provide an appreciation of the needs, skills, attributes, and self-investment (Norton-Pierce, 1995) that an adult language learner may bring to various interactive life situations of the language learning process.

Qualitative Findings

Interview findings.

Findings for the qualitative data showed that Sony used primarily metacognitive and cognitive language learning strategies in her SLA experience. Twenty-nine instances of metacognitive strategies and twenty instances of cognitive strategy use were noted in the interview data. Metacognitive strategies were noted in the themes: "Understanding/Learning New Words," "Handling Grammar," "Extra Practice," etc. Cognitive language learning strategies were used by Sony in the themes: "Understanding/Learning New Words," "Getting Main Idea and Details," "Learning Pronunciation," "Extra Practice," etc.

Sony used affective strategies to support many of her cognitive, memory, and metacognitive behaviours. There were ten instances of overt use of affective strategies noted in the interview data. The use of affective language learning strategies was evidenced in the themes: "Difficulties and Confusion," "Remembering a Successful/Unsuccessful Language Experience," "Understanding English Speakers and their Culture," etc.

Sony's primary use of social strategies reflected her ability to empathize with others, attempting to understand their feelings and behaviours. Thirteen instances of social learning strategy use were noted in the interview data. However, this precludes the fact that her basic motivational and personality type facilitated behaviour not measured on either the SILL inventory or in the qualitative processes (i.e., helping organize other students, both formally and informally, for participation in this research project; helping me organize the research project; etc.). Social learning strategies were evident in the themes: "Understanding English Speakers and their Culture," "Studying Grammar," "Extra Practice," etc.

There were eleven instances of the use of compensation strategies noted in Sony's interview data. Almost all of these involved processes in which Sony was attempting to make herself comprehensible in situations where her linguistic proficiency was limited. Compensation strategies were evident in the themes: "Difficulties and Confusion," "Being Understood," etc.

Memory strategy use included creating mental linkage by association, forming images in memory, placing words in context, etc. Seven instances of memory strategies were noted in Sony's qualitative data. They were evident in the themes: "Understanding/Learning New Words," "Getting the Main Idea and Details," "Learning Pronunciation," etc.

Reflective note findings.

Sony was one of the learners who made eight entries in her reflective note data. The entries were extensive (averaging about eight sentences each) and focused on

specific linguistic, paralinguistic, and social instances, often revealing her thought process from a perceptual phase to an evaluative phase.

There were twenty instances of metacognitive strategy use in Sony's extensive RN findings. They were present in varied situations, often too complex and interactive to isolate. However, some of the themes in which metacognitive strategies were evident included: "Understanding English Speakers and their Culture," "Studying Grammar," "Am I Making Progress?," and "Understanding Grammar."

Eight instances of affective strategies were noted in such themes as: "Understanding English Speakers and their Culture," "Difficulties and Confusion," and "Remembering a Successful/Unsuccessful Learning Experience."

Cognitive learning strategy use, in the RN data, was noted seven times in themes which included: "Understanding and Learning New Words," and "Understanding Grammar."

Social learning strategies were noted three times in themes which included: "Getting Help," "Relevant or Less Relevant Learning Activities," etc.

Sony's use of a memory strategy was noted once in the theme: "Relevant or Less Relevant Learning Activities." There was also one instance of a compensation learning strategy noted in this RN data. It occurred in the theme: "Difficulties and Confusion."

As can be noted, Sony reported extensive, interactive LLS in her SLA activities. The level of her commitment of energy to these activities would suggest a high level of personal investment (Breen, 1985), in addition to a high level of both

intrinsic and extrinsic innovation (Brown, 1994).

Table 21

Sony's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory						"Sometimes ...I will review in my mind ...only in my mind ...not use the book ...do same exercises ...write essay ...or use the grammar." (SSI)
Cognitive				"If you can interview people ...you can listen ...differences being ...how they will pronounce ...different opinions." (SSI)	"Sometimes I have to study ...but I always use two grammar books ...just choose the part I need ...and I study and do exercise ...if I didn't really understand ...I will ask my teacher or ask anyone." (SSI)	
Compensation						

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Metacognitive	"If you want to learn another language ...you have to turn you ...your thoughts to think about a language ...and how they think ...what's the difference between their lives and yours." (SSI)			"I think to listen ...listen to others talking ...driving in the bus ...can listen to others talking ...maybe you can walk in the shop and ask for something ...about the price ...how to use the article." (SSI)	"Today ...not only today ...I felt very confused about preposition ...I think it is very important ...sometimes I can get it ...I have to think about the situation and decide what preposition to use ...but it doesn't really work." (RN)	"It's really helpful for me to study on 'most, almost, get, make, etc.' Now I know the difference between them ...but in Taiwan our teacher didn't explain that for us ...maybe I forgot." (RN)
Affective	"Sometimes I just like kidding ...want to practice phrasal verb ...so I asked impolite question ...have you ever gone around ...but I didn't think about that was impolite ...Gerry was very impolite ...was that the culture of Taiwan ...I felt very disappointed ...I felt sorry for Gerry and all my country people ...Gerry told me ...'I just kidding.'" (RN)		(Regarding homestay) "Also ...I ...I write in my journal ...to my teachers about my feelings ...what is difficult ...or I feel confusion about ...what is the question?" (SSI)			

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Social	(Regarding homestay) "I think that depends ...some homestays are very good like mine ...they can help me ...speak English ...improve my English ...help me to complete my homework." (SSI)		"Sometimes I feel scared to talk with strangers ...but I think if you interview others ...speak the normal speed ...you have to listen carefully ...but I think ...is only way to learn." (SSI)	(With reference to interviewing) "Maybe they will refuse you ...maybe they would like to help you ...I can try to speak and make him understand what I have to say." (SSI)		"I will try to explain grammar to other people ...maybe from Taiwan [hearing] ...maybe I will use Mandarin to explain." (SSI)

Table 22

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory	"I just catch the pronunciation ...try to get the letter ...not really the meaning." (SSI)			"I think I will always choose to look in my dictionary ...and try to use the word ...and I listen other's word." (SSI)	"Sometimes I can catch the word ...I will change the words into my thought ...just in my mind ...choose to bigger ...wrote the words." (SSI)	
Cognitive	"I will write down the pronunciation ...copy ...oh stress ...stress here ...I will just copy or write down the vowel." "I know the pronunciation keys ...the rules ...I just catch the pronunciation ...try to get the letter ...I will write the pronunciation ...oh ...the stress is here ...or write down he vowel." (SSI)			"I think the children ...like their vocabulary is not so hard to understand ...they will use easy words for you." (SSI)	"Sometimes I will think Chinese ...but if I write in Chinese ...I will forget English word ...I think not good ...maybe I will get the sentence ...write a pun word ...some words on my paper." (SSI)	

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Compensation			(Regarding being misunderstood) "Maybe I will try again and ...if you couldn't understand my words ...I will show you my question in words [writing]. (SSI)			
Metacognitive				"Is it very important for my English learner to remember lots of vocabulary? Today we went to Goldstream. I had learned a few vocabulary about that ...so I could understand and explanation about salmon ...but if I hadn't, I didn't think I could understand." (RN)		
Affective						
Social				"On Saturday ...I went to ABC Sound [beside my friend] ...ask about TV ...and very interesting about discussion ...so she [clerk] didn't get it what I say ...so we had to talk and discuss it over ...so we got each other ...a little bit in words." (SSI)		"I think the most difficult would be vocabulary ...lots of vocabulary I don't know ...I have to ask for the word ...ask for explanation." (SSI)

Table 23

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory					
Cognitive					
Compensation					
Metacognitive	"I think I would ...after class in my room ...I would sit down ...maybe sit in my bed ...and try to remember that ...the procedure from the first thing to the last thing ...and write down in my journals." (SSI)		"The environment is very important for a language learner. They can find a teacher good at grammar in their own country. They need more practices. When I look up I know I have more courage to speak than before." (RN)	(What is important) "Uh ...I think ...depends ...different people ...maybe he [friend] likes to talk with host family ...but maybe I had to ...I should interview all the people ...I like that way to learn." (SSI)	"Sometimes my presentation really bother me ...I write about presentation ... in my journal ...read the grammar books ...ask teacher ...what kind of presentation ...feel afraid of standing up to get everyone's attention." (SSI)

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Affective	"In my class there was a visitor. He was an astrophysicist. I really liked his speech. I think it was interesting and helpful for me because what he said we had studied in our junior high school. So he could talk all my attention ....Also, today our seats were the same as in class. Everyone could see the speakers not the back of heads." (RN)				
Social		"I think I was interested in the morning class ...the teacher gave us twenty-five descriptions and five verbs ...we had to make a sentence ...and to make others agree with you ...If you were not really understand you would always at the start ...also others could help you to understand what you need." (RN)		"In my opinion, it wasn't a good idea to be taught by my classmates about newspaper vocabulary ...because classmates didn't really understand ...my teacher explain ...I have understood ...just be like a words in Chinese: Don't ask only one person when you get lost."	

Quantitative Findings

SILL findings.

Sony's scores for the SILL inventory are reported in Table 24. Of the values reported, the use of the affective strategy category scored in the high range of use. The other scores for Sony's language learning strategy use all fell within the medium range of use.

Table 24

SILL Inventory Scores for Sony

SILL Evidence Rank Order Strategy Use	Score
1. Affective	4.0
2. Cognitive	3.3
3. Social	3.3
4. Metacognitive	3.1
5. Memory	2.7
6. Compensation	2.5

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Reflective Synthesis

Both qualitative and quantitative findings provide revealing perspectives on Sony's use of language learning strategies. Each of the macrostrategies measured on the SILL evidenced use at a medium level, except for affective learning strategies. It has been reported that learners who use primarily complex language learning strategies (affective, cognitive, metacognitive, etc.) may, in their quest for meaning-focused learning, use fewer memory strategies (Nyikos, as cited in Oxford, 1993a). Thus the findings on Sony's SILL inventory suggested that she might be an experienced user of language learning strategies.

Sony's reported high use of affective learning strategies on the SILL inventory was interesting. Affect, as a construct, is difficult to define and measure (Phillips, 1992), and one wonders if the findings from the qualitative data which reflected a high level of metacognitive and cognitive strategy use are not in fact reflecting similar findings to the SILL affective category, although in a circuitous mode. That is, although Sony did not report the overt use of affective strategies extensively in the qualitative data, the use of metacognitive and cognitive strategies may have been external manifestations of essential, internal psychological processes (Breen, 1985).

It has been suggested that affect as an individual learner factor, and its ramifications for the language learning process, neurobiologically and otherwise, are not well understood and beg more research attention (Ehrman & Oxford, 1995; Schumann, 1994). Also, learners often do not report the use of affective and social language learning strategies because they are unaware of their importance (Oxford,

1990).

Sony's language learning strategy use in the qualitative data revealed extensive use of metacognitive strategies. These tended to be generalized, complex, and pervasive in nature. This was particularly evident in Sony's RN data. Sony noted reflectively the relevance of the physical and social learning environment and the significance of learning materials to the learner's response. She also noted the importance of using time efficiently, teaching style, and personal investment in offering her a relevant, well-organized learning experience.

Writing tasks are thought to be helpful as a format for disclosure of personalized language learning strategies (Faersch & Kasper, 1987; O'Malley & Chamot, 1990). Sony's writing in her RN data reported LLS potentially appropriate for problem solution, and in several instances developed her strategic learning approach from perception of the problem, assessment of available options through monitoring of responses, and finally to suggestions for possible solution and evaluation of efforts. As such, the diary type entries revealed the transparency of Sony's complex use of LLS in a way that was not possible in the quantitative findings, and were not as well developed in the interview data.

In developing the text for the RN data, Sony appreciably improved her grammatical proficiency level. Judging by the volume and complexity of the RN entries, they appeared to provide an opportunity for her to document personally relevant material. Learners who have an opportunity to write about their LLS use may experience the benefit of an intrinsically motivating learning task (Brown, 1994), an

opportunity to increase the schematic complexity of their existing LLS knowledge (Bacon, 1995; Schumacher & Nash, 1991), and support for developing learner autonomy (Cotterall, 1995).

Reflective or dialogue journal writing can support and validate LLS use for learners like Sony. It may also provide modelling for other learners, thereby heightening their consciousness relative to LLS use and its potential for them as individual learners.

Sony's writing provided her with a mode for continually refining and expanding her hypothesis about the English language and her participant socio-cognitive role as a language learner. This has been reported to be useful to language learners in developing proficiency (Corbeil, 1990; Faersch & Kasper, 1987).

The findings from the qualitative data also revealed Sony's specific modes of social and cognitive language learning strategy use. Thus, it was possible to view her use of complex and interactive strategies supporting the proactive behaviour necessary to optimize and bring her language learning opportunities to fruition. It has been suggested by Vann and Abraham (1990) that less successful language learners may use several LLS of varying complexity. The critical factor, however, seems to be the less successful learner's inability to cohese the strategies in a flexible, orchestrated, and focused manner to deal with the requirements of the presenting task or learning opportunity.

Sony talks of her realistic beliefs and attitudes relative to the language learning process. Learners who have realistic beliefs and positive attitudes toward the target

culture (Mantle-Bromley, 1995), and function proactively, using LLS to resolve both discrete and globalized learning tasks, tend to be successful in their endeavours (Oxford, 1990b).

Sony's extensive and complex RN data revealed her high level of social investment (Norton-Pierce, 1995) in the life situations of her SLA experience, and thus facilitated a more complete understanding of her use of LLS. In conclusion, it may be said that Sony's extensive use of LLS enabled her to seek out multiple and diverse learning situations and to monitor her language learning with a focus on understanding (versus memorization), creating solutions to her individualized learning challenges.

Table 25

Synthesis of Findings: Sony

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Metacognitive	49	1. Affective	4.0
2. Cognitive	27	2. Cognitive	3.3
3. Affective	18	3. Social	3.3
4. Social	16	4. Metacognitive	3.1
5. Compensation	12	5. Memory	2.7
6. Memory	8	6. Compensation	2.5

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Learning Experience of Participant 'Hiromi'

Description of Hiromi

A graduate of Junior Woman's College in Japan, Hiromi began her English language studies eight years ago in junior high school. She had studied Dutch for one year in Japan, and was studying both English and Mandarin when interviewed.

Speaking of her future plans to use English, Hiromi said: "English is a very helpful for me because I were a teacher ...Japanese language teacher ...I want to teach Japanese to foreign students ...if they don't understand ...or have some trouble in Japan ...I want to help them ...in English." (planning for a language task/metacognitive; empathy, cultural understanding/social; setting goals and objectives/metacognitive).

Speaking about how long it would take to learn another language Hiromi said, "I'm not sure ...but I think ...I guess ...five or ten years ...after Junior Woman's College I studied Dutch ...Dutch is very difficult ...now I study Mandarin ...very difficult ...and in spite of Kanji ...but Dutch is more difficult." (analyzing contrastively/cognitive).

Speaking of getting extra practice Hiromi said, "A few days ago ...I went to ...um supermarket ...I asked somebody ...mm ...this potato is so ...so cheaper ...or not? The man ...woman said to me 'I have no idea'. But I said, to myself, I have no idea is a correct answer or not? Usually I hear the 'I'm sorry ...I don't know about that' ...but I didn't know that ...I have no idea is okay." (analyzing linguistic expressions/cognitive; practising naturalistically/cognitive; self-monitoring/metacognitive; self-evaluation/metacognitive).

Qualitative Findings

Interview findings.

Hiromi spoke of studying words by reading, saying: "Reading ...almost ah ...words ...I look the ...sentence ...sometimes write it ...usually I look the word ...my eyes remember ..sentence or vocabulary ...I remember the page of the dictionary ...what kind of word ...where is the word ...top or down ...bottom of page ...the colour ...check the colour ...[to find it again] sometimes my eyes." (focused attention/metacognitive; making notes/cognitive; using imagery/memory; placing new word in context/memory). Thus, Hiromi's combination of both intricate and bedrock LLS (Green & Oxford, 1995) suggested that SLA and complex problem-solving learning processes are achieved in a variety of ways by individual learners.

Hiromi used the interviews to express her LLS abilities thoughtfully and completely. She seemed to have purpose in what she wanted to express, and was not deterred if she had to hesitate to bring her thoughts and expression to closure.

Metacognitive language learning strategies were noted in thirty-three instances. These primarily involved setting goals and objectives, arranging and planning learning, self-monitoring, and self-evaluation. She used metacognitive strategies in the themes: "Difficulties and Confusion," "Handling Grammar," "Extra Practice," "Am I Making Progress?," and "Relevant or Less Relevant Learning Activities."

In her use of cognitive language learning strategies Hiromi focused on practising, repeating, analyzing expressions, and on using resources (TV, language learning laboratory, dictionary, etc.). She used cognitive strategies twenty-nine times

in the themes: "Understanding/Learning New Words," "Extra Practice," "Getting the Main Idea and Details," "Learning Pronunciation," etc.

Hiromi's use of memory strategies in the interview data was noted ten times. Her memory strategies primarily involved the use of auditory memory, but there is also evidence of kinesthetic and visual memory strategies. They were evidenced in the themes: "Learning/Understanding New Words," "Studying Grammar," and "Learning Pronunciation." Affective strategies were evidenced in the data eight times. Hiromi used affective strategies to acknowledge and assess the ways she was feeling related to her learning process. Affective strategy use was primarily evident in the theme: "Difficulties and Confusion."

Social strategies were noted seven times in the interview data and involved Hiromi's empathetic and interactive relationships with more proficient English speakers. Social strategies helped Hiromi in the themes: "Understanding English Speakers and their Culture," "Extra Practice," and "Understanding/Learning New Words."

Hiromi's use of compensation strategies was noted six times in the interview data primarily in the themes: "Difficulties and Confusion," "Understanding Grammar," and "Getting the Main Idea and Details." She was confident when she spoke of the way she could move from one compensation strategy to another (repeat, ask questions, gesture, writing) in order to gain the comprehension of her English language listener.

Reflective note findings.

Hiromi made five short entries in her reflective note data. In terms of language

learning there were three instances of metacognitive strategies, three instances of cognitive strategies, one instance of memory strategy, and one instance of social strategy. They were all found in the themes: "Extra Practice" or "Difficulties and Confusion."

Table 26

Hiromi's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory				"Sometimes watching TV ...especially commercials ...I can listen again ...again and I croon and remember them unconsciously." (SSI) "When you talk to different people ...oh I remember the word ...and I studied ...English studies." (SSI)	"I must transfer ...I think about the verb ...just the verb ...so I remember 'eat, ate, eaten' ...maybe I don't remember ...mouth or sound come but ...mouth remember." (SSI) "Good way to study grammar ah ...compare the sentence ...which is ...which part of the sentence is different ...why that sentence is so different ...maybe ...yes use grammar book." (SSI)
Cognitive		"At first I didn't understand why the verb ...came after the name ...so I can't understand the verb ...but now I'm very happy when I understand ...verb and adjective ...then I interested." (SSI)	"After junior woman's college I studied Dutch ...Dutch is very difficult ...now I study Mandarin ...very difficult ...in spite of Kanji ...but Dutch is more difficult." (SSI)	"Television ...or ah ...sometimes I go to ...language lab ...there I can hear tape recorder ...again ...again ...so it's very good." (SSI)		

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Compensation			When not being understood Hiromi suggested the following strategies: "I could um ...ask the speaker ...again? [repeat] ...or say ...sorry I can't understand you ...please say more slowly ...or I will do gesture ...ah ...writing." (SSI)			
Metacognitive				"So this lunchtime I went to K-Mart ...I had to take a ticket for the movie ...I think ...what can I say ...'Could you ...give me ...five ticket ...for the movie?' ...so I make correct sentence ...I need time ...to say." (SSI) "Watch TV ... or ah ...sometimes I go up to the language lab ...I can ...I can hear the tape recorder ...again and again and again ...so it's very good." (SSI)	"Sometimes I remember the correct ...just the correct sentence ...I don't change it ...the sentence ...sometimes say different sentence ...'oh ...oh this is not good ...I ...I have never heard this sentence before ...ah differences ...so I think ...wrong." (SSI)	

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Affective			"I thought I didn't speak English but my listening ability is very good ...but native English like to use slang ...I couldn't understand that word ...so I'm afraid to speak and hearing." (SSI)			
Social	"Speaking of a plan to meet a conversation partner who did not appear Hiromi said, "I called her ...we manage [arrange] to meet at fountain ...she didn't appear ...maybe she can't skip part-time job." (SSI)			(Regarding new conversation partner) "...one day I look for information ...on the notice board ...so now I am touching with him ...so we telephone or once a week we speak." (SSI) "Now I share a house with my other friend ...Taiwanese ...she can't speak Japanese ...so now we are discussed every day ...she can't speak [English] so well ...like native speakers ...but we can practice." (SSI)		

Table 27

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory						
Cognitive		"...talk ...talk to many people ...when you talk to different people [you think] ...'oh I remember that word' ...I studied ...when I talk to somebody." (SSI)		"I pick up the meaning ...dictionary [indicated would circle it] ...I think ...sometimes I use the word ...make sentences ...article ...or talk to somebody." (SSI)	"I remember the meaning ...main idea ...situation ...the order ...order ...what you say and important word." (SSI)	"Most difficult ...hearing ...I think hearing is the most difficult ...I can understand and the ...vocabulary ...some vocabulary ...for example, I get up ...moving ...go to school ...I can hear that ...but I forgot ...so next sentence go through my head ...first sentence I transfer in my head ...Japanese ...da da something ...oh ...what ...is next sentence ...can't hear ...but next, next sentence I can hear." (SSI)
Compensation				"Um ...I'm sorry ...could you give me a little more information ...repeat." (SSI)	"I looking at you and your body language ...or your stress word ...hear ...and remember that and more sentence I can't understand." (SSI)	

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Metacognitive				"Right now I'm keeping my diary ...so I write new word in my diary." (SSI)		
Affective				"When I can't understand a word? ...sometimes I am ashamed ...to ask somebody ...I can ask ...but stranger ...I can't ask stranger." (SSI)		
Social				"Because when I find new words in conversation I can ask them soon before I forget these words." (SSI)		

Table 28

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory		"Teacher write vocabulary on the board ...check the stress ...so she say apple ...the point ...I look for [her] mouth ...I move my mouth as she say 'pp' [shows pursing lips]." (SSI)			
Cognitive					
Compensation					
Metacognitive			"Um ...I think ...it's not easy ...because I can't hear English speaker ...now I'm studying ...especially listening [elective] ...but I can't hear ...everyday watch the news ...movie ...or something ...so now I am confusing ...what should I do?" (SSI)	"Ah ...usually make a sentence ...it ...ah ...relation to me or something ...I must remember 'beautiful' ...ah ...I like a movie star ...Julie Roberts ...I can say 'Julie Roberts very beautiful' ...but I don't make a sentence its not concentrate me." (SSI)	
Affective					

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Social				"Before October ...I stayed with host family ...they have two children ...go to bed early ...get up early ...I couldn't have time ...a chance to talk to them ...so I don't think it is better ...to stay home ...homestay." (SSI)	

Quantitative Findings

SILL findings.

The findings on the SILL inventory suggested that Hiromi was a sophisticated and experienced strategic language learner. Five of the SILL macrostrategy category values fell in the range of "usually used" and one fell in the range of "always or almost always used." Her highest score was in the range of affective strategy use and it was predictive of the positive and organized manner in which she strategically approached her many and varied SLA endeavours.

Table 29

SILL Inventory Scores for Hiromi

SILL Evidence Rank Order Strategy Use	Score
1. Affective	4.5
2. Metacognitive	4.2
3. Compensation	4.0
4. Social	3.7
5. Cognitive	3.6
6. Memory	3.4

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Reflective Synthesis

Hiromi's findings from the SILL inventory suggest that she is an experienced and sophisticated user of LLS, particularly in the areas of affective and metacognitive strategies. While the number of instances of overt uses of affective strategies reported in the data did not fully support the SILL, the general nature of Hiromi's language learning behaviour did.

For example, findings from Hiromi's interview data near the onset revealed an observation on the difference in language structure between Japanese and English. She noted difficulties and confusion, subsequent insights, and realistic beliefs related to the process of learning a language in many ways different from her native language. Learners who use affective learning strategies to tolerate the ambiguities of an unfamiliar language and culture have an enhanced opportunity for success in SLA (Ely, 1989).

Some learners have the ability to use language learning strategies to flexibly generate usual and unusual solutions to their learning challenges, and these learners tend to be successful (Vann & Abraham, 1990). Hiromi used a variety of metacognitive strategies to plan, monitor, and evaluate her learning endeavours.

For example, when Hiromi's original conversation partner proved unsuccessful, she found herself another one. When she desired extra practice, she used her social and cognitive learning strategies to mobilize her developing language interactively with native speakers in the larger social community of the society. Although not completely confident, her level of intrinsic and extrinsic motivation (Brown, 1994) was

sufficiently high to enable her to reflect on incomprehensible feedback, and seek out clarification to resolve her difficulties (Holec, 1987).

It is thought that this construction of information from one's environment, which involves cognitive strategies (Corbeil, 1990), leads to the quality of learning characteristic of successful language learners.

Within the interview structure itself, Hiromi used the social strategies of asking questions for clarification and verification. That is, she would restate, or ask for further information, to summarize or clarify what she thought she had heard. This is reported to be a powerful cognitive learning strategy, particularly useful in naturalistic/authentic learning contexts (Bacon, 1992). Hiromi demonstrated her use of memory strategy involving auditory, visual, and kinesthetic memory. She specifically noted her use of physical responses or sensations (Oxford, 1990a) as a mode of contextualizing new language information in order to facilitate its association into her developing language knowledge structure.

In conclusion, Hiromi reminded me of the folly of making generalized assumptions about characteristics/styles and strategies of individual language learners relative to their cultural origin. In her study of style preferences, Joy Ried (1987) stated that the kinesthetic mode of language learning was, of all Asian language learners in her study, least preferred by Japanese learners. Related to this, Hiromi as an individual Japanese language learner showed an unexpected preference for kinesthetic and auditory sensory input and the use of sensory and kinesthetic related LLS in developing SLA proficiency. Such findings remind us that each learner has

his/her own preferred mode of SLA, which may or may not reflect larger cultural, academic, or psychosocial learner preferences for language learning strategies.

Table 30

Synthesis of Findings: Hiromi

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Metacognitive	36	1. Affective	4.5
2. Cognitive	32	2. Metacognitive	4.2
3. Memory	11	3. Compensation	4.0
4. Affective	8	4. Social	3.7
5. Social	8	5. Cognitive	3.6
6. Compensation	6	6. Memory	3.4

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Learning Experience of Participant 'Jessie'

Description of Jessie

Jessie is a twenty-two year old woman from Taiwan. Before coming to Canada, she studied hotel management for ten months in Switzerland. She had studied English for seven years, beginning when she was a high school student in Taiwan.

Speaking about her family and their valuation of English language learning Jessie said, "I have one older brother and two younger sisters and everybody study English because ...we have to study in high school ...everybody has to study ...English is very important in Taiwan ...I think the most important language is Chinese ...English ...Japanese ...and ...my family like ...travel." Speaking of her plans for the future she said, "I'm not sure, maybe I will try office." (self-evaluation/metacognitive; arranging and practising learning/metacognitive).

When we spoke of how long it would take to learn another language Jessie said, "A long time." She qualified this by saying, "If I try to speak with English speakers ...it's more you can prove [improve] it ...very quickly." (arranging and planning learning/metacognitive; self-evaluation/metacognitive).

Assessing the difference between naturalistic practice and planned practice Jessie said, "If I just watch TV ...maybe I can understand ...'what did they say?' and I can review ...I can review ...review ...review ...but if I speak with a English speaker ...if I don't know ...we can just stop and ask him or her." (arranging and planning learning/metacognitive; repeating/cognitive; self-monitoring/metacognitive).

When I asked Jessie how she could manage to figure out an unfamiliar word in

a book Jessie said, "I will read the whole sentence ...if I can't understand ...whole sentence ...check dictionary ...ah maybe I just know ...I just [can't] understand this word ...then I can understand the whole sentence ...so this word is not important ...if I couldn't understand the whole sentence ...I check dictionary ...if I see this word ...maybe it's a key word." (organizing/metacognitive; using resources/cognitive; using clues/compensation). "...If I understand the whole sentence I can guess ...ah this word I don't know ...but I can guess it meaning." (taking risk wisely/affective).

Reflecting on learning experiences she did not find helpful, Jessie said, "Some people, they know you are international student, so speak very slowly ...I think ...it's not very good for me ...now ...my teacher speak too slow ...we talk with [her] always ...but now ...didn't change." (self-monitoring/metacognitive; self-evaluation/metacognitive; discussing feelings with someone else/affective). Jessie spoke openly and confidently about her LLS and her SLA learning endeavours. When she noted problems, she reflected on them and pragmatically tried to generate creative solutions. Much of her energy in SLA activities was oriented toward this proactive resolution of challenges. Though cognizant of problem areas she was experiencing, Jessie gave no indication that she was immobilized or peripheralized within the locale of the classroom or the larger learning community. In fact, she impressed me as a language learner who was using her available resources wisely to support endeavours, including LLS needed to assure success in achieving SLA proficiency.

Qualitative Findings

Interviews findings.

Jessie revealed an expanded and diversified strategic approach to her SLA experience in the findings from her interview data.

For her time was valuable, as evidenced by such quotes as: "Last time I went to museum ...level 200 ...can't understand very well ...I think nonsense ...waste of time; ...speak with English speakers ...improve very quickly."

Cognitive LLS were evidenced thirty-six times in the interview data. Jessie used cognitive learning strategies to analyze expressions, encode information, and provide structure for her developing language knowledge. She used naturalistic practice to continuously utilize her language knowledge, thereby availing opportunities for revision and refinement of her developing language skill and knowledge level. Cognitive learning strategies emerged mainly in the themes: "Extra Practice," "Difficulties and Confusion," "Understanding/Learning New Words," "Learning Pronunciation," "Most Important Activity in Learning English," and "Relevant or Less Relevant Learning Activities."

Language learning activities reported in the interview data revealed twenty-five instances of metacognitive strategy use. Metacognitive strategies were used primarily to arrange and plan her learning activities, consciously focus attention, and to monitor and evaluate her learning activities. Metacognitive strategies were noted in the themes: "Extra Practice," "Remembering a Successful/Unsuccessful Language Learning Experience," "Understanding/Learning New Words," "Understanding Grammar,"

"Difficulties and Confusion," "Getting Main Idea and Details," etc. For Jessie it was also important to plan her energy efficiently. She wanted to secure a broad range of naturalistic language practice and expressed her frustration when this was not forthcoming. She seemed attuned to the realization that her psycho-cognitive development in SLA was dependent on the nature and quality of her social learning context (MacIntyre & Gardiner, 1994). She sought to optimize both her own use of language learning strategies and the situations in which she could use them.

Social learning strategies were evident in eighteen instances and were Jessie's third most preferred LLS strategy category. Social strategies enabled Jessie, through various modes of cooperation with proficient English speakers, to better empathically understand both target language culture and to avail herself of meaningful practice opportunities. Social LLS were noted in the themes: "Understanding English Speakers and their Culture," "Getting Extra Practice," "Difficulties and Confusion," "Relevant or Less Relevant Learning Activities," etc.

Memory strategies were noted eight times in the SSI data. These were primarily used to aid Jessie in visualization, association, elaboration, and grouping of language input and were evident in the theme: "Getting Main Idea and Details."

Compensation learning strategies were evident in five instances. Jessie used linguistic and contextual clues and asked proficient speakers for help in resolution of language ambiguities which her developing language could not resolve. Use of compensation LLS were noted in the theme: "Difficulties and Confusion."

Jessie used affective strategies in eight instances in the interview data.

Affective strategies were used to support Jessie in her use of positive self-talk, and in taking calculated risks to discern ambiguous situations. These strategies were evidenced in the themes: "Understanding/Learning New Words," Most Important Activity in Learning English," "Getting Main Idea and Details," "Understanding/Learning New Words," and "Extra Practice."

Reflective note findings.

Jessie made eight lengthy entries in her reflective note data. Her observations focused on various aspects of her learning activities and were insightful and transparent. That is, her writing revealed both her self-assessment processes related to her language learning dilemmas, and enabled me as a researcher to access her world of LLS.

There were fourteen instances of metacognitive strategy use noted in the RN data. They occurred chiefly in the themes: "Difficulties and Confusion," "Understanding Grammar," "Extra Practice," "Am I Making Progress?," and "Relevant or Less Relevant Learning Activities."

In the RN data there were six cognitive LLS noted. They occurred in the themes: "Difficulties and Confusion," "Extra Practice," "Studying Grammar," and "Am I Making Progress?."

Four social LLS were noted in the RN data. They were present in the themes: "Am I Making Progress?" and "Relevant or Less Relevant Learning Activities." Two affective strategies were noted in the RN data in the themes: "Relevant or Less Relevant Learning Activities" and "Am I Making Progress." No memory or

compensation LLS were noted.

Thus, in her own voice, Jessie reveals her active involvement in analyzing and understanding her learning behaviours and resolving learning dilemmas. Further, she assessed the efficacy of her learning efforts as they impact her particularized language learning challenges.

Jessie showed her ability to manage her learning at various stages. That is, in her RN writing she showed how she mobilized a range of reflections in trying to assess and better understand her learning processes. Jessie wrote of her personalized objectives for her language learning activities. She then talked about how she monitored her success in meeting her objectives, and reflected on some of the factors which could influence her success or failure in language learning endeavours.

Table 31

Jessie's LLS Use and Associated Learning Themes

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Memory						
Cognitive			"Today I felt confuse, this is second time I absent from evening writing class ...I didn't write essay ...maybe only one short essay ...I didn't have any improve ...I don't know why I can remember vocabulary word easily ...I still have difficult with grammar ...even I study it ...I can't use it." (RN).	"Now I have a conversation partner ...is very good ...she study Mandarin ...just beginning ...so mostly the time we are speaking English ...if I can't understand ...I will ask him ...'what does this world mean?' ...or I found television ...heard some word ...ask 'how do you spell that word?' ...yeah very helpful." (SSI)	"Um grammar ..even I can speak ...but speak is very fast ...I can't think about grammar because if I find a problem ...check grammar ...check dictionary ...check grammar." (SSI)	"Grammar is my weak point ...I know how to you but in real life ...I don't know how to use the grammar ...I don't hear grammar which I've learned ...from Canadians ...does Canadians use all their grammar?" (RN)
Compensation			"Not understanding native speakers) "Ah ...first I will guess ...if I really can't understand ...then I ask ...please say again ...or what do you mean ...sorry I can't understand." (SSI)			

Themes:	Understanding English Speakers and their Culture	English as a System of Language	Difficulties and Confusion	Extra Practice	Understanding Grammar	Studying Grammar
Strategies:						
Metacognitive			"I have a problem. 'Why I can't speak English with my Taiwanese friends?' ...sometimes we speak English but if something can't explain ...I'll change to Mandarin. I won't try to find English word ...if I speak to another language speaker I'll try to find vocabulary to explain." (RN)	"Today I went to teacher's potluck ...no school ...but I think I still use English in another place because I think talk with somebody ...good way to practice listening and speaking." (RN)	"Grammar is my weak point. When I am studying grammar I know how to use but in real life when I am speaking or writing I don't know how to use the grammar and I don't hear some grammar which I've learned from Canadian. Maybe it is my problem, but does Canadian use all the grammar in speaking and writing?" (RN)	"I felt confused ...evening writing class ...didn't write many essay ...didn't have an improve ...I still have difficult with grammar. I don't know why." (RN)
Affective						
Social	"If I live in homestay ...I can talk with host mother ...roommate talks with host daughter ...I can't ...maybe age." (SSI)		"If I can't understand I'll ask my teacher ...sometimes I will make a mistake ...have to come back and ask again." (SSI)	"It's good to practice ...maybe you can find someone ...they are very ...like talk ...and you just sit there and talk with them ...very good." (SSI)		

Table 32

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Memory					"Ah ...first they get married ...second is they not married ...maybe divorce ...I think even I understand ...maybe too many things I can't remember." (SSI)	
Cognitive	"I will write down ...pronounce ...maybe write down many times ...and pronounce ...for me ...it's the best way." (SSI)	"Last session teacher prepare ...I think very good ...really Canadian ...how do you say sentence ...maybe say too fast ...I try to guess ...oh I don't know what that means ...maybe two words ...not just one word." (fast speech) (SSI)		I will read the whole sentence ...if I can't understand ...check dictionary ...maybe this is two words not one word." (SSI)		
Compensation						
Metacognitive					"If I just concentrate one question ...listen ...listen I can get it ...if I read the whole thing ...maybe forget something important ...so I ask one question ...concentrate to listen ...listen ...and I can find it." (SSI)	

Themes:	Learning Pronunciation	Most Important Activity in Learning English	Being Understood	Understanding/Learning New Words	Getting Main Idea and Details	My Most Difficult Learning Task
Strategies:						
Affective		"I like to do vocabulary games ...because even I couldn't remember ...how to spell, but I know how to pronounce ...and I know the meaning ...I can go home ...just try to spell ...I can get it." (SSI)				
Social						

Table 33

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Memory				"First term ...I talk with my friend's conversation partner ...but he can speak Mandarin not bad and learning Mandarin ...so always talking Mandarin ...didn't learn anything from him." (SSI)	
Cognitive					
Compensation					

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Metacognitive	"Today ...I had real success ...new words from old ...in that exercise I already know a word ...and put them together and get a new word." (RN)		"Now ...I can say ...'please repeat' ...but first ...I think I couldn't because ...I think it's impolite ...but now I think if I can't understand I have to ask them." (SSI) "Recently I am thinking do I improve in this section and I think I get the answer ...yesterday, when I was watching TV I felt my listening is getting worse ...English is getting worse ...I don't know why sometimes my listening is good ...but sometimes is bad for me. I think concentrate is the most important thing and it also depend on content is easy or not." (RN)	"Yesterday I had attended an informal discussion meeting. We were talking about ESL program and I realize I haven't done any study yet. This term is like a vacation because my teachers ...teachers are very good people but their teaching can't make me interest to English. In the meeting I said, 'Teacher is very important for students' study' and everybody was agree with me. Someone said she doesn't care how long is class ...if teacher's teaching is interesting." (RN)	
Affective			"Last session teacher always gives us homework ...ask three Canadian English speakers these questions ...and first time ...I was very nervous ...I can't call ...but next time ...next time ...very good ...I just go to learn ...say, 'Could you help me with my homework?'" (SSI)		

Themes:	Remembering a Successful/Unsuccessful Language Learning Experience	Getting Help	Am I Making Progress?	Relevant or Less Relevant Learning Activities	Preparing for a Challenging Task
Strategies:					
Social				"...if I live by myself I think not good ...I have to cook ...waste of time ...living with Taiwanese ...never speak English ...very bad. If I live in homestay that's good ...I can talk with host family ...very good ...always at supper time ...like to talk with host mother ...if I have a problem ...I will talk to them." (SSI)	

Quantitative Findings

SILL findings.

On the SILL inventory, using Oxford's (1990) mode of scoring, Jessie's highest score was in the category of cognitive strategies. Metacognitive strategies were reported at a level approaching a high level of use (usually used). Affective, compensation, and social strategy use were reported at the same level, in the uppermost range of medium use. Memory learning strategies occurred at a lower level of medium strategy use.

Table 34

SILL Inventory Scores for Jessie

SILL Evidence Rank Order Strategy Use	Score
1. Cognitive	3.8
2. Metacognitive	3.4
3. Affective	3.3
4. Compensation	3.3
5. Memory	3.3
6. Affective	2.8

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Reflective Synthesis

Both the qualitative (RN and SSI) and quantitative (SILL) data suggest that Jessie used cognitive and metacognitive LLS extensively in her language learning activities. Memory strategies were used to strengthen Jessie's existing knowledge frameworks and to add to their complexity. She acknowledged at one point, "Very easy for me to memorize ...but sometimes not use ...so forget." In this sense she seemed to acknowledge that although memory strategies served her well in terms of conserving her time and acquiring information, they were most useful when combined with application and use.

Although at one time thought to be mundane, it is now felt that memory and other "bedrock strategies" (Green & Oxford, 1995) may be used frequently or moderately frequently by learners at all levels. However, it is important that they be used in combination with active naturalistic practice, combining function and form in meaningful language.

Jessie also used social, compensation, and affective strategies at a lower level. It is difficult to assess the full effect of learners' use of affective and social strategies and their interactive effect with/on the ability of the learner in supporting motivation, goal orientation, etc. (MacIntyre, 1994). Learners are often, both culturally and academically, not encouraged to pay attention to their affective language learning strategies (Oxford, 1990) and affect, as a construct, is somewhat difficult to fully understand (Phillips, 1990). Some cultures may focus most attention and effort on cognitive and memory learning strategies (Reid, 1987) and do not prepare the learner's

awareness/consciousness for attending to affective and social learning strategies (MacIntyre, 1994).

An interesting and important aspect of Jessie's use of LLS was her ability to organize her learning activities and to personally associate her psychological learning efforts with the social realities of a variety of learning situations. She evidenced a high level of self-investment (Norton-Pierce, 1995) in the many areas which she reported in her use of LLS. This high level of self-investment seemed to facilitate a high level of motivation. Jessie's motivation appeared to enable her to combine her use of LLS in such a way as to assess, monitor, and evaluate her active involvement in the learning process, and to focus her use of time, materials, and problem-solving activities to maximum advantage. That is, she used her LLS to develop the actual conceptual and behavioral skills necessary for successful language learning. She also worked actively to generate personalized problem solutions and maintain ongoing practice and negotiation of meaning in the English language.

A particularly important aspect of Jessie's ability was her use of LLS to assess her SLA progress. In order to do this, language learners have to be psychologically ready to become their own expert in deciding what is evolving in their learning experience (Holec, 1987). Jessie provided evidence in her LLS use that she, as a learner, was both willing and able to assess her personal learning efforts. She was aware of the significance to her, as a learner, of teaching methodologies, authentic language input, and relevant learning material. In the SLA learning world, teachers and external examination are often acknowledged as credible criteria for the

measurement of learners' efforts. Thus, the ability of a learner to take responsibility for personal learning assessment, in combination with the skill and ability to mobilize such assessment, is a powerful, emancipatory combination (Holec, 1987).

Table 35

Synthesis of Findings: Jessie

Qualitative Evidence -Sum of Two Methods- Rank Order of Strategy	Score	SILL Evidence Quantitative Findings Rank Order of Strategy	Score
1. Cognitive	42	1. Cognitive	3.8
2. Metacognitive	39	2. Metacognitive	3.4
3. Social	22	3. Affective	3.3
4. Affective	10	4. Social	3.3
5. Memory	8	5. Compensation	3.3
6. Compensation	5	6. Memory	2.8

SILL Profile of Results (Version 7.0)

Key to Understanding Averages:

High	Almost or always used	4.5 to 5.0
	Usually used	3.5 to 4.4
Medium	Sometimes used	2.5 to 3.4
	Generally not used	1.5 to 2.4
Low	Never or almost never used	1.0 to 1.4

This figure is based on Oxford's (1990, p. 300) SILL Profile of Results. Copyright exemption was obtained from Heinle and Heinle Publishers.

Conclusion

One may think of SLA as a generative process (i.e., "development as growth"; Ellis, 1989, p. 76). From this perspective, it is assumed that the learner has different linguistic, social, and communicative tasks at different levels of SLA proficiency. Early in the language learning/acquisition process, the learner is faced with developing a basic understanding of the target language as a system, as well as accumulating linguistic structure and behaviours that facilitate early referential use of language. Memory, compensation, and cognitive (Direct Strategies) strategies assist the learner in these tasks.

As language learners move toward language proficiency, "...[they] develop their own understandings or models of second or foreign language and its surrounding culture." (Oxford & Nyikos, 1989, p. 291). The ability to use appropriate learning strategies in a variety of situations enables the learners to take responsibility for their learning, thereby enhancing learner autonomy, independence, and self-direction. These factors are important because language learners need to keep on learning and seeking opportunities for learning, even when they are no longer in the classroom (Oxford & Nyikos, 1989).

Adult language learners bring to the SLA process different attributes from younger learners. Of these, one of the most important is the ability to think metacognitively (Ehrman & Oxford, 1995; Flavell, 1979). The ability to think metacognitively may include the ability to reflect on and regulate one's own learning and learning needs (Oxford, 1985a). As such, the learner develops conscious

awareness of his or her own learning patterns and needs and outcomes. This ability empowers the adult to "...set long term goals and determine one's own optimal learning environment." (Oxford, 1985b, p. 4).

The participants in this study often priorized or actively organized those learning situations which availed a greater degree of control over personalized learning and an expanded level of authentic input, as well as a heightened level of reflective thought.

Such behaviours seem to be important for the adult learner for a variety of reasons. Firstly, they recognize the learners' developed, mature world view and are empowering and motivating in a learning process in which adult learners may feel otherwise disempowered. Secondly, they provide opportunities for participation in communicative situations thought to be critical in the development of language proficiency (Lightbrown & Spada, 1995). Thirdly, they avail an opportunity for the adult learner to choose language learning activities appropriate to his/her needs, interests, and language proficiency level. [Active engagement and initiation of activity in the language learning process, is listed as one of the strategy groups most characteristic of *good* language learners (Naiman, et al., 1978; Wenden, 1987b) and appears correlated with other measures of learning success (Oxford, 1990b)].

Finally, adult language learners' use of LLS provides ongoing opportunities for personal reflection and analysis in interaction with native speakers in a variety of naturalistic learning situations. In turn, these opportunities may increase learners' tolerance for ambiguity and risk taking (Ehrman & Oxford, 1995), facilitate personal

understanding of motivation (MacIntyre, 1994) and anxiety (Horowitz & Young, 1991) related to their learning, and provide opportunities to challenge their "habits of expectation" (Roth, 1990, p. 119).

In conclusion, findings from this study which locate various and diversified preferred learning situational themes reflect findings from other studies which link successful language learning efforts in a variety of intentionally chosen, personalized ways not always associated with institutionalized learning (i.e., Ehrman & Oxford, 1995; Gardiner & MacIntyre, 1993; Naiman, et al., 1978).

CHAPTER FIVE

Conclusions and Recommendations

Introduction

One purpose of human language is to reduce ambiguity of meaning, facilitate communication, and to serve "...as a mechanism for the creation of social interaction among two or more speakers." (Richards, 1988, p. 84). The closing decades of this century have witnessed tremendous growth and change throughout the world. English has emerged as an international language of science, medicine, and education (Johnstone, 1992). In conjunction with these communication requirements, others related to globally disruptive political and ecological activity have resulted in an ever increasing number of immigrants, migrants, and other world travellers. This has necessitated extensive language reeducation worldwide through the process of Second Language Acquisition (SLA).

Second Language Acquisition was once thought to be primarily a linguistic process. Over a period of time, understandings of the actual processes and of the multiple and varied aspects affecting the process have resulted in a redefinition of SLA. Thus, it is now considered a multifaceted, interactive process (Gass, 1988). Current research in the field of SLA suggests a role for other disciplines including psychology, sociology, neurocognitive science, anthropology, and adult education. As such, the preferred educational approach in adult language learning (SLA) has reflected a major theoretical shift (McLaughlin, Rossman, & McLeod, 1983; Swaffar, 1989) in which individual learner attributes, as well as learning theory and methodology, play

major roles. Theoretically and pedagogically this has necessitated the understanding and integration of ideas and findings from diverse, though interrelated domains of knowledge and research (Flynn, 1990; MacIntyre, 1995; Schumann, 1995).

Educational research can be seen as careful, systematic attempts at developing a better understanding of the educational process with the aim of improving its effectiveness (Entwistle, 1984). To this end the role of the adult learner in the SLA process has received increasing attention and interest in regard to self-determination, self-competence, and metacognitive behaviours characteristic of adult learners (Brown, 1990; McCoombs, 1990).

Nevertheless, a major dilemma facing learners and teachers in the field of SLA has been the lack of consistency in levels of success experienced by various language learners. In the past, research has often sought simple answers related to the complex question of how SLA occurs. Brown (1990) says that "...we have yearned to see the complexity of acquiring a second language reduced to some sweeping generalizations that hold across multiple contexts, some simple formulas for teachers, or maybe even an ultimate method." (p. 383). This type of solution is not appropriate to the task at hand (Brown, 1990; Flavell, 1979), and ultimately does little to delineate the complexities that an adequate theory of SLA needs to address (Long, 1990).

In terms of the complexity involved in human learning and in language learning in particular, it appears that SLA is a multifaceted, interactive process in which no one variable can be seen as entirely central. It seems to be LLS use is dependent upon a number of variables, some known and some unknown. SLA is a

highly personalized process and, unlike L1 acquisition, probably occurs in a number of different ways depending on the learner, nature of the learning experience, goals of learning, etc. These findings have been suggested in the literature (Cook, 1992; Kumaravadevalu, 1994). This avails a greatly enhanced theoretical base from which to glean insights into dynamics which impact the SLA process.

Concluding Observations

1. Despite theoretical debate in the literature about language learning strategies, the participants in this study appeared to use 'strategies' as defined by Oxford and measured by SILL. For me, this use of strategies was real. That is, I began with the question of understanding what strategies the participants used and then identified naturalistic situations in which they described their LLS use.

Although the use of three different methods of data collection may have obscured the research question, the use of Oxford's approach and tool provided some focus, security, continuity, and value in the data collection process and interpretation. That is, it was useful in explaining what strategies were used by the participants, as well as the ways in which they were used.

2. A question remains about the utility of using a combination of two qualitative methods of data collection with Oxford's quantitative approach. That is, it was difficult and challenging to triangulate the resultant findings in an attempt to gain insights about specific language learning strategies. Did this attempt to triangulate help or hinder a clear understanding of strategy use?

Summative tools like SILL, are designed to produce standardized information

about individuals as members of large groups. Considering this usual use of such discrete item tools and the fact that my sample was small, SILL may not have been a suitable choice in understanding LLS.

However, there has been a call for new and creative ways of combining qualitative and quantitative research methods to provide a multi-perspective approach in investigating complex social phenomena (Mathison, 1988). SLA and the use of learning strategies constitute such phenomena (Flavell, 1979). As such, combined, interactive, and innovative use of methodology may be useful in gaining a more complete understanding of the nature of such phenomena in establishing structural corroboration by gathering and cohesing differential perspectives or images on existing research questions. Triangulation might then be viewed as availing different views on the nature of the research endeavour.

It has been said that,

> What is important for researchers is not the choice a priori paradigms, or methodologies, but rather to be clear about what the purpose of the study is and to match that purpose with the attributes most likely to accomplish it. Put another way, the methodological design should be determined by the research question (Larsen-Freemon & Long, 1991, p. 14).

The purpose of this research was to contribute to an expanded understanding of the way in which successful female adult language learners use LLS. Thus I ask, would it have been more appropriate to see all three data collection processes as

having utility at different levels of insight into the nature of LLS use?

I am left with the feeling that the special usefulness of SILL in a research group of this size and nature may be to provide an empirical structure for understanding more global, perhaps qualitative findings. I also think that SILL has excellent potential for raising 'consciousness' about the nature of LLS use, thereby causing learners to reflect on the subject both generally and personally.

3. My participants were adult learners. They appeared to use strategies in ways not always accommodated by the theory and research underlying SLA.

For example, Yuriko, Sony, and Hiromi used affective strategies in ways which seemed to support and facilitate their learning. Only recently has affect, both neurobiologically (Schumann, 1994) and socially (MacIntyre, 1995), become a more prominent focus of research in SLA. Affect, as a construct, is still not well understood, and as such is often difficult to identify or describe. From the findings of this study, it seems that this is an important area for further investigation.

4. How do language learners perceive and conceptualize their language learning tasks? In my findings, there were some areas in which learners showed similar patterns in their reflections about the learning and use of LLS.

As adults, the participants brought with them values, beliefs, and attitudes toward SLA which often seemed to facilitate their use of LLS. These findings were evident in the interview and reflective note data as it was not possible for SILL to identify such specific, idiosyncratic behaviours.

For example, Hiromi, Yuriko, and Tomomi expressed assumptions that the

English language was completely unlike their native language, Japanese. Tomomi said, "English and Japanese is completely different ...it's hard to say many things ...totally different ...character ...is different ...English just letters ...noun and adjective in exchange ...language is completely different."

However, rather than being disempowering or discouraging, these insights seemed to enable perceptions that learning English might involve new and quite different approaches to the learning and use of language. In a sense, it may have reflected a level of readiness to learn in some of these women. One wonders how much of the use of innovative or novel methods of language learning is shaped by learners' readiness to accept change and ambiguity as an integral part of the learning experience.

Similarly, when asked how long it might take to learn another language, Alex replied, "Oh, I think it would take forever ...many years." In both of these areas the women were able to use their beliefs and knowledge about language learning to realistically define their task and better understand their learning challenges. Such findings suggest that realistic beliefs and values may aid the second language learner in tolerating ambiguity, maintaining motivation, and mobilizing task knowledge in the generation of appropriate and focused LLS use. Thus it may be important to help learners assess and examine their beliefs, values, and attitudes related to language learning in order to realize appropriate goals and LLS in their learning experience.

5. In attempting to understand the life situations in which the strategies were evident, it seemed that LLS are realized by the learner at both an internal and external

level. For example, the theme "Am I Making Progress?" suggests an internal introspective domain. However, "Being Understood" implies behaviours and interactions in contact with the concrete social world external to the learner.

6. This was a small survey of seven learners, all women. How much of these two factors influenced the results? Although gender was not a primary focus, it is possible that some of the seventeen themes, which emerged, were influenced by gender. Language is contextual, and context for women in modern society has been reportedly defined as unique. While being sensitive to gender effects in this study, the small number of subjects and the complexity of understanding LLS and their use was the fundamental research question. However, the findings of such researchers as Tannen (1990) and Toohey and Scholefield (1994) would suggest that a gender focus might be an appropriate inclusion in further research in the area of women's LLS use.

7. It is difficult to explain findings resulting from variant data collection methods which do not consistently support existing conceptual ideas about language learners' use of LLS. That is, language learners in this study used individually significant LLS to create innovative, unique, and sometimes particular, solutions to language learning tasks.

For example, in the thematic category "Getting Help," Yuriko used mainly social learning strategies, Jessie used a combination of metacognitive and cognitive learning strategies, and Hiromi used affective and memory learning strategies. Still others, such as Alex and Sony, used a combination of several learning strategy categories to accomplish the task requirements. LLS use seemed to depend on the

situation in which the task occurred, learners' perception of the task, and her particular learning resources.

Pervasively, the conceptual nature of the situation in which the task occurred seemed to be important in helping the learners define and mobilize appropriate LLS. It has been said that there are many ways to successfully learn a second language and that each language learner has a unique and individual language learning career (Brown, 1994). One wonders if some of the incongruencies that emerged in this study are as much a product of the individual learning processes as the divergent research methodologies.

8. It is not easy to accommodate such idiosyncratic use of LLS with the precision of existing theories or the instruments currently utilized in studying LLS. Perhaps the dilemma of better understanding the uniqueness and complexity of diverse processes characterizing the language learning process could be the basis for further research.

Such research might focus on longitudinal studies in order to ascertain if, and how, learners change the use of LLS throughout their language learning careers. Cross-cultural studies would help us examine the effect of early experiential learning and socialization, as well as the role they play in the choice and use of LLS.

9. From my perspective, the use of both qualitative and quantitative methodology has provided initially perplexing conclusions. However, as we come to a more inclusive understanding of the nature of LLS and their characteristics, it may be possible not only to describe LLS but to better appreciate how they are operative and

useful in the lives of second language learners.

10. Anita Wenden (n.d.b) has suggested that we may need a new paradigm in researching LLS. She posits that, to date, the major focus in LLS has used a discrete approach to collecting and analyzing data. That is, the research objective has been to identify and classify strategies and provide taxonomies. These strategy systems are then sometimes mobilized for further research and learner strategy training that are, at times, quite separate from the task that originally elicited them.

Because the relationship between the strategies used and the task knowledge necessary in the actual task performance are so critical to optimal LLS use, this may be a fruitful area in which to focus further research (i.e., What aspect of strategy use is shaped by task requirements? Are learners aware of this crucial connection between strategy and task?).

11. The thematic categories which framed these women's use of LLS were generated from their lived experiences related to their use of LLS. Expressed in their own voice, these experiential, behavioral aspects of their learning journey allowed me to examine anecdotal and subjective aspects of LLS relevant to them as adult learners. It should also be remembered that the researcher brought to the study several levels of subjectivity and tacit knowledge regarding the use of LLS in SLA. As such, both areas of subjective knowledge (the learners' and the researchers'), as well as the interactive subjectivity, undoubtedly influenced the findings of this study.

Although these findings may not be generalizeable in the traditional research sense, I am left with the perception that they could provide foci for further research.

That is, it seems important to attend to those LLS variables which learners priorize, operationalize, and discuss as having relevance to their language learning experience.

Recommendations

Practice enhancement.

1. ESL teaching methodologies should address the SLA learning event in consideration of learners' needs including stage of learning in terms of psycholinguistic research, individual learner factors, and available teaching/learning resources. Learners need help in using the variety of strategies which they naturally possess and in becoming conscious of the many others available. This may be accomplished through consciousness raising using strategy use inventories such as SILL (Brown, 1994), dialogue journals (Bacon, 1995), multi-skill portfolios (MacNamara & Deane, 1995), and other self-assessment techniques.

2. SLA teacher/guides need to examine their assumptions about the nature of adults' SLA processes and learners' individualized strengths and needs. Critical reflection rather than consistent use of specific guidelines and methodological techniques will aid educators in participating in more flexible, informed, and learner centred SLA learning experiences.

3. SLA contexts which facilitate metacognitive LLS should be available and planned. Specifically, learners should have opportunities to think reflectively by journalling, goal setting activities, self-evaluation, and feedback exercises. Learning contexts which facilitate learning in the area of social and affective strategy use should be included in an effort to support metacognitive behaviour. Successful learners could

be encouraged to model their behaviour, particularly in formalized learning activities.

4. Intermediate adult female SLA learners who seek out authentic learning situations and otherwise evidence self-directed learning efforts should be recognized and valued. Their mode of negotiating meaning and processing the target language through the use of LLS could thus be acknowledged as critical to an optimum SLA experience, and thus might serve as a model for other learners.

5. Teacher/facilitators have opportunities to create and shape learning activities which support inclusive, relevant, communicative language learning. One way of establishing credibility of such efforts is to involve learners in the planning, organization, and evaluation of their learning activities, including LLS assessment and development.

Theory enhancement.

1. SLA theory could be enhanced by a more specific recognition of adult SLA learners as adult beings. Though not often mentioned in literature, theoretical perspectives on adults' modes of approaching and sustaining their SLA efforts could be enhanced by the inclusion of andrologogical theory. Adult language learners bring to the SLA process well-developed personal attributes, beliefs, and values. Educators' appreciation and knowledge of these could serve to enhance the language learning process.

2. ESL teacher/guides need to develop and refine a generative, inclusive attitude toward SLA research. Use of different data collection methods could be used to address variant learning contexts and purposes for research, as well as the

multifaceted nature of both the SLA learning process and SLA learners.

3. SLA learners who seek out authentic learning situations and otherwise engage in self-directed learning should be recognized and valued so that their mode of negotiating meaning and processing language is acknowledged as critical to optimal language learning. Such modes of language learning behaviours are useful in incrementally developing theoretical understanding of LLS in SLA.

Further research.

1. There are many relationships associated with social and affective behaviours of learners and the way they impact cognitive and metacognitive behaviour. Further research could focus on the contexts that learners choose for their learning and what these mean to them personally and socially. That is, how do learners view their meaning as members of a new social world? How does this affect motivation and subsequently the ability to enter into cognitive and metacognitive endeavours?

2. There are many ways in which learners become actualized in their personal life and in their educational life. It would be helpful to know from learners' perspectives the kinds of learning variables which serve to facilitate the self-actualization process. It would be useful to examine these findings cross-culturally and longitudinally to better understand the process of becoming and being an adult SLA learner.

3. Further research could include a combination of qualitative and quantitative methodology in order to facilitate a more refined and inclusive understanding of the learners' use of LLS in SLA.

4. Methodologies for enhancing learner self-assessment and collaborative learner/teacher assessment should be investigated. The potential use of dialogue journals, portfolios, and self-evaluation inventories may serve to foster learner autonomy and facilitate cooperative learning contexts. The change in philosophical perspectives that accompany such activities may serve as an impetus to optimizing attitudes and energies in language learning and teaching.

The above conclusions and recommendations suggest varied and interesting trends in the use of language learning strategies by a group of successful adult female language learners and some implications for further research. They also serve to conclude the documentation associated with this research study.

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Appendix A: SILL Inventory

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Pages 217-229

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Appendix C: Frame for Reflective Notes

November, 1994

Reflective Notes

Research Project: Strategies of Successful Female Language Learners

Each day when you are doing you learning log would you please write a short description of a situation or experience:

1) That you found useful or helpful in your English language learning (i.e., it can be something from classroom activities, from a field trip, from a social activity, from a "homestay" conversation). Can you think why it was especially good?

2) That you found did not work well, that you did not find helpful. (Again, it can be from any area of your life and learning, try to think why it was not helpful.)

For example:

November 15, 1994 1) Today I had a real success....

2) Today I felt confused.....

Appendix D: Outline of Strategy System

Language Learning Strategies

Diagram of the Strategy System: Overview

Learning Strategies

- Direct Strategies
  - I. Memory Strategies
  - II. Cognitive Strategies
  - III. Compensation Strategies
- Indirect Strategies
  - I. Metacognitive Strategies
  - II. Affective Strategies
  - III. Social Strategies

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PERCEPTIONS OF A 'QUALITY' LEGAL EDUCATION:

"LEARNING TO THINK LIKE A LAWYER"

by

BRENDA D. DAVIS 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfilment of the requirements for the degree of

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DEPARTMENT OF EDUCATIONAL POLICY STUDIES

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ABSTRACT

This qualitative study explored the reflections of selected lawyers on their law school experience. The study considered a broad overview of participant experiences from the initial decision to enter law school through to a consideration of ongoing and future legal education issues. The purpose was to identify elements of a 'quality' legal education experience. The study evolved from the perceived need in higher and adult education literature to better understand the student experience.

The study drew upon the insights of graduates from four Western Canadian law schools whose comments were grounded in both their educational as well as professional work experiences. The learner's post-graduation perspective provided guidance in the exploration of quality by identifying elements of a quality pre-professional university program. Both legal education and adult and higher education literature were reviewed in conjunction with participant's statements about their personal experiences of law school. The study specifically contributes to the research literature in legal and higher education as both have generally disregarded the learner's perceptions of the educational experience.

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LIST OF TABLES

Table 2.1 Responses to Question - "Why did you go to law school?": Comparison Canadian Lawyer survey results with responses from Focus Group 34

Table 2.2 Responses to Question: Why did you go to law school? Comparison of Canadian Law Survey and One-to-One Interviews 34

Table 2.3 Summarized responses from one-to-one interview participants to the question: "What do you think is the purpose of law school"? 38

Table 2.4 "To Think Like A Lawyer" - Summarized responses of the one-to-one interview participants to the question: What do you think the phrase, 'to think like a lawyer' means? - How does law school teach you to think like a lawyer? 52

Table 3.1 Academic and Practitioner Approach to Teaching - Strengths and Weaknesses as Identified by One-to-One Interview Participant Responses 108

Table 3.2 One-to-One Interview Participants Summarized Responses Identifying Other Factors Affecting Their Learning Experience 112

Table 3.3 Summarized Comments of Interview Participants on Marks and Methods of Evaluation 123

Table 4.1 Summary Participant Responses (Focus Group #2) - Giving Advice to Prospective Law Students. What piece of advice would you give to a law student who was starting law school? 154

Table 4.2 Summary Participant Responses (One-to-One Interviews) - Giving Advice to Prospective Law Students. 155

TABLE OF CONTENTS

Abstract

Acknowledgements

List of Tables

CHAPTER PAGE

Chapter 1: RESEARCH PROBLEM, DESIGN & METHODOLOGY

Introduction 1

Problem Statement 5

Significance of the Research 5

Limitations / Delimitations 8

Definition of Terms 9

Assumptions 10

Research Design and Methodology 11

Introduction 11
- Qualitative Research 12

1) Research Approach 12

2) Data Collection 15
- Researcher 15
- Participant Selection 15
Criteria for Focus Group #1 16
Criteria for Focus Group #2 16
Criteria for One-to-One Interviews 17
Contact with the Participants 18
- Data Collection Procedures 19

3) Data Analysis 20

4) Ethical Considerations 22

Summary 23

Organization of the Thesis 24

Chapter 2: ELEMENTS THAT DEFINE A QUALITY LAW SCHOOL EDUCATION

Introduction 25

Quality In Higher Education 25

Aims and Objectives - The Purpose of Law School 26

Development of the Questions 26

Participant Responses & Analysis 29

1) Why did you attend law school? 29

2) What do you think is the purpose of law school? 37
- Case law method and the over-emphasis on litigation 42
- Narrow focus of law school 43
- Image of 'success' defined by large firms/corporate mentality 43

3) What was the most important thing you came away from law school with? 44
- Analytical skills 45
- Accreditation 45
- Social 47
  - Friendships 47
  - Contribution to Society 47

4) What does the phrase, "to think like a lawyer" mean to you? 48

5) How was "thinking like a lawyer" taught? 54

Summary 55

Chapter 3: TEACHING AND LEARNING DYNAMICS - 'FORMAL'

Introduction - Formal Learning Experiences 57

Development of Questions 57

Over-all Assessment of Teaching and Learning at Law School 60

Total Quality and the Improvement of Legal Education 60

Effective Instruction 64
- Class size 69
- Impersonal Relationship between the Teacher and Learner . . 70

Key Principles of Effective Teaching 70

Principle 1 - Interest and Explanation 75

Principle 2 - Concern and Respect for Students and Student Learning 76

Principle 3 - Appropriate Assessment and Feedback 79

Principle 4 - Clear Goals and Intellectual Challenge 80

Principle 5 - Independence, Control and Active Engagement 81

Principle 6 - Ongoing Instructor Evaluation 84
- Student evaluation 85
- Independent evaluation 86
- Self-evaluation 87

Effective Student Approaches to Learning 89

Why Surface Approaches to Learning Are Adopted by Students 94

1) Perceived need to recall or apply trivial knowledge 95

2) Assessment methods which create anxiety 95

3) Cynical or conflicting methods about rewards 96

4) Excessive amount of material in curriculum 97

5) Poor or absent feedback on progress 99

6) Lack of interest or background knowledge of subject 99

Additional Learning strategies - Study Groups 101

Curriculum Focus: Academic versus Practical 102

Instructor Focus: Academic Faculty Versus Practitioners 104

1) Focus Group #1 104

2) Focus Group #2 105

3) One to one interviews 106

Other Factors Affecting the Learning Experience 112

1) Expense 114

2) Mature students 115

Socratic Method 115

Methods of Evaluation 121

Advice to Faculty 125

Advice: If You Were To Teach A Course 126

Summary 127

Chapter 4: INFORMAL LEARNING IN A QUALITY EDUCATION EXPERIENCE

Introduction 129

Identifying Aspects of a Quality Legal Education 130

1) Mooting 131

2) Client communications and counselling 131

3) Student Legal Aid (SLA) 132

Advice to Future Law Students 136

Theme #1 - Understand the Role of the Lawyer 137

Theme #2 - "Remember Who You Are" 140

Theme #3 - Maintain (a Healthy) Balance 146

Theme #4 - Get Involved! 147
- Volunteer Involvement (Student Legal Aid) 147
i) Law in context 148
ii) Skills Acquisition 148

iii) Community Service 149

Theme #5 - Don't Expect a Job (as a Practicing Lawyer) 150
1) Marks and Articles 152
2) Choice of Electives 152

Summary 157

Chapter 5: CURRENT CHALLENGES AND FUTURE DIRECTION

Introduction 158

Development of the Question 160

Analysis and Review of Responses 164

1) Technology and Change 164
- Legal Specialization and Life-long learning 166

2) Too Many Graduates: Not enough jobs 170
- Alternate careers 173
- Law schools role in post-graduation transition and placement 174
- Need for action 175

3) Core Courses and Relevance 182

4) Balance Between Theory and Practice 187

5) Brief Review of Legal Education Reform Movements 189

Summary 193

Chapter 6: SUMMARY AND REFLECTIONS

Introduction 196

Research findings 199

Chapter 1 - Statement of the Problem (Research Plan) 200

Chapter 2 - Purpose of Law School 202

Chapter 3 - Teaching and Learning Dynamics - Formal Learning 205

Chapter 4 - Informal Learning in a "Quality" Education Experience 215

Chapter 5 - Current Challenges and Future Direction in Legal Education .. 220

Implications for Further Research 224

Summary 226

BIBLIOGRAPHY 228

APPENDICES:

Appendix A: Telephone Request Format 240

Appendix B: Confirmation Letter 242

Appendix C: Participant Agreement Form 244

Appendix D: Pre-Interview Questionnaire 245

Appendix E: Focus Group Moderators Guide 247

Appendix F: Focus Group Participants Guide 248

Appendix G: Interview Guide 250

CHAPTER 1

RESEARCH PROBLEM, DESIGN AND METHODOLOGY

INTRODUCTION

Legal education in Canada is in an era of dynamic change, yet it has not developed a clear concept of quality which could provide direction to the field. Significant changes in recent years include the increasing distance between practicing lawyers and the law faculty. The fact that legal education at the university level is now perceived as a distinct enterprise, quite separate and apart from the other educational activities of the legal profession, was noted as being a significant development at the 1985 National Conference on Legal Education in Winnipeg. Arthur (Matas & McCawley (ed.):1985) said that this separation "... made possible conscious thought about what is being taught (at law school) and how it should be taught." (p.162) However, there has been little evidence to support that academic scholarship in respect to legal education at law school has, in fact, increased since the separation which would justify this statement.

In studying 'what is being taught and how it should be taught', it is important to consider the experiences of law graduates, as they are in the best position to reflect upon their legal education experience and consider its quality. This is particularly important as graduates can draw upon both their educational and professional experiences to guide their assessment of legal education. Therefore this research study explored the educational experience of law school through the perceptions of a number of selected former graduates who have since achieved the designation of becoming a lawyer whether or not they currently practice law.

During law school, the quality of the teaching and educational value of specific courses are routinely assessed on a course by course basis, by students, at the end of each term. Yet

the researcher was unable to locate any research study which asked graduates to consider, or assess, the quality of their over-all legal education experience once they had commenced working in the legal profession. Research and evaluation of higher education itself is generally considered in need of further study. This research study is particularly critical as it examines an area - the education of law students - which has received almost no attention in terms of formal research. In the consideration of the law graduates' perspectives on what constitutes a 'quality' legal education it was recognized that quality was a somewhat elusive concept. Mahew et. al. (1990) stated that,

> A major item for clarification before quality can be addressed is nomenclature. Every educational institution insists that its primary commitment is to "quality" or "excellence," terms that are used interchangeably ... (yet) while quality as a concept shares certain abstract dimensions whenever it is discussed, it lends itself to so many different perspectives that meaningful dialogue is impossible unless the participants agree on a common approach. (p.23-25).

In this study, despite considerable deviation there were many areas of general consensus uncovered regarding the characteristics of a quality legal education. The definition of 'quality' was premised in part upon the concept that "Quality is fitness for use," (Juran:1974:p.22) Consideration was therefore given to how well law school facilitates the transition of the learner to the profession of law or facilitates an acceptable alternate career path in terms of the acquisition of the necessary skills, knowledge and values. After a review of the various definitions of 'quality' from the literature, the following definition was found by Mayhew et. al (1990) to be both appropriate and workable in the context of higher education:

> Quality undergraduate education consists of preparing learners through the use of words, numbers, and abstract concepts to understand, cope with, and positively influence the environment in which they find themselves. (p.29)

This definition was found to be useful in guiding the research inquiry. While it was

recognized that quality takes on slightly disparate meanings in different settings, several concepts from Total Quality Management (TQM) literature were found to be useful in framing the study of pre-professional legal education at law school.

One of the key concepts of TQM is defining quality in terms of the needs of the people and groups that are served by an organization. Law faculties need to be concerned with at least three interest groups, or "clients," who are vitally concerned with the quality of legal education in Canada:

1) the public;
2) the respective Law Societies; and
3) the students.

All of these groups have their own unique perspective and each has a legitimate interest in ensuring that students receive the best education possible in law. The public is entitled to require that law students are well trained and able to offer professional legal services upon admission to the Bar. Lawyers are a self-governing profession monitored by their respective Law Societies which also have a vested interest in ensuring quality legal education as a pre-requisite to commencing a term of articles and ultimately attaining membership at the Bar. This study focused only on the third group of 'clients', the students, specifically former students who are in a unique position, as members of all three interest or client groups, to ascertain whether they were well-served by the legal education they received at university.

Selected former students were asked to reflect upon their overall legal education at university and provide detailed information on learning experiences, which proved valuable in their later professional life. Participants were also asked to comment upon the potential for improvement of legal education programs at university and to substantiate their recommendations with examples drawn from personal experiences both educational and professional. In compiling and analyzing the reflections of graduates, the study should

contribute to an increased understanding of legal education as well as provide initial ground-work in the critical first step of 'continuous improvement' in higher education.

The research should also provide some specific information on the over-all quality of legal education in Western Canada although as Chafee (1992) cautioned, those who are unfamiliar with Total Quality Management (TQM) principles and their application to post-secondary education, often express frustration about what they perceive to be the vagueness and incompleteness inherent in this approach. It is difficult, for example to provide a single precise definition of quality, the purpose of TQM principles are not necessarily to provide the 'answers.' Rather TQM offers assistance in posing key questions and providing an array of potential methods through which the faculty itself can address the issues through their own expertise and insights. The institutes of higher learning are ultimately responsible for creating the conditions for, and providing the foundation of, a 'continuously improving' organization.

The information and opinions elicited from participants were examined in the context of the two competing aims of law school:

1) providing students with an academic background of legal theory; and
2) ensuring adequate training for the practice of law.

Determining the aims and objectives of legal education was critical to the analysis of what constitutes a 'quality' legal education in Canada. The teaching and learning dynamic in law school and the need for improvement had to be considered against the back-drop of whether law school should have an exclusively academic focus or whether there must be a practical skills component.

According to Green (1994) "It is a truism to say that ... quality is the touchstone of the 1990's". In examining how quality might be defined and assessed in the context of law school, the study drew upon legal education literature, research in the field of adult and

higher education and the theory and practice of quality management. Two key concepts were the 'commitment of continuous quality improvement' and the 'customer' or 'client' as the centre or standard in determining progress towards quality.

PROBLEM STATEMENT

What do lawyers as former students think, when reflecting upon their own experiences in law school, about the quality of their legal education at a university in Western Canada.

Sub-problems:

1) What specific elements are identified as being part of a high 'quality' law school program?

2) What significant formal educational experiences do participants identify as being associated with the 'quality' of their learning in law school and is this related to teaching strategies?

3) What are the significant "informal" educational experiences at law school which impacted upon the quality of the law school experience?

4) What do participants identify as challenges in legal education now, based upon their past experiences, both educational and professional?

SIGNIFICANCE OF THE RESEARCH

This study explored the over-all 'quality' of legal education at law school through analyzing the reflections of research participants about their legal education experiences at

the university level. Legal education, and the preparation of individuals for a career in law, has changed dramatically in the past few decades. In fact, McLaren (1985) who reviewed the history of legal education in common law jurisdictions in Canada, stated that it was not until 1950 to 1960 that legal education across Canada consisted of the present requirement for a minimum two year pre-law university education, followed by a three year law program at a recognized university resulting in a degree and further apprenticeship in some type of articling and/or bar admission program. The inclusion of legal education in a faculty at a degree-granting university and the requirement that students follow through with the specific steps outlined by McLaren are both relatively recent. This may in part account for the lack of formal research of legal education generally and specifically the quality of education received by law students in their required three year attendance at a law faculty in Canada.

A thorough survey of the literature revealed very little research in the area of legal education and even less which was specific to Canada. In addition, there were no studies found which considered the perceptions of graduates as to the quality of their legal education experience and the effectiveness of law school in preparing them for future careers.

This confirms the finding of Elkins (1985) that the study of legal education and the literature that has been written, fails in one significant respect,

> ... it ignores students, their experiences, hopes, dreams, fears and failures, their experience of profound personal change. We need to take seriously everyday routines which structure reality and define a student's life world. (p.55)

This study may help to address the lack of attention devoted to the student perspective by exploring the 'quality' of the over-all learning experience at law school through the recollections of former students.

In this way, the student's learning experience in terms of their own needs, both emotional and intellectual, their preferences regarding the teaching and learning dynamics and their own personal experiences in terms of both formal and informal learning opportunities at law school have been identified. Participants provided a unique perspective as that they drew upon both their experience as former students and also as professionals in their reflections upon the law school experience.

There was a need for education theory to inform attempts at improving the learning environment in law school. This included clarification of the aims and objectives of a quality legal education and recognition of effective teaching and learning strategies. This, in turn, required an over-all understanding of the education experience from the perspective of the law student, considering both the formal and informal learning opportunities which make up the totality of the law school experience. Finally, a plan for the ongoing (continual) improvement of legal education was considered as this constitutes a necessary element of Total Quality principles.

The more that is understood about how students learn and how they perceive a learning situation and over-all educational environment, the easier it will be to improve the 'quality' of education. This should assist in meeting the expectations of not only the learner but other interested 'clients' such as members of the legal community and society. The study aimed to increase what is known about learners in higher education generally, in addition to addressing the specifics of legal education. The study was important for the questions it raised and the need for further research of both a practical and theoretical nature it uncovered. This research may contribute to the further study of 'quality' education and the future exploration of the perceptions of students in their interaction with the legal education environment at law schools in Canada.

LIMITATIONS / DELIMITATIONS

Limitations of the Study

In any qualitative study there are definite limitations in terms of sampling, replication and generalizability. In this study the researcher worked alone and consequently it was only possible to canvass a limited number of participants. A further limitation was that the researcher was solely responsible for collecting and analyzing the data. This was partially addressed by working with a peer who was available to discuss the data analysis process and by keeping a research journal and noting personal reflections.

In addition, other researchers may have identified or selected different themes and commonalities from the data. Due to the amount of data in the form of transcripts, it was possible that some distinctions may have been superficially covered. For example, the themes compiled did not focus upon individual variables such as gender, ethnic background, socio-economic status, pre-law academic or work background and marital status. Specific characteristics of the individual were not matched to the comments made by that participant. In addition, other extraneous or unrelated incidences or personality characteristics may have affected the participant's responses in ways that cannot be entirely accounted for. These factors may have impacted unfavourably upon a participant's accurate or impartial recollection of the law school education experience.

Delimitations of the Study

This research was delimited to the study of legal education at law faculties in Western Canada. The participants were selected from former students who graduated with a law degree from a Western Canadian University within a specific time period (1985-1995). The study focused only upon the perceptions of former students and the data were compiled through requesting information from selected members of this group. Participants selected are not necessarily reflective of law students generally in Canada, nor even of Western Canada.

DEFINITION OF TERMS

As part of the framework of the study the definition of quality was not determined by the researcher in advance. During the conduct of the data gathering, participants were free to define a 'quality' legal education as it related to their personal experience of law school. The purpose of the research was exploratory, to discover the definition of quality from the perspective of law school graduates. At the conclusion of the research, quality, in the context of legal education could be considered as the preparation of the learners in acquiring the necessary knowledge, skills, and values to understand, cope with, and positively influence the environment in which they find themselves following graduation

For the purposes of this study the following definitions were used:

Formal Experiences: All activities required by registration in a course offered by the law faculty. This included class-room instruction and discussion as well as all activities required to successfully complete the course such as research papers, assignments, required moot court experiences and final exams.

Informal Experiences: All activities which students engaged in that are associated with the law faculty but students are not required to be participants in order to complete their studies. Examples include: participation in voluntary moot court competitions; volunteering at a Student Legal Aid (SLA); forming friendships; and other involvement in extra-curricular social activities whether strictly for fun or for more serious academic purposes (i.e. engaging in a study group).

Faculty: All instructors who taught courses offered by the law faculty during a university session. This included both full-time academic staff and part-time sessional/adjunct instructors.

Former Students: Graduates of a law faculty in Western Canada during the period 1985-1995 and participants in this research study.

ASSUMPTIONS

Four of the underlying assumptions of this study were:

1. That former students consulted possessed the ability to recall the necessary information to assess their law school experiences, make determinations in respect to the 'quality' of learning experiences and respond to the specific questions in the interview process. (i.e., that they were able to remember and accurately describe their learning experiences, providing distinct examples from their years at law school.

2. That the specific legal education terminology used by participants would have similar meaning when comparing comments of the participants. (ie. clinical education; moot court experience; substantive law courses)

3. That former students would be able to recall with some accuracy, learning experiences that took place from 1 to 10 years in the past.

4. That legal education programs in Western Canadian law faculties are similar enough in nature to warrant comparison of the comments of participants regarding their legal education experiences.

RESEARCH DESIGN AND METHODOLOGY

Introduction

What do lawyers as former students think, when reflecting upon their own experiences in law school, about the quality of their legal education at a university in Western Canada.

The purpose of this research was to better understand the legal education experience at law school. The research explored the experience of law students through the eyes of lawyers who were asked to reflect upon and assess the over-all quality of their law school education. This included consideration of: the purpose of law school; the teaching & learning dynamics; formal and informal learning experiences in law school; and ongoing issues in legal education.

As the research focused on the reflections of former law students and the subjective appraisal of their legal education experience, a qualitative research paradigm, informed by a phenomenological perspective, was selected as the most appropriate approach. Maykut and Morehouse (1994) contend that adherence to traditional methods of inquiry have limited educational research in the past particularly in respect to the subjective experiences of students. "Many scholars have called for the use of qualitative research to help us increase our understanding of human experience ...". (p.150) As the research study also concentrated on the personal interpretation of events that occurred in law school, it was important to take a phenomenological approach which "... is a focus on understanding the meaning events have for persons being studied." (Maykut & Morehouse:1994:p.3). The qualitative research approach included data collection through intensive interviews with former law students with resulting data being systematically transcribed and analyzed. The theory building which resulted was based on the intrinsic relationship between the data and the actual experiences of students.

As highlighted by Kirby and McKenna, (1989)

> The selection of the method is a critical aspect of researching and is usually based on what kind of information is sought, from whom and under what circumstances. It is important to recognize that methods appropriate for gathering abstract, theoretical information will not be equally appropriate for gathering subjective experience. (p.63)

For this reason a more traditional quantitative approach to research was not considered as the best method or paradigm.

Qualitative Research

The following characteristics of qualitative research as outlined by Bogdan and Biklen (1992) provided the basic framework for this study:

1) the research is descriptive in that it is rich in detail and description;

2) it is concerned with process rather than simply outcomes and products;

3) data are analyzed inductively; and

4) the participants' perspective, that is, how they make sense and meaning in their lives is an essential concern.

1) Research Approach

In order to understand the experience of others, one must be attuned to their view and perception of their experience and must listen to them as they tell their stories. Thus it was important to hear directly from law graduates in order to discover the subjective experiences. According to Borg & Gall (1989) "... much can be learned from human subjects simply by asking for their perceptions" (p. 386).

The research question was addressed through an exploratory study, using focus group and one-to-one interviews as a method to gather information from law school graduates. As part of the research design, participant involvement was initially generated through an informal discussion group to identify issues. This initial 'focus' group was essentially a

spontaneous gathering of lawyers without regard for background or group characteristics. The individuals met in a social setting with limited advance notice that they should come prepared to discuss their law school experiences. The group met informally for over an hour discussing their perceptions of law school. Limited guidance was provided by the researcher and participants set the ambit of their exchange. The dialogue helped the researcher to establish the framework of the study. Subsequent to this meeting, and based upon the notes taken of the discussion, the researcher was able to generate the questions which guided the subsequent focus group. The Focus Group Guide for Participants which was developed is contained in Appendix F.

For simplicity of terminology the initial discussion group, whether technically within the strict definition of a focus group, has been termed Focus Group #1. Questions were developed and tested in a second focus group and a verbatim transcript was made from a tape recording of this session. The group of law graduates who were convened by the researcher to purposely discuss their law school experiences will be referred to as Focus Group #2 throughout the thesis. The Interview Guide which was developed following Focus Group #2 is contained in Appendix G. This Interview Guide was used for all of the one-to-one interviews.

Finally twenty (20) one-to-one interviews were conducted to provide further data which was gathered by taping and transcribing the responses which participants gave to the questions developed and tested in the two prior 'focus' group sessions.

Focus Group #1 - followed the definition of Beck, Trombetta, and Share (1986) who described the focus group as "an informal discussion among selected individuals about specific topics relevant to the situation at hand" (p.73).

One of the characteristics that distinguishes focus groups from other qualitative interview procedures is the group discussion. The major assumption of focus groups is that with a

permissive atmosphere that fosters a range of opinion, a more complete and revealing understanding of the issues will be obtained. The goal of focus group interviews is to create a candid, normal conversation that addresses, in depth, the selected topic. (Vaughn et al: 1996:p.4)

The following is a list that Vaughn (1996) developed indicating common uses of focus groups. The first three examples are accurate descriptions of Focus Group #1 (*) and the last four are indicative of the purposes of Focus Group #2 (**) in this study.

(*) 1) Develop a general understanding of a target groups' perceptions of a specified topic.

(*) 2) Identify the language and key concepts that target groups use to discuss a specific topic or issue.

(*) 3) Generate research hypotheses that can be further developed and tested using other research approaches.

(**) 4) Field test a research procedure, measure, or reaction to a set of research procedures that the researcher intends to implement.

(**) 5) Solicit ideas that relate to the topic of interest to determine whether the identified research questions are complete and represent those that are viewed as important by key stakeholders ...

(**) 6) Key ideas that relate to the topic are identified. The importance or significance of these key ideas can be described.

(**) 7) How strongly the participants feel about these key ideas can be identified ..." (Vaughn et al: 1996 at 40)

The one-to-one interviews helped the researcher collect more individualized accounts of law school without the influence of other participants. Interviews are a special form of interaction between people, the purpose of which is to elicit information by asking questions. (Kirby and McKenna: 1989 at p. 66). The "Interview Guide", which was used in all one-to-one interviews, was a series of questions developed on the basis of issues

identified in Focus Group #1. The questions were then 'tested' in Focus Group #2 and found to generate information which directly addressed the research question. A copy of the "Interview Guide" is located in Appendix "G".

2) Data Collection

In the study the data gathering process was only partially structured so that the participants were able to freely discuss their experiences. All data was gathered through either group or one-to-one interviews with former law students. After the initial Focus Group #1 was conducted, where the only criteria for participation was attendance at law school in Canada, all subsequent participants that were selected had at least one year of work experience following graduation and no participant had been out of law school for more than 10 years.

All participants in Focus Group #2 and the one-to-one interviews were former students who graduated with a law degree from a Western Canadian University between the years 1985-1995. The study considered only Western Canadian Universities as former students were accessible and the researcher was familiar with members of the bar in three of the four Western provinces. Participants selected were available for in-person interviews in two cities in Western Canada, which would not have been as easily accomplished had a broader selection of law schools in Canada been selected for inclusion in the study.

The Researcher

The researcher is a Masters student in Education at the University of Alberta and a lawyer in Alberta (non-active) and British Columbia (practicing). In addition, the researcher has taught as a sessional instructor at two universities in Western Canada.

Participant Selection

The data were gathered through qualitative methods - two focus groups and twenty (20) one-to-one interviews. In order to answer the research question it was important to "select

information rich cases" (Patton:1990:p.169). Purposive rather than random sampling was therefore selected as appropriate. "By purposely selecting a wide range of subjects ... the qualitative researcher will be more likely to uncover the full array of "multiple realities" relevant to the inquiry. (Borg & Gall:1989 at p.386).

Focus Group #1 was primarily an ad hoc discussion group where the only criteria to 'qualify' individuals to participate was that all individuals had graduated from a law school in Canada. Most of the participants were acquainted with each other although the researcher had only met three of the eleven individuals prior to the session.

Contacts made with participants in Focus Group #2 and the one-to-one interviews were made initially through a "snowballing" technique. "This is a technique used to identify individuals who might be interested in participating in your research. Each person you survey or interview, for example, might be asked to identify another person who could be contacted." (Kirby and McKenna:1989 at p. 99). Participants selected for Focus Group #2 and the one-to-one interviews were also chosen through purposive sampling. While a 'snow-balling' technique was used to gather potential contacts, individuals were ultimately selected in order to provide at least a representative number of female and male participants. Additional criteria used by the researcher in selecting participants are identified below:

Criteria for Focus Group #1: Focus Group #1 was set up with minimal involvement on the part of the researcher. The only requirement was that all members of the focus group had attended law school in Canada. There were eleven participants in Focus Group #1. The participants ranged in legal experience from one articling student through to a person who graduated in the mid-1970's. Participants had worked in a variety of areas of law and for a broad range of law firms. A couple of participants had already left law and were practicing alternate careers. This included one participant who had chosen not to article following law school.

Nine of the eleven participants had been "called to the Bar" and were able to practice law in some province in Canada. A couple of participants were qualified to practice in more than one province. The participants were all currently working in a Western Canadian province, however, they had graduated from law schools across Canada. The discussion which was generated in this session was completely unstructured and spontaneous. The researcher played a minimal role in facilitating the discussion. Focus Group #1 was not taped - notes were kept by the researcher of key issues raised by the group.

Criteria for Focus Group #2: A screening procedure was developed to aid in the selection of the specific participants for the structured focus group interview. There were ten individuals scheduled to attend which included an even balance of female to male although one individual (male) was unable to attend and notified the researcher on the day of the Focus Group. The remaining nine participants were representative of a range of ages (both now and at the time of entering law school) and possessed a broad spectrum of career experiences following graduation. This included work experience as government lawyers, non-practicing and practicing lawyers and two individuals who had left the practice of law. Those participants in the group who were still practicing law included representation from sole practitioners and individuals who worked either as partners or associates in small, medium and large-size firms. All participants were graduates of the same law faculty within a two year time period.

Criteria for One-To-One Interviews: Twenty, semi-structured interviews were conducted using similar criteria to select participants. There were only two differences in criteria between Focus Group #2 and the One-to-One interviews:

1) Participants in the interviews came from a range of law schools in Western Canada; and
2) Participants had graduated over a ten year time period.

In setting up the interviews, individuals were contacted by the researcher using names provided by other participants or through personal contacts in the legal profession. The participants were screened to some extent so that there was representation for year of graduation. The average year of "call to the bar" was five years prior to when the interview was conducted although there was a range of participants over the full ten year period. There was also an attempt to include participants from as many Western Canadian Law Schools as possible and 4 out of the 6 schools had a graduate interviewed in the study. Participants were also selected to represent a mix of non-practicing and practicing lawyers. Work experience included practice in large, mid-size and small firms as well as in government and other organizations.

Contact With Participants: Each participant in Focus Group #2 and the individual one-to-one interviews were contacted by telephone and asked if they would be willing to be interviewed about their experiences in law school. The formal telephone request and confirmation letter are attached as Appendices "A" and "B". All of the individuals who were contacted agreed to participate if they were available in terms of time. There were eleven participants in Focus Group #1 and nine participants in Focus Group #2 making a total twenty former law students who participated in the two focus groups. There were twenty additional participants in the one-to-one interviews in the study. The following observation by Patton (1990) was helpful in determining the appropriate sample size:

> ... validity, meaningfulness and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the observational/analytical capabilities of the researcher than the sample size. (p.185)

In summary, the criteria used to select participants in Focus Group #2 and the one-to-one interviews were individuals:

a) who had graduated with a law degree from a university in Western Canada within the past decade;

b) who were able to attend interview sessions in either of two urban centres in which the researcher conducted in-person interview;

c) who reflected a variety of individual realities through diversity of personal characteristics including representation from both genders, they were of different ages and possessed a broad range of educational and work experience; and

d) who were able to discuss and articulate their ideas and thoughts, and were available and willing to participate in the study.

The primary purpose for using these selection criteria was to ensure that a cross-section of lawyers participated in the study. The researcher wanted participants who following graduation had experienced a variety of work situations as this could affect the reflections that the person had on the learning experience and therefore influence their perception of a quality legal education. The length of time that had elapsed since graduation, and other personal factors (ie. gender) may have also influenced perceptions of the quality of legal education. Participants were selected, given the restriction of the sample size, to reflect as wide a variety of personal frames of reference and experiences as possible. The aim was to gather a broad range of perceptions of a quality learning experience in law school.

Data Collection Procedures

Research was carried out in a natural setting. The one-to-one interviews were conducted wherever it was convenient for the participant. Locations included: law offices; the court-house; restaurants; and private residences. Focus Group #1 was conducted at a restaurant in a secluded seating area and Focus Group #2 was held at a private residence.

The data were gathered directly from the people who had the necessary information to address the research question. The fact that the researcher is also a lawyer and former law student helped in accessing the individuals who could provide the necessary information.

According to Kirby and McKenna (1989), "If you are a member of a group from whom you seek information, your access to them (the participants) is different than an unfamiliar researcher's would be". (p.103)

Good rapport was critical and was fostered by a straightforward introduction of both the research focus and the researcher's background. Information that would ease a participant's concerns was provided. This included details such as confirmation of meeting dates and times by telephone and by mail where possible. All participants were informed that arrangements could be made following their interview or focus group session for further comments. Participants were also given the opportunity to review their transcripts, however, no one chose to exercise this option. A brief explanation of how the data would be used was provided to all participants and further information was given if requested.

3) Data Analysis

As is characteristic of qualitative research, the primary data-gathering 'instrument' was human contact which was initiated by the researcher. The researcher used two primary types of data collection methods:

I. Focus Group Interviews:

Unstructured Format (Focus Group #1) - Notes taken

Semi-Structured Format (Focus Group #2) - Tape Recording

II. One-to-One Interviews:

Semi-Structured Format (All Interviews) - Tape Recording

All one-to-one interviews and the Focus Group #2 session were tape-recorded and verbatim transcripts were made. As indicated earlier, the researcher prepared general notes following Focus Group #1 and these were used primarily to identify specific themes for further exploration in future data collection. Very few complete quotations were gathered from Focus Group #1 but it furthered the research design by providing an initial survey of the area.

Tape-recorded sessions were listened to several times by the researcher although verbatim transcripts were available. Auditory review of the responses helped to provide a better appreciation of the speakers' inflection and the emotive content of the data. Transcripts were also reviewed in detail and key phrases and ideas in response to each question were highlighted. This process identified the repetition of themes and areas where there were commonalities in the participants experiences. Borg & Gall (1989) have set out the process of inductive data analysis as follows: "the qualitative researcher studies the data inductively in order to reveal unanticipated outcomes. In other words, the qualitative researcher first gathers the data and then tries to develop understanding and draw generalizations" (p.386).

Once the data from the transcripts had been reviewed numerous times and themes identified, a summary of the content for each participant was charted. The summarized responses were then organized under specific issues in Table format. This led to further revision and clarification of the key themes. The literature was then reviewed in greater detail to provide further support or commentary on the findings. Finally specific quotations from the transcripts were identified and selected as being the most representative of either a general theme or an individuals unique ('negative') or contrary perspective.

Initially the number of themes identified was expansive with many different categories. According to Maykut and Morehouse (1994) it is quite typical for the initial review of the data to reveal numerous potential categories. "The number of categories derived from any particular data set will depend on the focus of inquiry, the type(s) of data collected and the analytical skills of the researcher" (p.138).

It was necessary to develop a number of propositions that helped define categories in order to combine similar data and limit the number of themes. Propositions were useful in

this exercise which followed the research definition of Taylor & Bogdan (1984) who stated that, "A proposition is a general statement of fact grounded in the data" (p.134). Propositions provided the rules for inclusion and helped to reduce the data to a manageable proportion and to better convey the meaning of the data. Data generally was consistent, however, whenever participant comments did not fit a category or theme (negative instances) there was an attempt in the research to give 'voice' to the dissent. Otherwise in accordance with Taylor & Bogdan (1984) "... propositional statements (were derived) from a substantial accumulation of the positive instances" (p. 134).

4) Ethical Considerations

The following measures were taken to address the ethical concerns in respect to the study:

1. The study was approved by the Department of Educational Policy Studies' Ethics Review Committee.

2. Each participant was advised by the researcher as to the purpose of the study, the degree of commitment required, the specific activities that would be involved, how the data would be used and the ethical standards of the study. This was to ensure that the participants were clearly aware of the nature and purpose of the study.

3. Participation in the study was voluntary and prior to becoming involved, each participant was asked to sign a consent form. The 'Participant Agreement Form' which was used is included in Appendix "H". All participants were informed that they had the right to 'opt out' of the study at any time and that any identifying information in the study would be kept anonymous and confidential. If participants had any questions or concerns with the study, they could contact the researcher or the researcher's advisor at any time. All materials generated from the research were kept secure when not in use. Following completion of the study, the tapes and any identifying documentation or notes will be destroyed.

SUMMARY

This study collected and reviewed the comments of law graduates who were asked to reflect upon the quality of the education they received at law school. This included their perceptions of their legal education experiences in light of their later professional life. While at law school, students can generally provide immediate feedback at the end of a specific course particularly in respect to evaluating the calibre of instruction. However there are few if any opportunities to consider the overall quality of a students education experience.

There has been even less occasion for former students, who have had to use the education received in their professional career, to later provide feed-back on its quality. This study allowed participants to reflect, assess, and comment upon the years of pre-professional education they received at university. In this study, former students were able to consider their law school education from a broad perspective.

Questions asked allowed them to reflect and comment upon:

1) their over-all educational experience;

2) their specific recall of a variety of teaching-learning dynamics in both formal and informal situations; and

3) their present concerns about issues in legal education with an opportunity to consider necessary improvements for improving the quality of legal education in the future.

Chapter 6 - "Conclusion" follows the four data analysis chapters and provides an over-all summary of the research and recommendations.

ORGANIZATION OF THE THESIS

This research study, which was an initial foray into a hitherto unexplored area, compiled and analyzed the perceptions of selected alumni who graduated from university law programs in Western Canada between the years 1985 to 1995. The focal question of this study was: "What do lawyers, as former students think, when reflecting upon their own experience in law school, about the quality of their legal education?" Further sub-questions were developed to elaborate the research question. The responses to these questions resulted in the identification of four themes.

These themes were:

1. the purpose of law school which included 'learning to think like a lawyer';
2. teaching and learning dynamics and formal learning experiences;
3. informal learning in law school; and
4. issues and future direction in legal education.

Each of the themes is explored in a separate chapter together with an analysis of data associated with the theme, coupled with a review of the relevant literature. Included within each chapter are numerous verbatim excerpts from the transcripts of Focus Group #2 and the one-to-one interviews. The quotations are interwoven with references to research in higher education and literature specific to legal education. Providing the actual words of the participant in respect to key themes helped to illustrate the discussion of the research findings and education literature. In reading quotations the following guidelines apply:

Focus Group #1 - Individual participants are not identified although if there is a direct quotation then quotation marks " " will indicate the phrase.

Focus Group #2 and One-to-One Interviews - Participants are identified by pseudonyms used when there a direct quotation, indicated by quotation marks " " was made, or with reference to the summarized response of a specific participant. (i.e., "Mable")

CHAPTER 2

ELEMENTS THAT DEFINE A QUALITY LEGAL EDUCATION

INTRODUCTION

Quality in Higher Education:

Quality has been undeveloped as a concept in higher education and there is considerable uncertainty about how to define, or discern a quality educational "product." (Yorke:1992) When higher education institutions were examined in the United Kingdom, quality was defined as, "... the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs ... (it is) the extent to which a program of study satisfies its customers' expectations." (p.91) The key feature in assessment was consideration of the expectations of the consumer. This has been a fundamental tenet of the literature on quality that the customer has a right to set standards.

Unfortunately this does not resolve the issue in higher education as it is not readily apparent who the customer of higher education is. Yet, the answer to this question has serious ramifications for the way that quality is defined. As was indicated in Chapter 1, there are three primary groups who are perceived as customers of legal education. First, the members of the profession as represented by the Law Society. Second, all members of Canadian society, who as a whole have a legitimate interest in the outcome of the legal education that law students receive. Finally the law students themselves are the third group and they are the most directly effected customers of legal education. In another sense they are also a "product" of the higher education system in that they are transformed by the education they receive. (Yorke:1992)

Information in this study was gathered from one of the affected groups of consumers - lawyers. Participants were encouraged, however, to adopt a dual perspective when responding to questions about their own legal education experience. They were to provide their perceptions as former law students, yet in the context of their current situation as a practicing lawyers. By viewing the law school education process as it had been experienced by law students, yet canvassing this information from lawyers in practice, it was possible to access two of the three "client" groups. It was beyond the scope of this research to consider the views of the third client group - the general public - in respect to the pre-professional education of lawyers.

Aims and Objectives - The Purpose of Law School

In order to explore the quality of the legal education experience it was important to first establish what the former students had expected law school to be. This was accomplished by identifying; a) why the participant choose to go to law school; and 2) what the participant had thought they would or should accomplish during the three year program.

DEVELOPMENT OF THE QUESTIONS

The over-all purpose of law school was discussed in Focus Group #1. Comments made by participants suggested that the law school experience had not matched their expectations. Two questions found useful as probes in Focus Group #1 and used again in Focus Group #2 and the one-to-one interviews to explore the dichotomy of experience versus expectations of participants were:

Question 1: Why did you decide to attend Law School?

Question 2: What do you think is the purpose of Law School?

A second issue that arose from Focus Group #1 was the fact that members of the group were not always talking *ad idem*. Often the same terms were used by the participants but it was clear that these terms were used to describe very different experiences. The participants in Focus Group #1 came from law schools across Canada and had graduated over a twenty year period. Students from the late 1970's and early 1980's generally agreed that law school should be more practical. They were basing this belief upon the curriculum of their law school years which in most cases was entirely academic in nature. A few of the more recent graduates (1990's) commented that law school should be less practice oriented, however, they had generally experienced a much larger practical component which often included the option of clinical experience.

Two additional questions were therefore developed to provide a more accurate understanding of a participant's comments on their law school experiences. The exploratory questions were open-ended and invited each participant to describe critical elements of a quality legal education. The two questions were:

Question 3: What do you think is a necessary part of an excellent legal education?

Question 4: What was the most important thing you came away from Law School with?

In order to define or assess quality in legal education, it was imperative to first determine the purposes or aims of a law school education. Participants in Focus Group #1 were allowed to explore this issue - the purpose of law school - with very little structure or direction. The discussion was animated and often vacillated between the actual purpose of the law school education as it was experienced, as opposed to the ideal outcomes that participants expressed. The diversity of the opinions reflected a very similar and ongoing debate in the broader legal education community.

It was the opinion of most Focus Group #1 members that the purpose of law school was to prepare students for the practice of law. The opposite view was also expressed by a minority who argued that law schools were not, and should not be tied to the "training" of future lawyers. Only one person was so extreme as to insist that there be NO practical application whatsoever. He supported this view by insisting that a law degree, as part of the university general education, should simply be completely academic in nature. Other participants, however, agreed that a law degree should prepare a student, at least in part, for their future role as a lawyer. There were divergent opinions on what aspects of "lawyering" should be included in the law school curriculum and whether the focus should be primarily academic or practical.

Participants in Focus Group #1 unanimously recognized that the majority of students do go to law school with the intention of becoming practicing lawyers. Further it was agreed that for most students law school provided the necessary educational foundation for the individual to begin their professional training to become a lawyer. Beyond this, however, there was a broad range of opinions as to what law schools should do in order to best prepare students to enter the practice of law. Most of the discussion focused on the issue of the appropriate mix of theoretical and practical courses and also on the means that instructors choose to meet both the espoused and unintentional objectives of a law school education.

When Focus Group #1 discussed their law school experiences, they frequently used the expression, "I learned to think like a lawyer." It seemed that this was viewed as one of the main objectives or outcomes of a proper legal education. It was apparent, however, that members of the group were not able to define this phrase with any clarity. In fact, they were somewhat surprised when asked how law school achieved this objective.

Although participants disagreed on whether "thinking like a lawyer" was a positive attribute (i.e., a necessary skill-set of a lawyer) or whether they perceived it much

more negatively (i.e., as a narrow and limited view of the world) it was apparently critical terminology in describing the law school experience. In fact, no matter how the individual defined or interpreted the phrase, it seemed to correlate directly to the participant's perception of the predominant or over-all outcome of a legal education. When the phrase, "learning to think like a lawyer" was used, it seemed to be a short-hand way of expressing the educational process that the law student experienced in becoming a lawyer. In order to use the words of the participants and explore this concept further it was important to ask Question 5 and to use probes to uncover the role that law school played in developing this attribute or skill-set. The question and probes developed to gather this information were:

Question 5: What does the phrase "to think like a lawyer" mean to you?

Probe: Did Law School teach you to do this?

Probe: How does Law School teach you to "think like a lawyer"?

Responses to Question 5 in respect to "thinking like a lawyer" compiled similar responses from Focus Group #2 and the one-to-one interviews as had been expressed in Focus Group #1. All answers were closely associated with the participants overall perception of the purpose of law school.

PARTICIPANT RESPONSES & ANALYSIS:

1) Why did you decide to attend Law School?

Focus Group #2 provided a mixed response to the first question. There were as many different motives for attending law school as there were participants. Reasons for going to law school that were not associated directly with becoming a lawyer included: general interest; curiosity; and one person ("Jake") who stated that he

simply went to law school because; "I thought it might be interesting and I really had nothing better to do at the time."

Many did express that their primary goal was to become a lawyer. Other factors which influenced individuals in their decision to attend law school included:

1) having family members who were lawyers - ("Dawn") " ... it is a family business, if I wanted a piece of it, I had to be a lawyer ..."; and

2) altruistic motives such as those expressed by ("Mary") who indicated that she desired, "... to help people ..." and by ("Joan") who stated that she "... went to law school to contribute more substantially to social justice".

Ironically, one participant ("Brad") who had not wanted to become a practicing lawyer when he chose to go to law school, stated that he "... failed miserably in that goal because I am a lawyer". In contrast, another participant, "Ella" who stated that she had wanted to be a lawyer since she was 12 years old, had chosen since graduation to leave the practice of law. In fact later in the session she claimed that she would not even recommend that someone like herself go to law school. "Don't go. Do something else! ... I don't think it was worth the time and the effort. I don't think I learned anything I couldn't have learned other places, by going to law school. And I found out at the end that I didn't want to be a lawyer." According to this viewpoint, unless the individual actually practiced as a lawyer upon graduation, a law school education was not an experience to be recommended.

The participants were never asked directly whether they attended law school with the aim of becoming a lawyer. The actual question was open-ended: "Why did you decide to attend law school?" In response, participants often gave more than one reason. The statements made, however, often assumed that becoming a lawyer was a given so it was unnecessary to include this in the response. For example, ("Mary") had stated that she "... wanted to help people". Presumably she meant as a lawyer, but this was not made explicit in her answer.

Based on the majority of responses, it seemed that most of the participants expected to become lawyers and enter active practice following law school. In 1996, "The Canadian Lawyer" magazine published the results of a cross-Canada survey of law school graduates (1992-1995). One of the questions in the Canadian Lawyer survey was whether it was the role of law school to prepare students for a career as a practicing lawyer. Black (1996) reported that "Just over 72 percent said "yes," (which was) a sharp jump over (the) 1991 response rate of 54 percent." (p.16). In the most recent (1997) Survey, Black (1997) stated that the figure has again increased, with 77 percent answering in the affirmative. Unfortunately, only a bare majority indicated that law schools in Canada succeeded in that goal and "... 47 percent rendered an emphatic "no" according to the survey. (p.18)

In this research study, most of the participants also indicated that they entered law school intending to become lawyers and they had expected that a legal education would prepare them for the profession of law. Whether or not this is part of an increasing trend noted by Black (1996) in the Canadian Lawyer survey, the numbers of students who expected a law degree program to be in the nature of pre-professional training was certainly significant. This commentary of respondents in the cross-Canada surveys and the participants in this study reflected not only the perception of graduates in respect to the aims and objectives of law school but also their assessment of whether the law school met the needs of the student.

Black (1997) stated in her report that:

> ... (the) ongoing debate in law schools is whether they should be more like trade schools. Most graduates stick to the view that law schools should aim to be vocational institutions rather than purely academic ivory towers ... As we noted last year, many graduates felt law schools have failed to find an appropriate mix between the practical skills that should be taught and the black-letter theory of law. (p.18)

Law schools must decide if they will accommodate student expectations in determining the purpose of a legal education. In setting the aims and objectives, the law school must consider whether these should be consumer-driven. If yes, then the

key consumers of legal education must be identified. Is it the public who need legal services? Is it the Law Societies as representatives of the profession? Or is it the student who experiences directly the consequences of the choices made about the purpose of a legal education? The law faculty of the future may have to address the needs and expectations of all three of these client groups.

Determining the proper aims and objectives of legal education in Canada has been the subject of ongoing debate. This issue has not been settled and now the additional factor of a rapidly changing world must be taken into account when answering this question. The perceptions of the student body simply reflect, in part, the current economic climate and demands that higher education be relevant in terms of developing marketable skills in a highly competitive job market.

Renner (1995) cautioned that a common mistake of higher education is to prefer theoretical over practical education. According to Renner (1995) this must be remedied in these demanding times, if a university education is to remain a desirable option.

> Higher education continues to separate learning from living at the very time when the rate of social, cultural and technological change makes it even more important than ever to reduce such temporal delays between learning and living.
>
> Education implies learning how to think in order to be able to do. Training implies learning how to do in order to be able to participate, and belong, and through this process learning to think. Change is happening too fast for learning to be for tomorrow; it must be for now if it is to reach the now generation. (p.100)

"Quality" even at the academic level in university must in part be measured by the needs and expectations of students in the context of the greater society according to Mayhew et.al.(1990) and Green (1994). Very few participants answered that law was a choice based solely upon altruistic or educational aims. It was recognized as a professional degree and the desire to attend law school was generally motivated, at

least in part, by the acquisition of a professional designation following graduation. While only a couple of participants expressed the strictly pragmatic view of "Dennis" that law school should have no pretensions beyond being a glorified trade school, there were several individuals who criticized the fact that their legal education experience had been too theoretical and had not prepared them adequately for the practice of law.

Table 2-1 which follows provides a break-down of reasons for attending law school comparing the responses of participants in this study with the 1996 cross-Canada survey of law graduates (1992-1995) conducted by the Canadian Lawyer magazine. It is important to note that both the Canadian Lawyer survey and the one-to-one interviews allowed respondents to give more than one reason for attending law school so percentage (%) numbers do not total 100%. No statistics are provided for Focus Group #1 as participants simply discussed generally their reasons for attending law school. Focus Group #2 participants each gave one response for attending law school which are recorded below.

TABLE 2-1. Responses to Question: Why did you go to law school?

COMPARISON WITH RESPONSES FROM FOCUS GROUP #2:

(Black:1996:23) Survey Results **(Davis:1996) Participants**

Canadian Lawyer Survey (1996)		Focus Group "2" - Number of Participants	
Long-term interest in law:	33%	Long Term Interest:	(1)
Intellectual appeal:	31%	General interest:	(3)
Financial rewards:	23%		
Prestige:	18%		
Chosen by default:	14%	Chosen by default:	(1)
Job security:	12%		
Family influence:	8%	Family influence:	(1)
Enhance a non-legal career:	6%	Career move:	(1)
		To help people:	(2)

TABLE 2-2. Responses to Question: Why did you go to law school?

COMPARISON WITH RESPONSES FROM ONE-TO-ONE INTERVIEWS:

(Black:1996:23) Survey Results **(Davis:1996) Participants**

Canadian Lawyer Survey (1996)		20 One-to-One Interviews - Number and Percentage of Participants	
Long-term interest in law:	33%	Long-term interest:	10% (2)
Intellectual appeal:	31%	Intellectual appeal:	25% (5)
		Specific legal area:	15% (3)
		General interest:	5% (1)
Financial rewards:	23%	Job Opportunities:	10% (2)
Prestige:	18%	Honourable career:	5% (1)
Chosen by default:	14%	Chosen by default:	10% (2)

Canadian Lawyer Survey (1996) Table 2.2 (cont.)		20 One-to-One Interviews - Number and Percentage of Participants (cont.)	
Job security:	12%		
Family influence:	8%	Family influence:	15% (3)
Enhance a non-legal career:	6%	Career move:	5% (1)
		To help people:	20% (4)

Table 2.1 and 2.2 illustrates many similarities between the types of responses generated by the two studies. One notable difference was the number of participants who expressed a long-term interest in law. A much higher percentage is reflected in the cross-Canada survey. Possibly this included numbers relating to a significant category that was missing from the Canadian Lawyer survey.

A number of participants in the one-to-one interviews and the Focus Group choose to attend law school in order to "help people". This was the second largest number of responses in the study to the question - Why did you attend law school? As there were no recorded responses of this nature in the cross-Canada study, it is likely that it was simply not an option that respondents could select in the multiple choice format of that survey. This motivation of students suggests that while participants are anxious for law school to prepare them for a career in law, they may not necessarily be motivated by strictly monetary concerns. In fact, the responses suggest that law schools needs to address the practical skills within the curriculum in order to provide students with the means of fulfilling dreams which are just as likely to be altruistic in nature as driven by financial considerations.

Tyler (1949) in a seminal work on curriculum and instruction identified four fundamental questions which must be answered by any higher education institute in developing an educational program:

1. What educational purposes should the school seek to attain?

2. What educational experiences can be provided that are likely to attain these purposes?
3. How can these educational experiences be effectively organized?
4. How can we determine whether these purposes are being attained?

DeVries (1996) stated that the "... objectives-based approach to quality assessment has undergone several metamorphoses since Tyler in 1950 [sic] advanced the idea that objectives should be specified in behavioral terms." (p.193) Yet these principles are still useful in setting standards for a quality education. By addressing the first question, in particular, the law faculty could help in identifying the governing aim of a quality law school education.

Failure to clearly define the purpose of an educational program is a serious yet common problem. This issue was particularly evident in legal education where identifying a common ground in terms of aims and objectives has become an area fraught with turf-wars and strongly divergent opinions on the purpose of a law school education. However, simply ignoring these issues means that the law school flounders without the guidance that has been identified as necessary to ensure a quality education experience. In the words of Tyler (1949) "... if an educational program is to be planned and if efforts for continued improvement are to be made, it is very necessary to have some conception of the goals that are being aimed at." (p.3)

Tyler (1949) wisely recognized that "... in the final analysis objectives are matters of choice, and they must therefore be the considered value judgments of those responsible for the school." (p.4) In determining the guiding values, however, Tyler stressed how important studies of learners can be as a source of educational objectives. The objectives must be considered in terms of student "needs" recognizing identifiable gaps in knowledge, attitudes and skills between desired or acceptable norms and actual behaviours and attitudes of students. While some have criticized that

defining the aims and objectives of legal education would diminish the ability of the law school to teach intangible skills and sophisticated theory, others have recognized that "... (t)he purpose of the objectives is not to limit the educational process but to define it. Students are entitled to know what the teacher expects." (Rayson & Tyree:1991:p.255)

Participant responses to the following question helped to identify their perceptions on the objectives of law school. The comments of participants provided insight to the reality of the law school experience in terms of what individuals had thought the requisite objectives of law school were. In addition, many remarked on the expectations and "ideals" they held as students when they entered law school concerning what they had thought "should" have been the aims and objectives of the law school.

2) What do you think is the purpose of Law School?

According to Focus Group #1 the primary purpose of law school was to train students to become lawyers. The participants of Focus Group #1 also pointed out that unfortunately this "purpose" may not be shared by many academic instructors particularly those who had never practiced law.

While participants identified that the purpose of law school was to prepare students to become lawyers, it was generally agreed that the law school's performance in this respect was mixed. Law school did fulfil a valuable role in legal education but it did not "prepare" graduates for the day to day practice of law. In Focus Group #2, "Ella" stated that "... I still felt when I left Law School that I hadn't been prepared for practice". "Mary" responded to this statement by saying that,

> I think Law School prepares you to practice law the way elementary school prepares you for high school ... there's a big piece that's missing in the middle that you sort of have to sort out on you own ... after you graduate.

Most participants in Focus Group #2 agreed that this was an accurate assessment of the situation. Law school gives some of the knowledge and skill-set to become a lawyer but it does not complete the education process.

The following Table 2.3 sets out the summarized responses of participants in the one-to-one interviews regarding the purpose of law school from two perspectives. Both perspectives are included because one of the interesting outcomes of this question was the fact that participants often responded by enquiring first whether they should answer in terms of: What the purpose of law school "IS" or "What the purpose of law school "Should Be". In these situations, participants were encouraged to give both responses.

NOTE: Where participants were speaking of what they would like to see in terms of aims and objectives the "Should Be" responses are noted in *italics*.

TABLE 2.3 - Summarized responses from one-to-one interview participants to the question: "What do you think is the purpose of law school?"

Name	**Purpose of Law School - "IS" - *"SHOULD BE"***
Heather	Teaches a way of thinking which is unique to law school. Provides grounding in core subjects and legal analysis.
Peggy	Tends to get students ready for the business world. Students simply want to make money. *Thought law school would be a general education directed at teaching people to think for themselves.*
Brian	There are two goals that are in conflict: 1) providing a general education which continues the liberal Arts tradition; and 2) training those students who will enter the profession.
Peter	Law school is a trade school and a delay in entering the "real" world. *Practical skills are necessary and interaction with practitioners should be included.*

Table 2.3	Purpose of Law School - "IS" - *"SHOULD BE"* (cont.)
Richard	Teaches a way of thinking. Teaches a body of knowledge. Not clear whether purpose is to produce lawyers or academics. *Thought law school would teach students to be lawyers.*
Victor	Teaches about law and to think like a lawyer.
Casey	Law school is training for hierarchy - basically setting up a rationale for hierarchies and calling them meritocracies. *Lawyers perform a "non-function" in society. The time in law school would be better spent educating people on the types of matters that bring people into dispute and learning how to mediate rather than simply learning about imposing "solutions" on people in the present judicial system.*
Janet	Provides a general education in every area of law. Teaches the ratio of many cases - simply memorization and regurgitation of basic law concepts. *Thought the purpose was to teach students how to be lawyers. It should teach you to be open-mined, use analysis & advocate - seeing both sides of an issue. Should also focus on people-skills.*
Penny	Teaches people to think like lawyers. What law is/how it works and how disputes are settled.
Benjamin	Prepares you to be a lawyer. You come out of law with certain thought processes, a general understanding of the law and it's application in the modern world.
Dennis	Law school is a rating system, a screening device with an intellectual veneer. It restricts the number of people and the type of people who will graduate and become lawyers. *Should be shorter (1 year) trade program to learn the basics, the "mechanics" of law.*
Jonathan	Provides a basic knowledge in all areas of law. Abstract thinking, context of law and theoretical under-pinnings are also part of law schools purpose. *Should also give a sense of what lawyering will be like and some career focus.*
Raymond	Teaches a way of thinking - "Brainwashing" The necessary background in substantive law is accomplished in first year. Too much time is spent on arcane knowledge. *Should be shorter (2 years) and more practical.*

Table 2.3	Purpose of Law School - "IS" - *"SHOULD BE"* (cont.)
Beatrice	Students learned to lose respect for future clients and because law school itself is so competitive, it is difficult to create ethical and empathetic lawyers. Majority of students ended up believing in a type of "survival of the fittest" world. *Law school should produce a lawyer who not only appreciates the power of law over peoples lives but is also able to use the law for the betterment of society.*
Lynne	Provides legal background and an approach to the law. The basic building blocks. How to think as opposed to how to practice. The option of practical courses are available.
Mable	To think in a certain way. *Should be more practical because most people expect to be lawyers.*
Natalie	Should be academic orientation and not too concerned with practical. Possibly in the third year offer practical component.
Charles	Trains people to be lawyers, at least in part. How to analyze issues and start thinking like lawyers. Provides basic legal background.
George	*Thought the purpose of law school was to train students to be lawyers.* Now think purpose of law school is provide a broad back-ground for many careers. Teaches an analytical way of thinking.
Timothy	Trained students to think (yet also stifled their creativity). It is a trade school despite what people say because most students become lawyers, but it's very academic and not very practical in orientation.

The participants in the one-to-one interviews basically identified three key purposes of law school:

1) teaches a certain way of thinking;

2) covers legal subject matter through substantive law courses; and

3) prepares students for the practice of law.

The majority of participants (eleven) perceived that the primary role of the university was to teach a certain way of thinking. This was often referred to as the ability to

"think like a lawyer" and included the skill of legal analysis. The other two purposes were given equal recognition. Seven participants identified that law school teaches substantive law and provides basic legal knowledge in core subjects. Law school was also seen as having a role in preparing students for practice although the specifics of how this was done were varied and included references to the acquisition of analytical skills and knowledge of the law which were both part of the first two categories.

Of the ten interview participants who chose to consider what they felt the purpose of law school "should be" seven felt that law school should be more oriented to teaching students about the practice of law. This ranged from learning the basics through to more interaction with practitioners and the opportunity to learn and practice specific skills. Only one participant felt that law school should be more academic and have a less practical orientation. Black (1997) related similar quotations from her own study, including the following, "Law schools should train lawyers to practice law, serve their clients and earn a living". (p.18)

Participants did not go so far as to suggest that the role of law school should simply be the preparation of students for the day to day practice of law. In Focus Group #1 there was strong sense that it was not enough to teach practice-oriented courses only. It was considered necessary to include the philosophical underpinnings of law in a quality legal education. The educator should provide a broad context to the subject matter and not present only those legal principles and skills required in the practice of law. Although the group recognized that the "average" student may not see this as being relevant at the time of instruction, in retrospect most participants in Focus Group #1 agreed that it was an important part of their legal education and should be considered as an essential purpose of law school.

Focus Group #1 participants recognized that law school must provide basic grounding in substantive law, with a primary focus on analytical skills to prepare students for practice.

Focus Group #2 participants agreed that the purpose of law school was to teach general legal principles and provide an over-view of the key areas of substantive law. They also identified that law school plays a role in affecting significant behavioral change in respect to attitudes of the students. In the words of "Mary", "... there is also a certain element of socialization and teaching you to fit into a certain mind set, to have a certain outlook ... when you graduate."

Other issues identified in the discussion on the purposes of law school included:

1) case law method and over-emphasis on litigation;
2) narrow focus of law school; and
3) image of success as defined by large firms and corporate mentality.

Case law method and the over-emphasis on litigation

Substantive law was taught primarily through the analysis of case law. Focus Group #1 indicated that there should have been more emphasis on alternate dispute resolution. This would have included negotiation, settlement and other aspects of "lawyering", outside of a strictly adversarial or litigation focus. Participants in Focus Group #2 and in the one-to-one interviews agreed that most courses were taught through the case law method, simply reviewing the written decisions judges make at the end of the litigation process. Over-reliance on the case law method of instruction was seen as a limitation by some participants because it does not reflect the actual practice of law. In practice most cases settle before trial and litigated cases are the exception rather than the rule.

The underlying concern with the case method was based upon two premises:

1) that law school should give a more accurate portrayal of what occurs in practice. If this was identified as one of the aims of law school then courses should be developed accordingly, with more emphasis on skills, such as lawyer-client communications, negotiations and drafting; and

2) the teaching of substantive law should incorporate other forms of dispute resolution and not simply rely solely on the study of case law in a subject area. An over-emphasis on teaching case law may foster the use of adversarial problem solving approaches upon graduation, including an over-reliance upon the judicial system.

Narrow focus of law school

Many participants in Focus Group #1 expressed disappointment with law school as an educational experience. There was a general sense that law school was much less enjoyable than undergrad studies. In fact, some felt very limited or stifled. One participant indicated that it killed all of his creativity. Another participant observed, "Overall (I was) disappointed ... (I) did not like how focused and narrow law school is." Other participants also referred to legal education as being less enjoyable than their under-graduate program and more limited in approach. "Brad" believed that this stemmed from the teaching style adopted by law professors.

> Well I think with the exception of perhaps one or two courses in jurisprudence you are never taught to challenge the fundamental underpinnings ... (it was) "Here it is as found - learn it and write it down!" whereas I think in an Arts background you challenge the fundamental underpinnings.

It was interesting to note that participants who found law school narrow in focus and less fulfilling than their previous university degree were generally those who had an Arts background. In contrast participants who came from a Business or Commerce background tended to find that law school was very similar to their undergraduate degree or at least equivalent in terms of their satisfaction with the learning experience.

Image of "success" defined by large firms and "corporate mentality"

One issue perceived by Focus Group #1 participants was that law school either overtly, or covertly supported the underlying premise that the "Big firm is the way to go." Or in the words of one participant, "Law school focuses on big-firm mentality

not ... man in the street law." Participants suggested that this might stem from the study of "cutting edge" case law at the Appeal Court level, which was primarily litigated by larger firms. Other participants felt that the big firm emphasis came from an environment which fostered the important influence of the larger firms on the law faculty. This included, sponsorship of social functions such as wine and cheese parties where the students with the best marks were veted. Also noted were the donations made from large firms to the law faculty and funding provided through sponsorship of prizes or scholarships for students as well as the involvement of faculty instructors on contracts of employment to downtown law firms. All of these factors added to the presence of the large firm influence. The underlying message perceived by many students was that large firms are a preferable articling experience. This also influenced the drive for high marks, competition with fellow-students for limited positions available at these firms and an over-emphasis on corporate-commercial areas of law.

The law school should carefully consider the leverage that large firms have and examine how this impacts the quality of the education experience. Where possible, the law faculty should attempt to counteract the more negative repercussions this influence has on students. There was a perceived need to de-emphasize the tendency to promote the big law firm as being the best or only option upon graduation. Cane (1981) recognized that,

> The law school cannot be expected to change social reality, but it can be expected to remember that it has a unique charge in our society: to train students for the practice of law, a public profession. No other institution serves that function ... as long as a single model dominates legal education, students will continue to learn corporate jobs not only pay the best, but they are the only ones which deal with "interesting" legal problems. Few students will develop the tools or the inclination to look beyond the routine aspects of providing legal services to the poor and middle class." (p.232).

3) What was the most important thing you came away from Law School with?

Analytical Skills:

The majority of Focus Group #2 participants identified analytical skills as being the most important thing that they acquired in law school. Not only was it the most common response, but it seemed to confirm that the focus of law school was primarily upon the teaching of these skills. It was perceived by participants as being a basic building block that was both fundamental to success in law school and essential for the day to day practice of law.

Accreditation:

"Having the right to article" ("Mary") or the right to practice, or acquiring the law degree were also aspects of law school that were identified as being "most" significant. While some viewed the degree as an achievement in and of itself, other participants saw it simply as another "stepping stone" to the final phase of the educational process of becoming a lawyer. Finally there were those who viewed this process of accreditation with mixed feelings. "Joan", in discussing the purpose of law school, commented that,

> At the risk of sounding totally cynical, I think one of the aims of law school, as it was when we went, was to weed out a certain percentage of the population. In other words, present certain hurdles that would be very difficult to jump ... so that fewer people were practicing."

Dennis was also critical about what a law degree means and categorized it as a "screening device." He perceived that the hurdles erected by the law schools were not only exclusionary but they were also directed at certain groups in society. In his view it was not based on merit. Rather it was the individual's economic and social status that enabled a certain class or type of person to successfully complete a law degree. "Dennis" contended that,

> ... (it is a) screening technique to make sure that only people who can afford to be out on their own for three years with no visible means of support can go! ... if you want it to (continue to) restrict the "class" of people that are entering the profession, then leave things as they are."

The perspective expressed by "Dennis", was illustrative of similar criticism contained in recent legal education literature. In a report on *Equality in Legal Education*, prepared by a Special Advisory Committee to the Canadian Association of Law Teachers, (Alvi et.al.:1991) the Committee stated that there was strong justification for an expanded "concept of merit" in determining who should be admitted to law school:

> Admissions processes for Canadian law schools are discriminatory. they are primarily numerical, based on pre-law grades and performance on Law School Admission Tests. This concentration ... favours a certain profile of student, particularly those with the support, both personal and financial, that enables them (to) obtain the credentials of law school admission by performing well in the course of secondary and post-secondary education.
>
> This regime tends to discriminate against single parents (usually women) and mature students, as well as students from communities who for reasons of systemic economic and social disadvantage have not traditionally been participants in university-oriented career streams. (p.15)

According to the Committee (Alvi et.al.:1991) the narrow measures of merit that currently control legal education are the result of,

> ... (a) default of a clear set of pedagogical goals directed to the preparation of students for the socially responsible and professionally competent profession of law. If legal education were clear about its own objectives it would be able to develop evaluation mechanisms and pedagogical instruments that work against the inherent meritocratic assumptions of society, not feed on them. It would be able to create a law school experience that is more humane and that is more realistically oriented to the preparation of lawyers. (p.19)

The Committee continued by finding that the excessively competitive atmosphere in law school was the result of the current admissions, evaluation and placement processes undertaken by the faculty. Thus competition created an unhealthy environment for students particularly those who, "... do not share the perspectives, the aspirations and the abilities of the stereotypical law student." (p.25)

Social:

Education is a social activity and participants were quick to admit that personal connections were a key aspect of the learning experience. The ability to contribute to society was another factor that contributed to the quality of pre-professional education which is consistent with the espoused aims of the participants who wanted to help others and contribute to society.

Friendships: "Heather" stated "I made some very good friendships and I'm still friends with a number of classmates." Another participant, "Raymond" contrasted this aspect of his experience in law school with his undergraduate degree,

> Well, obviously friends. It's interesting because ... most of the friends that I've made in law school have actually stuck around, ... Most of the friends I made in under-grad haven't ..."

Many participants placed friendships as being more important or certainly on par with the acquisition of skills or knowledge acquired in law school. Two examples are:

1) "Brad" who asserted that,

> ... the analytical skills are the center and I think the other critical element is the peer group that you come out with the sense that you graduate with the class and they are people you've spent a number of years with ... and that's the group that I feel most comfortable practicing with ... in that I know them the best."; and

2) "Kent" who said that,

> I think the most important thing from an educational perspective that I came away with were the principles that I learned in first year ... and the second thing is the relationships. ...I feel completely comfortable ... I feel I could phone anybody now, nine years after school ..."

b) Contribution to Society: Another aspect of law school that was identified by several participants as being particularly rewarding and an important educational experience at law school was volunteering with Student Legal Aid (SLA). This provided an opportunity to help people, to learn by doing and in the process to

contribute to society. This particular experience was referred to many times by participants and played a central role in their informal learning experiences.

As public interest law per se has seldom been included in the traditional legal curriculum, student involvement on a voluntary basis with SLA has helped in part to address this need. It has been recommended, however, that law schools take a greater role in expanding the exposure to public service law and introducing students to their obligation, as members of the legal profession, to community service. According to Alvi et. al. (1991):

> Legal education currently places too much attention on a narrow range of professional roles. Law schools train students to be practitioners, primarily serving individual and corporate interests within the context of a conventional law firm (typically in large partnerships), or to be law professors. There is insufficient emphasis on public service or community service law. (p.27)

Note: Participant comments in respect to SLA will be covered in greater detail in Chapter 4.

4) What does the phrase, "to think like a lawyer" mean to you?

> The study of law is something new and unfamiliar to most of you - unlike any schooling you have ever been through before ... You come in here with a skull full of mush. You leave thinking like a lawyer.
>
> Professor Kingsfield
> (Paper Chase - 20th Century-Fox, 1973)

This quotation about the study of law at Harvard reflects the almost archetypal ideal of a law school education. In fact, articles about the teaching approach taken by Kingsfield, who is actually a fictional character, have formed the basis of serious academic discussion - Kingsfield and Kennedy: Reappraising the Male Models of Law School Teaching (Hantzis:1988) Yet "fiction" reflects "fact" in this instance as most participants identified that the key purpose of law schools was to teach students to

"think like a lawyer." There was generally a consensus that the legal education process had been successful if the graduate left law school thinking like a lawyer.

According to MacFarlane, (1985) the phrase, "to think like a lawyer" was familiar to most people in legal education.

> Learning to think like a lawyer is one of the more overt ways which students are socialized into the profession of law. The socialization process begins on the first day when the students are told openly and with pride on the part of the speaker (faculty or administration) that they will learn to think like lawyers and they will never be the same. (p.198)

A book entitled, "Thinking Like A Lawyer" was published in 1996 written by a professor at the Thomas Jefferson School of Law (Vandevelde:1996) and it begins with the following definition;

> The phrase "to think like a lawyer" encapsulates a way of thinking that is characterized by both the goal pursued and the methods used ... The goal of legal thought ... (is) to identify the rights and duties that exist between particular individuals or entities under a given set of circumstances." (p.1)

There was a clear difference between "lay thought" and legal thought according to Vandevelde (1996) and while lawyers may no longer consciously remember each step of their thinking process, once they learn this new approach to thinking they often refer to the unique way that they receive and process information and describe it in a kind of "shorthand." Thus the use of the phrase learning to "think like a lawyer" in the legal education context:

> ... thinking like a lawyer essentially requires beginning with a factual situation and, through ... (legal analysis) arriving at a conclusion about the rights and duties of the persons or entities involved in the situation ... (Vandevelde:1996:2)

The ability to "think like a lawyer" has been most closely associated with the skill of analysis. Law students are taught this through the application of alternate and often conflicting legal rules considered in a variety of fact situations and through the

comparison of specific cases. Analytic ability was the one product which legal education has claimed it can deliver and there was generally not much debate on this point. Most participants included legal analysis in their definition of the phrase and they confirmed that law school taught legal analysis.

When Focus Group #1 participants used this phrase, the group members were asked, "What do you mean by the expression, "to think like a lawyer?" Participants stated that it meant:

1) to be analytical; and

2) to tear things apart and analyze and apply key principles.

Members of Focus Group #2 were also asked to identify what this phrase meant to them, but two probes were added so that the methods used to achieve this special way of thinking could be identified:

Probe:	Did law school teach you this?
Probe:	How does law school teach you to, "think like a lawyer?"

The probes helped to connect this common phrase to the educational process that occurs in law school. When participants referred to the purpose of a law school education, or when they identified what they took away from law school, almost all referred to a different mind set which seemed to encompass more than simply acquiring analytic skills in thinking. In fact, it was occasionally referred to positively as a socialization process or more negatively as a type of brain-washing. ("Sara")

In Focus Group #2, it was identified as thinking analytically as well as being able to strip any emotion from consideration of the facts when attempting to solve problems. "Sara" reflected that:

> In part, I think, "thinking like a lawyer" is being detached ... (being) emotional or supportive ... that is not the best way to respond to a

> client. That is why they come to you. They want a detached, analytic, view of the problem broken down into different categories of legal principles ...

Participants in Focus Group #2 also discussed whether this way of thinking was something that you could control or "turn off." The majority concluded "No" as indicated by the following two comments;

> 1) "Brad": "... (you) can't switch it off at the end of the day and I continue to cross-examine my family and friends ... after awhile they say enough with the questions! - You just can't turn it off!"

> 2) "Ella" in agreement stated: "I think that's so true. Even when you've stopped practicing for some period of time."

It was apparent from the comment made by "Ella" that learning to think in this manner seemed to become a permanent part of a person's character. It did not seem to diminish over time even when the individual was no longer involved in the practice of law. It was a difference that was not just experienced by the individual but was also recognized by others as being unique to the profession of law.

"Dawn" was no longer practicing law and had for several years worked in an alternate career. Yet she found that when she talked to strangers as part of her job they sensed that she had legal training:

> ... after about 3 minutes on the phone the question would be - "Are you a lawyer? You sound like one!" - so it does, it changes the way you look at things.

"Greg" agreed and went on to say that while it was true that other professions use similar skills of analysis and questioning, there was still something unique about the way lawyers view the world which has been confirmed by independent observers:

> ... it is an impression that people have, because as we have said, people can identify that you are a lawyer, from the way that you talk to them.

He pondered later in the session whether that was because, "As lawyers we may completely ignore the emotional content of the situation ... I hope that is not the way we practice but (it is) the way you are taught to think in law school ...".

In response to the question on how law school taught them to "think like a lawyer", Focus Group #2 participants were unanimous in their belief that it was the pressure of 100% final exams. Law school teaches you to "think like a lawyer" - "By flunking you if you don't!" according to "Mary". "That's it, next question!" declared "Jake" indicating that "Mary's" response was the complete answer to this query. Participants in the one-to-one interviews had somewhat more to say about the issue of learning to think like a lawyer. As a rule they dealt less with the threat of exams and provided a broader perspective on the process of how law school actually accomplishes this objective. A summary of the responses of the participants in the one-to-one interviews are listed in Table 2.4.

Table 2.4: "To Think Like A Lawyer"

Summarized responses of the one-to-one interview participants to the question:

Question: What does the phrase "To think like a lawyer" mean to you?

Probe: How does law school teach you to think like a lawyer?

Name	Definition: To Think like a lawyer	How is this taught?
Heather	To think in shades of grey - not black and white. Able to argue both sides. Analytical.	Pre-disposed to think this way before law school. Learned through debating, mooting, listening to both sides and class discussion.
Peggy	Analytical thinking. Objective.	Reading cases and figuring out what was important in the cases.
Brian	Look for resolutions. Narrow thinking - need to avoid this. Giving clear advice.	Exam pressure. Through articling experience. Briefing cases and class discussion. Professor analyzing cases and the socratic method.

Table 2.4 (cont.)	To Think Like a Lawyer (Commentary)	How Is This Taught?
Peter	Procedures versus results. Focus on the consequences.	Focus on procedure and litigation.
Richard	Analyze. Critical Think about liability.	Analyzing cases. Professor discussing cases.
Victor	Dispassionate. Analytical. Code of conduct.	Reading, digesting and identifying principles of law. Discussion in class. Socratic method.
Casey	Learn the language and lexicon. Introduced to a male/rational/imperialistic philosophy. Try to pin down reality, truth and reason.	Through pedagogical approach taken in case method of teaching. Texts written by judges or lawyers and students are not exposed to critical perspective or texts written by non-lawyers.
Janet	Be broad-minded. Keep open-mind to suggestions - cannot adopt a narrow view.	Philosophy courses more instructive than law courses. Law school was black & white / actual practice is grey.
Penny	Always thinking of solutions.	Bombarded with cases and how disputes are handled.
Benjamin	Logical. Reasoned. Unbiased. Unemotional. Very objective context.	Reading cases. Analysis. Examine reasons for decision. Jurisprudence.
Dennis	Approach human situation by distilling facts relevant to a given court.	Lecture. Omitting all human elements. Reading cases.
Jonathan	Think analytically. Facts - cut to the heart Dispassionate and objective.	Too much emphasis on how to think like a lawyer in law school. Need to think in broader terms and remember emotional and social context. Law as an objective study is a fantasy.
Raymond	Being a litigator equals taking an adversarial approach.	Cases you read. Analyze end result (only tip of the ice-berg). Learning abstract concepts with no root in practical life.
Beatrice	"B-S" phrase - No one knows what it means or everyone has a different idea. To think analytically, sometimes too analytically without intuition or context about peoples problems.	Solving problems through analysis.
Lynne	Logical/analytical thinking. Able to boil down to basic problem.	Case Method
Mable	Organize absolutely everything and reduce to what is really important	Law students have pre-disposition. Build facts to support argument.

Table 2.4 (cont.)	To Think Like a Lawyer (Commentary)	How Is This Taught?
Natalie	To be able to see and argue both sides of an issue.	Lecture & discussion. Other points of view (i.e. criminal law)
Charles	Analyze problems - find solutions.	Predisposition of law students. Skill moulded by law school. Repetitiveness of examining cases and solutions.
George	Think analytically.	Case method/fact patterns. Analysis and problem solving. Socratic method and critical thinking.
Timothy	Ability to give advice & solve problems	Examination process - 100% finals.

5) How Was "Thinking Like A Lawyer" Taught at Law School?

The majority of participants in the one-to-one interviews indicated that the key method of teaching students to "think like lawyers" was the study of case law. The case method should include substantial student involvement through extensive class discussion according to McKeachie et.al. (1986):

> The case method, like other discussion methods, falls toward the unstructured end of (the) continuum of methods. The teacher's role in the case method is primarily to facilitate discussion - questioning, listening, challenging, encouraging analysis and problem solving, and proposing hypothetical situation to test the validity of generalizations. The student's task involves analysis of the case, distinguishing relevant from irrelevant details, and arriving at reasonable hypotheses or conclusions. (p.68)

The majority of participants confirmed that the case method was used in law school although some professors used only the lecture method. In those situations students learned primarily through reading and analyzing cases on their own and through following the legal reasoning of judges as it was presented in class. Discussion about cases in class or student debate which reviewed different perspectives of legal issues were specifically mentioned as very beneficial by five participants. The Socratic method which has been commonly associated with the review of case law was identified as being critical by only three participants. Finally, there were just two participants in the interviews who agreed with the participants of Focus Group #2 and

identified 100% final examinations as being the necessary ingredient in teaching students to "think like a lawyer."

Of particular note are the three participants who indicated that they felt "thinking like a lawyer" was a predisposition that law students brought with them to law school. There has been some research literature in support, finding that certain types of people are attracted to law and are admitted to law school programs. (Alvi et. al:1991;Pearce Report:1987;Matas et.al.:1985) It may be appropriate, however, to conclude with the caution voiced by "Jonathan" that while law school did teach him to "think like a lawyer" - "... there is too much emphasis on that in law school."

SUMMARY

The objectives of any education program can be classified under the three broad headings: skills, knowledge and attitudes. All three types of objectives should be considered in the development of curriculum but this has been a concept that the law faculty, coming from a traditional liberal university perspective, has had limited success in achieving. Legal subjects are currently taught by concentrating on substantive knowledge and a limited skill-set (i.e. legal analysis). These are areas where law schools have excelled and the participants were generally in agreement that the law school demonstrated competency in achieving these objectives. But the law faculty should, according to participants, aim to teach more than current case law and the skill of legal analysis. As students, participants entered law school expecting to receive a broader education. One that would encompass a full-range of lawyering skills.

The recommendations of participants come at a time when law schools are subject to increasing internal and external pressures and the transformation of legal education has to take the following factors into account:

a) members of society are becoming more sophisticated regarding legal rights and demanding better legal services;

b) the university has experienced deceased funding at the same time as the demands for accountability have increased; and

c) graduates of law school have expressed disillusionment with law school and the practice of law as both have failed to measure up to their expectations.

These serious concerns can be addressed, in part, by considering the guidance of graduates. Providing a balance of practice and theory was a theme repeated many times by participants although their responses were generated from questions concerning various aspects of the legal education experience. It should be understood that a broader or more practical orientation need not transform the law faculty into a "trade" school. Nor does it simply refer to clinical experience although that should be available and encouraged for every student. Rather students expected that they would be exposed to a broad range of educational opportunities. This should include research, analysis and writing experience through to practical instruction in the law with the opportunity to interact with practicing lawyers.

Law schools should make efforts to set objectives that will foster the skills, knowledge and attitudes necessary to help the student serve "average" clients in the future. This can be done by combining theory and practice and providing opportunities for students to satisfy their altruistic motives for attending law school in terms of helping others in clinical settings. The following chapters will consider this theme in greater depth. These changes could be structured so as to have little impact in terms of increased cost for the law faculty yet by addressing the needs of students and society, a better quality legal education should result.

CHAPTER 3

TEACHING AND LEARNING DYNAMICS

> The aim of teaching is simple: it is to make student learning possible ... higher education will benefit if those who teach enquire into the effects of their activities on their students's learning ... changes in how we think about and experience teaching are crucial to improvements in higher education. (Ramsden: 1992:p.5)

INTRODUCTION - "FORMAL" LEARNING EXPERIENCES

The quality of legal education was primarily judged by the students' assessment of the teaching-learning dynamic. There was a consensus amongst participants that both teaching and learning can and should be improved. There was also a clear connection between student learning in law school and the quality of instruction.

In this research study, it was important to listen to what participants had to say about their experiences as students. Comments were gathered about the elements of good teaching and the impact that different teaching styles and methods had upon personal learning. Participant experiences were a critical component in the consideration of how to improve teaching, and formal learning from the point of view of the student. Most participants found that good teaching encouraged high quality student learning and participants consistently identified the quality of instruction at law school as being an important part of a quality legal education.

Development of Questions

Focus Group #1 considered many aspects of a quality legal education but the majority of comments focused upon the formal learning experiences of law school which included classroom instruction and methods of evaluation. In order to reflect this emphasis several questions were developed which explored these themes further in Focus Group #2 and in the one-to-one interviews. In order not to narrow the focus of

the study participants were initially asked simply to evaluate their law school experience. One of the initial questions was purposely broad and open-ended and this allowed participants to comment on any aspect of their legal education experience:

> **Question: What is your over-all assessment of your law school as an educational experience?**

In order to delve further into the teaching and learning experience a number of probes were developed. Participants were asked to give:

1) examples of effective teaching;
2) examples of effective learning strategies; and
3) further details on any other factors which influenced their experience of teaching and learning at law school.

Focus Group #1 had identified that a key tension or dilemma was the fact that while most students go to law school with the intention of learning how to practice law, the instructors tend to be academically oriented. Once identified as a factor which potentially influenced the learning experience, questions were developed to explore this issue further. First participants were asked if they had noticed any differences as students between instructors who were full-time academics and those instructors, generally practitioners, who are part-time sessional or adjunct instructors. The initial inquiry was kept purposely general so as not to influence the responses in any way. If the participant identified any differences then they were asked if they had a preference and encouraged to provide further information on their preferred orientation of instructor.

The educational developments considered to be part of a standard legal education were also considered important to include in the study. Hartwell & Hartwell (1990) in their observations of law school classrooms, noted that "Traditionally law professors use a Socratic approach to teach their students..." (p.509). As this method of

instruction was identified in the literature on legal education as a method that had been developed and in use since 1870 to specifically teach law students (Teich:1986), it seemed appropriate to ask participants about their experiences with the Socratic method. The following question, which asked participants to consider their reactions to the use of this teaching method, was therefore developed:

> **Question: What was your experience with the "Socratic method" at law school?**

The Socratic method was not defined for participants when asking the question, however, only one participant appeared unsure of what this meant and stated that she had not experienced it during law school. Participants were also encouraged to discuss the other methods of instruction used in law school through the use of appropriate probes.

Participants in Focus Group #1 had spoken at length about the competition in law school and the key role that marks played. This led to a general discussion on systems of evaluation and particularly the impact of low marks upon students. Group members proposed that the strong, and often adverse, feelings about evaluation which law students experienced was due to the fact that all students who enter law school are used to receiving above-average to exceptional marks. One particularly stressful incident raised by a member of the group involved a student who was first verbally abusive, and then physically abusive, of an instructor who had given him a poor mark. While this was clearly an isolated and extreme incident, members of the group agreed that it was illustrative of the type of pressure that each one of them had felt in respect to competition for, and importance of, marks. It was therefore critical to include a question which elicited comments from participants about the marking system or methods of evaluation used at law school. A further probe was used to elicit the participants opinions on the legitimacy of the assessment methods utilized in accurately reflecting the quality of learning. The question and probe were:

Question: What comments do you have on the marking system and methods of evaluation used at law school?

Probe: Did marks accurately reflect your learning (in a particular course)?

Finally, as Focus Group #1 had referred to specific ways to improve the teaching and learning dynamics in law school it was thought to be important to give other participants a similar opportunity to reflect upon how their legal education experience could have been improved. An open-ended question was developed which concluded the review of the formal teaching and learning experiences in law school.

OVER-ALL ASSESSMENT OF TEACHING & LEARNING AT LAW SCHOOL

Most participants gave law school a fairly positive assessment. Several commented that it was either a "pretty good" or a "positive" experience. There were a few who found law school quite negative, however, and others who were non-committal. Drawing on the experience of the participants there was certainly room for improvement. The "Quality" paradigm was found to be useful and it provided guidance in analyzing the comments of participants.

"Total Quality" and the Improvement of Legal Education

Tzannes (1994), stated that business was far ahead of education in understanding the principles of the "Total Quality" Movement. Educators are only slowly becoming aware of the significance of the concepts such as Quality Assurance. Tzannes (1994:p.58) noted that,

> Quality assurance is sometimes confused with the concept of ... course evaluation, (however) Quality assurance goes much further ... Quality assurance is pro-active in that it establishes systems designed to prevent ... failure.

In respect to improving the systems of teaching and instruction, these terms were defined broadly and included many aspects of the professorial role as identified by participants. Consideration was given to the design of curricula, the choice of content and methods, the various types of teacher-student interactions, and the assessment of students.

Ultimately the words used to describe excellence or quality in higher education are of little consequence according to Conrad & Blackburn (1985) who found little difference between terms used. The key criterion was in the striving for higher standards no matter how defined.

> When it comes to the concepts of excellence and quality ... (the) two terms are essentially interchangeable. Like quality, excellence carries with it a dimension of style, not just an outstanding achievement but the manner in which the accomplishment is achieved. Both excellence and quality imply the highest standards and an unwillingness to settle for anything less than that which could be achieved. (p.287)

While the central focus of this study was to assess the law school experience from the perspective of "quality", participants did not suggest that law faculties were in any way unique with respect to the need for improvement. In fact, many participants commented upon recent changes which have significantly improved legal education.

Yet, one of the key principles of "Quality Assurance" which helped the Japanese achieve unprecedented business success was the objective of "continually improving" a system, no matter how successful it might be at present. There was no conception of a pre-existing limitation or ceiling which would limit efforts at self-study and improvement. According to Tzannes (1994 at p.58) the strength of the Japanese "Quality" program, was the eventual goal of *dantotsu*; the aim to become the "best of the best." The continuing need for re-examination and improvement was stressed. Therefore, while many aspects of legal education were perceived as positive, there were still several areas identified that law faculties could aim for improvement if the standard adopted was to become the "best of the best."

For example, three of the participants were non-committal in their response to an over-all evaluation of their law school experience. They stated that it was impossible to assess the experience without first establishing a defined purpose of law school. Without reiterating the discussion in Chapter Two, these participants indicated that law school had certainly not prepared them for the practice of law. Based on this criteria, which they suggested could be a legitimate standard, they would not have rated law school positively.

According to Diamond, M.D. (Gillers:1990) in a review of the psychological problems of law students, he found that law school often required an adjustment in student expectations or the individual would find that law school was a very disappointing experience. He observed that,

> The law student enters law school with the expectation that, in the space of three years, he will learn the substance of the law and that he will acquire a self-image of a lawyer. Inevitably, the student is disappointed and becomes frustrated and depressed. Depending upon his predisposition and temperament, he may blame himself, he may blame his school, or he may blame both. (p.63)

Participants provided support for Diamond's contention that disappointed expectations resulted in a more negative view of law school. "Dennis" and "Peggy" echoed an opinion voiced at Focus Group #1 when they stated that law school had been a "narrow" experience. Both found that it had not met their expectations although "Dennis" was more critical of the lack of clear and honest objectives. He believed that law school should strip away the arcane and simply reorganize as a "trade" school. "Peggy" on the other-hand found that law school did have a clear purpose but it did not live up to her expectations because she was unable to relate to the corporate climate with its over-emphasis on business law and making money. The only positive experience she related was working for a term in the Criminal clinic where she connected with fellow students and found that the work helped other people.

In some instances even the more positive assessments were somewhat qualified by additional comments made by the participant. As one example, "Jonathan" qualified his assessment that he had found law school to be a very good experience educationally, by noting that, "The time you spend in a classroom is only a ... very small part of the law school experience." While he recognized that classes were a significant component and that there was always room for improvement, he cautioned that,

> If you only went through law school and just attended the classes, and that's it, I think that it would be a very narrow experience because it is so structured and so, so narrow. I don't think it would be fulfilling at all! But it was many of the other things in law school, the socialization, the Student Legal Aid (SLA program) ... debate with fellow-students ... undergoing the moot court experience ... those are all parts of the broader experience that I thought was quite valuable for me.

This idea that the most significant educational experiences in law school often take place outside of the class-room is an issue that will be explored further in Chapter 4 - "Informal" Learning.

Emphasis on the importance of the "formal" learning experience in determining a quality legal education in law school was best illustrated by a comment made by "Benjamin". It was an interesting contrast to "Jonathan's" over-all assessment of his law school education which encompassed both the formal and informal learning experiences. "Benjamin" responded to the same question by focusing entirely on the "formal" learning which took place in the class-room. He tied his over-all assessment of the educational experience to the quality of instruction when he stated that

> ... some classes were incredibly meaningful. Some were incredibly meaningless, and it depended ... not on what the subject matter was, but on the instructor. Good instructors meant good courses, meaningful courses ... criminal law wasn't inevitably a meaningful or meaningless subject, it depended on who your instructor was.

Many participants similarly voiced their opinion that "formal" instruction played a key role in determining the quality of their educational experience at law school.

Effective Instruction

There was essentially no disagreement amongst participants that effective instruction was a necessary part of a quality legal education. Participants in this study while they indicated that they could learn even in situations where the instruction was poor, identified effective instruction as being a critical factor in facilitating learning. "Dona" a participant in Focus group #2 expressed her belief that she could learn "in spite of" poor instruction when she stated, "I think I had some of the worst teachers that I've ever had in law school, which is not to say I didn't learn the material." She continued by referring to a specific example of an inadequate instructor and indicated that she was able to learn despite this individual but cautioned "Mind you I only learned enough to pass his exams!"

Other participants in Focus Group #2 agreed with "Mary" when she commented that "In some cases instructors were good and the quality of instruction was high ..." but there was also agreement when she continued with her second observation that when the instruction was sub-standard "... going to classes actually hurt you in terms of trying to learn the material." Many participants commented that it was preferable to "skip" classes when the instructor was not effective and there was little to be gained by attending. Despite their apparent ability to learn the material without assistance where necessitated by poor instruction this was obviously not the preferred choice. Rather, participants expressed their concern that the importance of instruction was not recognized by the law faculty and they made many specific suggestions for improving the over-all quality of teaching.

When participants were asked what they had thought was a necessary part of an excellent legal education many referred to the key role played by the instructor. "Heather" responded to this query by saying that: "... teachers who care and teachers who can communicate clearly and who treat the students with respect" are absolutely critical.

Faculty members must be able to communicate knowledge. This has been recognized as absolutely essential to the existence of institutions of higher learning including the university. According to Mathis (1979), "A college or university is judged by the performance of its faculty; and the quality of educational programs is directly related to the behaviour of faculty members, especially their effectiveness as teachers." (emphasis added) Unfortunately most faculty members have only acquired an expertise in content area and have no formal training as educators. Professors are generally recruited based upon their academic credentials and are seldom selected for their proven ability to teach. As a result, the professor who is solely a content expert may not have either the background or the inclination to prepare for the diverse roles which are necessary to facilitate learning. Without conscious attention to the educational process there is unlikely to be a successful transference of the knowledge which the content expert possesses.

Many academics have assumed that their role of communicating knowledge can be satisfied by the research and publication functions of faculty. The ability to teach and transmit information to students has often not been valued as an essential quality of academic responsibility. The "Smith" Report (March, 1990) which summarized the findings of the Independent Commission of Inquiry set up by the Association of Universities and Colleges of Canada identified as a primary issue, the status of teaching in universities. Dr. Smith stated that, "...teaching is seriously undervalued at Canadian universities and nothing less than a total re-commitment to it is required." (Ahmad, 1992:3)[1].

In fact, Blackburn (1991:364) after a thorough review of the literature concluded that, compared to the studies on the scholarly output of faculty, research on the teaching

[1] This issue was addressed in an open letter to the Presidents of Canadian Universities, where Ahmad (1992:3) and colleagues expressed their concern over the fact that faculty are encouraged to neglect teaching in preference of research and publication.

role of faculty was quite restricted in scope. The lack of value accorded to the teaching role of the university professor was found to be an issue in the faculty of law similar to the problem identified in other faculties of higher education.

The whole issue of effective instruction in law school has been discussed in several articles and books (Gold:1992, LeBrun:1994, Ramsden:1992) but there is resistance by some law instructors to take the time necessary to review, revise and improve their course delivery. Despite a good deal of rhetoric about the importance of teaching excellence, traditional scholarship was still found to receive more rewards than does innovation in education (Moses: 1988). As a result many academics have chosen to spend more time developing their research profile at the expense of improving their expertise in teaching.

This did not go unnoticed by the students. When "Heather" spoke about the importance of instruction she also stated her concern that other demands on law professors interfered with the time they were able to devote to the teaching role. She "... worried about the effect on the quality of teaching (by) having rigorous requirements for publication and other involvement in the University."

"Lynne" also noted that an excellent faculty is critical to an excellent legal education but she clarified this statement by adding, "... and when I say that, I mean good teachers as opposed to well-published people who have been high achievers and have Master's degrees." Although she recognized that these attributes may not be mutually exclusive she was concerned that,

> ... there is a real drive to get people (who) are considered to be the best and brightest without giving consideration to their teaching ability. Because if you can't pass the information on, it's really not much value to your students. Good teaching is the most important thing!

Through many similar comments made by participants, the findings of an earlier study by MacFarlane (1986) were reflected. MacFarlane explored the personae of the

"ideal" law professor through the perceptions of both students and lawyers and found that neither valued the legal research and writing function of a law professor. Students and lawyers alike rejected the notion that research and writing were an important or worthwhile activity and neither was seen as a necessary attribute of an "ideal" law professor. MacFarlane (1986) found the antipathy surrounding this issue surprising as it appeared to extend to any activity which might orient the professor towards a "cloistered academic life."

> Research and writing is not only unacclaimed, but also is specifically rejected ... it is perceived to be a bookish, intellectual activity divorced from the real world of training for the practice of law.
>
> ... Certainly no perception exists of any contribution of writing and scholarly activity to classroom teaching. Given this break in the link between writing and teaching, one should not be surprised that students and practitioners believe the professor should concentrate on classroom duties instead of what are seen to be personal, tertiary pursuits. (p.104-105)

While MacFarlane recognized that the results of his study would meet with the disapproval of the law faculty he justified publication of his research with the statement, "Some professors may be outraged by this finding, but their discomfort does not alter the existence of the perception held by students and practitioners." (p.105)

MacFarlane also found that the role of service to the larger community was also considered unimportant. "A professor in any discipline in a university has three generally accepted duties: teaching, writing, and service. Students and practicing lawyers have rejected two of these three duties for their ideal law professor personae. All that remains is classroom teaching ..." (p.105) The implication of MacFarlane's research findings are that the law professor only exists in the minds of law students and lawyers as a creature of the classroom to be judged solely upon performance of that role.

Despite the clear message that class-room instruction was considered a critical element according to both students and practitioners, some law professors have claimed that any push to improve teaching effectiveness is an infringement upon their academic freedom. But Gold (1992) countered this argument by stating that this was an inappropriate justification of poor education practices.

> ... no one doubts that a person should be protected in his controversial opinions ... but the freedom has been extended beyond the privilege of comment to controlling the contents and teaching methods of a subject or course of study. Academic freedom has been used to justify racist and sexist language and other instructional behaviours, to promote the right not to teach an agreed component of a syllabus, to refuse to adopt varied teaching and assessment methods, to preclude the evaluation of a course or a particular instructor's delivery
>
> ... The interest of academic freedom is to provide opportunity for free comment and exchange without risk of sanction or discipline, it does not substitute for curriculum development, instructional design or the assessment of learning ... (p. 109)

Renner (1995:146) was much harsher in his criticism of the use of academic freedom to justify poor educational practices. He commented that academic freedom has now simply become the freedom to be an academic. He contrasted this with other more collaborative methods of learning,

> ... (which) start with the decision by teacher and student to share an academic goal ... match(ing) the needs of both the student and the teacher. This mutuality is far different than when academic freedom means my right as a teacher to do what I want and your right as a student to forego the credential that only compliance will bring. (Renner:p.111)

MacFarlane (1986) identified in his study an interesting phenomenon. He found that the self-personae which law professors develop in the course of their career was not only different, but it was in many ways completely opposite to, or in the words of MacFarlane "hostile to" the ideal law professor personae as identified by practicing lawyers. Law professors and lawyers as a group seemed to have little or no

understanding of each other. Law students identified with a personae of an "ideal law professor" that was somewhat in the middle ground. When they began law school they identified more with the personae of the ideal professor that was initially nearer to the professors' ideal. Gradually, however, throughout law school, students moved towards the practitioners' ideal. Apparently the three years of exposure to legal instruction resulted in students identifying less and less with the ideal professor personae as perceived by their law professors.

MacFarlane (1986) speculated that the divergence between the professors ideal self-image and the ideal personae of a professor that both students and practitioners hold may by the result of the current state of legal education. Students and practitioners may be distanced from a realization of the full role of the law professor as a result of the larger size of classes and the impersonal nature of the teacher-learner relationship where the full work of the professor was not known.

The two possible explanations of the antithetical divergence of perceptions were stated by MacFarlane as being:

1) the result of large classes; and
2) the impersonal nature of the teacher-learner relationship.

Focus Group #2 participants made the following comments which shed further light on these two issues:

<u>Class-size:</u>

Several participants agreed that smaller class size would have improved their legal education experience. ("Sara"/"Ella"/"Jake") While "Kent" agreed that small classes were beneficial, but he recalled one particularly effective professor in his undergraduate years who had established rapport with even larger classes than existed in law school. "One of the reasons that I don't really accept the size excuse is that in under-grad ... (Prof. name) was everybody's friend and he had hundreds of students. Size does not have to be a barrier!"

Impersonal relationship between teacher and learner:

More than one participant agreed with the statement that it was critical to have "... teachers who are accessible" ("Brian") but comments of other participants indicated that this expectation was often not met. In fact, members of Focus Group #2 discussed the actual physical plant of the law faculty as being designed in such a way that it isolated the instructors from the students. According to "Greg", "... they almost built that building to create a barrier between the faculty ..." In terms of access to instructors, it was noted by "Mary" distance could also be established on the basis of personal availability and she commented that there were some professors who were "... willing to be accessible to students who had problems (and others) who would treat any kind of question after class as a kind of intrusion."

Certainly there was a broad spectrum of feelings associated with the relationship of students to faculty. "Ella" commented that she had always felt, "... that the tone ... the basic tone was intimidation ... I felt very intimidated in class." Another member of Focus Group #2, "Joan", reflected that there was, "... a learning culture in different schools, in different faculties. Like a tradition of what the faculty was as a whole." According to "Joan" the interaction of students and professors was therefore critical as this established the climate for that faculty.

KEY PRINCIPLES OF EFFECTIVE TEACHING

Participants in Focus Group #2 and the one-to-one interviews were asked to give an example of effective teaching. If no information was forthcoming, the participant was asked to recall one instructor and describe something that this individual did, that really "worked" for them in terms of assisting their learning.

In considering what qualities were associated with his most exceptional instructor, "Kent" commented that it was the combination of an excellent teacher in a small class

setting and both "Joan" and "Jake" agreed that small sections were superior classroom settings. The participants in Focus Group #2 not only stressed the benefits of smaller classes directly, but also indirectly, by selecting as examples of effective instruction those individuals who had taught them in "small section" classes or seminars. Part of this can be attributed to the traits of particularly effective instructors which were identified as including organizational skills, clarity, knowledge of subject area and enthusiasm. Some or all of these characteristics may have been more easily demonstrated in smaller settings which were more conducive to student-teacher interaction. The importance of smaller classes and the connectedness of the teacher and the learner was best illustrated by the observation of "Joan" who stated that students in small classes could be more involved in the learning process,

> ... getting back to why I enjoy small sections so much, (it) has to do with the variety of tasks that were demanded of us which didn't include necessarily the lecture-only (teaching) style ... that was really important.

While teaching required a particular skill-set, this did not necessarily equate with the academic prowess of the instructor according to "Ella", who declared that, "... I know that there are a lot of intelligent people who are very bad teachers."

"Ella" believed that, "Teaching is an art." Factors that were identified by the participants seem to indicate that if it is "an art", it is an art that can be learned, at least in part. There were many attributes of an excellent instructor that had to do with organization and enthusiasm as with innate personality characteristics of the instructor.

For example, "Sara" commented that the best instructor she had was an intelligent man but the most important criteria is that he was interested in the material he taught. She contrasted this with instructors who did not keep current or make any effort to responsibly teach the subject:

> ... there were some professors who I do not think had updated their materials for 5 or 10 years ... and I make no comment on their intelligence because you could not tell (based on) what they were doing.

Others in the group agreed that it was important for the instructor to know the subject area. "Jake" remarked that it was also important for instructors to start with the basics and give the students something to build on rather than going off on "tangents."

While the reviews on the quality of instruction were mixed in Focus Group #2, "Jake" was quite impressed and in response to criticisms about the quality of instruction in law school, he stated that,

> Over-all I thought that the calibre of teachers at (law) school ... was better than the teachers that I had in undergrad (however it) ... is just a fact of life going to university, a lot of people don't like to teach but they have to teach.

Another participant, also attempted to counter-balance one of the more negative remarks made about law school instruction - that teaching was simply viewed by the faculty as a necessary evil of getting their pay cheques. "Brad" responded with the observation that there were many professors to whom this did not apply and that the majority were trying very hard considering that,

> ... I'm not sure that professors generally at university are taught how to teach. I think in law school there are a lot of professors who are teaching out of their fields of expertise so they neither have the interest nor the ability.

He continued by saying while individuals may struggle against these factors he was, "... not sure that they're given the tools" and concluded by stating that "I am not sure we were the most appreciative audience either." While an appreciative class may be easier to satisfy, the literature would support the premise that good teaching encourages high quality student learning and there is always room for improvement in the critical role of the professor. According to Ramsden (1992), it is unfortunate that,

> It suits many lecturers to believe that because learning is ultimately the student's responsibility, effective teaching is an indeterminate phenomenon. There is a cherished academic illusion, supported by abundant folk-tales, that good teaching in higher education is an elusive, many-sided, idiosyncratic and ultimately indefinable quality. (p.87)

In fact, Ramsden (1992) has compiled a list of properties that instructors themselves identified as being key components of effective teaching. He combined this with a similar list developed from student experiences. He summarized the research findings in the "Six Key Principles of Effective Teaching in Higher Education". It was interesting to note that attributes of effective instructors which participants identified were easily categorized in five of the six principles identified by Ramsden. LeBrun (1994) compiled these principles into the following summary:

Ramsden:1992

Key Principles of Effective Teaching

Principle 1) **is able to make teaching and materials genuinely interesting and understandable so that learning is pleasurable for students;**

Principle 2) **is willing and able to show respect and concern for students and their learning;**

Principle 3) **can provide appropriate feedback and assessment;**

Principle 4) **offers intellectual challenge and specifies clear goals;**

Principle 5) **engages students actively in their learning, gives them control over learning and independence; and**

Principle 6) **is able and willing to learn from students.**

Le Brun et. al (1994) p. 120

According to "Beatrice":

> There's something about good teaching no matter what the age is of people or the subject being taught, there are qualities of good teaching. They love their subject, they're enthusiastic. They give lots of examples. They don't read their lectures. They use a variety of teaching techniques.
>
> They don't always lecture. Sometimes they get (students) into small groups, sometimes you might do a little written exercise in class ... we weren't exposed to many (different teaching methods) in law school. ... in law school, the primary teaching method was lecture style ... but even lecture style can be captivating if someone is good at it ... but I think it's often not done overly well (and) it's probably used too much.

While some have argued that teaching is an "art" which cannot be improved, Ramsden (1992) stated that, "The reality, as opposed to the mythology, is that a great deal is known about the characteristics of effective university teaching." (p.88) While he conceded that it is complicated and there is no indication of a "best way" to teach there are several principles that have been recognized. "The research supports what good teachers have been saying and doing since time immemorial."(p. 89) Ramsden (1992) considered research studies that compiled the discrete attitudes and behaviours in instructors that were identified as important properties of good teaching. The compilation of research results by Ramsden in the *Key Principles of Effective Teaching* was accurately reflected in the attributes and behaviours of a good instructor as identified by participants in this study.

Ramsden further found that there is evidence to support the authenticity of students' views. He quoted two studies of evaluations of teaching in support and found that findings taken together, "... tend to undermine the widespread views that students confuse popular lecturers with good lecturers ..." Further the belief that students cannot recognize good teaching due to the fact that they are not knowledgeable in the subject area or are not mature enough to recognize "what is good for them" is another myth of higher education.

> It is abundantly clear from comparative studies of graduates' and students' reactions to courses (see, for a recent example, Mathews et al., 1990) that anecdotes to the effect that bad teaching is really good teaching (when students reflect on it a year or so later) have no foundation in fact. Graduates rate the same courses similarly to current students." (p.90)

When participants in this study recalled experiences as students they demonstrated that they were critical consumers of education and were not satisfied with superficial "entertainment" in the classroom. Learning had to taking place if the instructor was to be held in high regard. "Casey" is one example of a participant who criticized an approach taken by one professor and although he indicated that the time spent was "enjoyable", it certainly did not salvage the fact that the professor provided only a superficial coverage of the subject matter.

> I thought that he was funny and engaging, and then, I got out of contracts and realized I know absolutely nothing about contracts. He didn't take, he never, ever took an overall view and exposed us to the whole thing, the big picture ...

Each of the principles identified by Ramsden will be considered in turn by providing participant quotations which identify the importance of that element in respect to law professors.

Principle 1: Interest and Explanation

In considering this principle Ramsden (1992) stated that,

> Few people would disagree that a facility for giving clear explanations of complex subject matter is a mandatory part of a lecturer's repertoire. It is evident that this facility can be learned (Brown:1978) Even more important, however, would appear to be the related ability to make the material of a subject genuinely interesting, so that students find it a pleasure to learn it. (p.96)

Participants - Positive characteristics identified by Focus Group #1 ranged from personality traits such as a sense of humour to the ability of organizing and teaching an area of substantive law by fusing context with theory. But most frequently recalled by participants were instructors who were passionate about the area that they taught.

One example, concerned an individual who thought that their subject area, "... was just the best thing and he made you love it!"

"Mary": I think the very best professors I had were very clear. They were able to explain complicated principles in very clear language ... they were also very enthusiastic about their topics so that they conveyed that enthusiasm to the students and it would catch on.

"Penny": I think of the professors that really stand out in my mind is Judge (name), she spoke so well and made her classes so interesting and made the cases come alive for us ...

"Charles": Property law is really quite boring. Out of all the first year courses that's probably the worst! But he could actually keep you interested ... he knew when people were getting bored, so he would do something maybe a little bit silly ... he would personalize the cases ... he could get you to relate to the problem ... he worked on the strengths of the course rather than just teaching as a job.

"Heather": Professor (name) is a very good academic instructor (who) enjoys legal argument and the academic analysis, gets very excited about it ... I remember watching him thinking he's really having a great time up there.

"Mable": (*an example of effective teaching*) ... would definitely be (from) one of my smaller courses where you actually had some interaction. I don't find personally that I learn well in a room of 250 people and somebody is just talking at me and I have to spit back the same thing ... the courses that I learned the most from were ones where the professors seemed impassioned about what they were teaching ... they were able to make law interesting and related to something that I could relate to.

Principle 2: Concern and Respect for Students and Student Learning

According to Ramsden (1992:98) "Research on higher education ... underline(s) the vital importance of respect and consideration for students in effective university teaching.

> Key indicators include "honesty and interest in teaching" "availability and helping "students feel that a subject can be mastered. "Teaching ... requires developing a keen interest in what it takes to help other people learn; it implies pleasure in teaching and associating with students ... (Ramsden:1992:p.99)

Participants - The members of Focus Group #1 agreed that one of the key attributes of a good instructor was "intellectual honesty". One participant spoke about a particular professor who, "... didn't prepare for class, he just propounded". He said that the students recognized this immediately and simply didn't bother going to class. Members of Focus Group #1 agreed that it was totally inappropriate for instructors to use the class as a "soap-box".

"Natalie" gave the example of a busy practitioner who she felt was an exceptional instructor. He managed, despite his busy work schedule, to always be well prepared. He also exposed the students to a well rounded learning experience by introducing many guest speakers from the legal community and covered cases by involving students in active discussion and analysis in class. The individual attention and concern for the students which he communicated was found by "Natalie" to be highly motivating even when she knew that she would never practice in that area of the law. She stated that,

> ... he was good at getting the class going in terms of saying - "Okay, this is the principle. Now what about this situation? How would you argue that? What would you ask? ... (he taught) the practical application of the theoretical. He knew his stuff, could apply it, (he had) tremendous presence (yet) a lot of respect for the students ... as many cases as he had on the go he was not too impressed with himself, I mean he wasn't there for you to say how great he was, he was really concerned with you understanding the law and the process in courts ... I never missed that class - it was just fascinating!

Participants agreed that a truly effective instructor had to have not only the ability to make the course material stimulating to the class but also to be aware of when the majority of students were no longer engaged in learning. "Richard" cited the example of one professor who,

> ... was a really great teacher in that he could tell when he was losing people ... like one course (which) was after lunch, and I think a lot of people started to nod off, but when they did he would try to make things more dramatic, and entertaining ... you would remember a concept partly (because of) the way he dramatized it.

Instructors should aim to be student-centred as it is not in the best interests of the student to focus on the role of the teacher or place the instructors brilliance on display. Unfortunately some of the examples provided by participants set out situations where there was a clearly lack of consideration for the students by the instructor. Particularly damaging were professors who demonstrated little concern or respect for student learning by making no attempts to engage the students at their level of understanding.

Instructors were found to be more effective when the student's level of knowledge and their abilities were considered when setting course objectives and preparing materials for class. "Casey" referred to one instructor who illustrated the dividing line between challenging a class to acquire new knowledge and simply demonstrating a lack of concern for student learning by choosing language and subject depth which were clearly inappropriate,

> I never knew what he was talking about. And no one else (in the class) knew what he was talking about, because he (was) so full of himself that he was talking on a really high level, and expecting everyone else to be totally conversant in ... theories of interpretation and hermeneutics ... and no one had a clue what he was talking about ... (he should have) come down to our level (and) taken two or three degrees off of his ego.

"Raymond" also found that the failure to convey the subject matter to students was related to an instructors failure to focus on student understanding,

> My (subject) law professor was hopeless ... he was totally ineffective because he spent all of his time talking about abstractions way off in left field ... the whole basic understanding of the law was missed ... it was like a soap-box for him (and) I don't think that's the right arena for "soap-boxing."

MacKay (1995) in an article entitled, "Some thoughts on a more humanist and equitable legal education" considered the challenge of making law schools more inclusive for students. He stressed the importance of ongoing dialogue between the teacher and student which involved, "... considerable self-reflection at both the

rational and emotional level." (p.920) He concluded that the importance of respect and concern for the student were absolutely critical:

> Without the human link between teacher and student founded upon a respect and caring for that student, there is little hope for transformative education and a more inclusive education. (p.923)

Principle 3: Appropriate Assessment and Feedback

The importance of feedback has been confirmed according to McKeachie et.al. (1986) in numerous research studies which were summarized as follows:

> The timing and emphasis of feedback on performance should be:
>
> 1) frequent, immediate, contingent, and informative in terms of pinpointing the probable source of student errors;
>
> 2) encouraging; and
>
> 3) provided in a natural context that displays performance recognition by a source the student respects.
>
> (Corno & Rorkemper, 1985, p.81; see also Brophy, 1981; McKeachie, 1986, Chapts. 8 and 9) Under such conditions argue these researchers, a sense of growing competence and self-worth tend to support intrinsic engagement with learning.

Participants - Members of the two focus groups and participants in the one-to-one interviews stressed the importance of there being high quality and ongoing feedback on student work. In Focus Group #2, "Dona" commented that the one way her legal education experience could have been improved was if she had got better feedback, "... they should let you know what it is they were looking for". "Mary" agreed with her statement and added that this feedback need not be related to the method of marking. In fact, even if the instructor choose to use 100% finals, which most participants condemned, "Mary" still felt that ongoing feedback would be of assistance. She recommended the use of practice examinations, ... where you would get feedback about:

a) this is how I want you to analyze problems;

b) this is where you are departing from that;
c) this is what I want you to learn from this course.

So even though you might not get marks that count ... at least you would be moving towards an objective and you'd be getting feedback to help you when you finally do write that final exam.

This issue will be looked at in more detail in the section on Student Assessment & Evaluation Methods later in this chapter.

Principle 4: Clear Goals and Intellectual Challenge

Ramsden (1992) found that it was important to express the aims and objectives of a course for two reasons:

1) it required the instructor to think more critically and deliberately about student learning and the direct connection this had to the teaching activities; and
2) it sent a clear message to the students in respect to exactly what they were expected to learn in the course.

Unfortunately, according to Ramsden, "All too often students begin a higher education course with only the vaguest notion of what key concepts they must master. Breakneck attempts to "cover the ground" in the absence of a clear structure focused on key concepts intensify their confusion and deaden their excitement" (p.100)

Participants - Comments of participants supported the need for clarity in terms of course objectives and the importance of a well designed course with over-all structure and daily lesson plans. According to Ramsden, the course syllabus is the traditional way that the content of a course is communicated to the class. Course objectives should be related to learning activities and aimed at assisting the students.

"Mary" stated that "... the very best professors I had were ... very organized in terms of each lecture and also the over-all structure of the entire course, so that the course had an objective and by the end of the course you had reached that objective." According to Ramsden (1992)

> The most compelling reason for using aims and objectives, or some similar method of describing content, is that it forces us as teachers to make our intentions for student learning explicit.
> There ought to be a definite educational justification for every activity, every piece of content, that is present in a course of student. Tradition and habit are not satisfactory educational reasons.
> (Ramsden:1992:p.134)

Five of the interview participants indicated that they agreed that organization and clear direction throughout the course were essential to the student and a necessary attribute of an effective instructor. One participant gave an example of a professor who provided the lesson plans in advance to the class. She thought that this had been particularly helpful in learning the materials covered.

"Brian" was in agreement with the importance of lesson plans and he provided this as his one example of something that a professor did that was really helpful for him as a student. "(Name) had great lesson plans that had the course broken down ... (it) tells you where you are, where you are going, breaks things into little "bites". I think that was good."

Principle 5: Independence, Control, and Active Engagement

Ramsden viewed education as a "provisional state." The primary objective of all learning should be to ultimately make the learner self-sufficient. This is particularly critical in teaching future professionals where life-long learning will be a requirement in order to keep abreast of developments in the field of study. There are really two parts to this equation:

1) students must be provided with sessions to practice; and,
2) learning should be individualized to accommodate different learning styles.

Opportunities should also be provided for both individual problem solving and cooperative learning. According to Ramsden (1992) "The positive effects on achievement of cooperative learning as compared to competitive and individualistic learning are very well established in the educational literature." (p.101) Ramsden (1992) also cited research in which participants found group discussion helped them understand course material and fostered a "deep approach" to learning which lead to higher quality learning outcomes. In addition, in order to foster high quality learning, students should have some choice not only over "how to" learn the subject matter but also control over what aspects of the content are to be focused upon. (p.100)

Participants: Class discussion and study groups were two key elements identified by participants as being helpful in maintaining their interest in-class and assisting them with study out-side of the classroom. There were, however, few participants who spoke about having any input into the material covered in classes. One exception to this general rule was the opportunity that students had in paper-courses to determine a specific research topic and focus their efforts on self-learning in that one area of the law.

Many participants indicated that these types of courses provided the best opportunity for in-depth learning. "Casey" - "I made a very conscious choice to take mostly paper seminar courses". Although he found that paper courses were more labour intensive then simply studying the night before and writing an exam which was what he stated he did when he had courses with 100% finals, "Casey" believed that despite the increased work-load in courses with an end-of-term paper, that it was worth the time and effort as he was then able to develop his own ideas, "... and I also could take a more critical-analytical outside look at the course content".

While it was important to many individuals in the study to have an opportunity to choose and explore a subject area in depth, it seemed particularly essential to individuals like "Casey" who were critical of the common teaching style found in law school. "Casey" referred to this approach using a term developed by Paolo Friere, and said that it was "... the banking style of learning (where) teachers are just trying to deposit the learning in the students." He found that law school lacked active learning opportunities and that for law students, "... it's not a mediated learning experience."

Learning was generally found to be enhanced where the student was able to modify their own learning strategy and also where there was some influence on the course content or development. This was much easier to accomplish in seminar courses where marks were based on the submission of an in-depth research paper and participation in class discussion. "Casey" acknowledged that he was able get a lot out of law school courses, but he purposely accommodated his own learning style through the choice of courses. He was able to maximize his own learning because that's, "... the approach that I took to it, and not the approach I was meant to take to it."

A second example of choice over how to learn the subject matter and control over course content, was very unusual. Only one report of this type of interaction between students and the law faculty was disclosed in the study. It reflected a very responsive law faculty that followed the "active engagement" aspect of Principle 5. The situation involved one participant who indicated that he was part of a group of students who went to the faculty and asked if the faculty would offer a specialized criminal law course comprised of one term of full time study and practical experience. This course had been run in the past but there were no plans to offer it during that particular school year. Because of the student interest expressed in a joint petition, the law faculty responded by setting up the course and it was available to those students who had requested that it be offered. The participant indicated this comprehensive and practice-oriented course was his most valuable learning experience at law school.

Principle 6: Ongoing Instructor Evaluation

This principle is based upon the instructors desire to learn from students and other sources about the effects of teaching and how it can be improved.

One of the most important and over-looked aspects of teaching is its evaluation. The constant evaluation of teaching is intrinsic to good teaching. It enables the instructor to understand the effects of the teaching upon their students' learning. As McKeachie (1986:267) stated in respect to the importance of student feedback it,

> ... is based (on the) assumption that the purpose of education is to bring about changes in students. If instructors agree with this assumption, it is apparent that information from students is required to provide a basis for improved teaching. Student evaluation of instruction is a relatively direct method of obtaining this information ...

As the ultimate criterion of effective teaching may be evidenced by the impact of teaching upon student learning, it was important to evaluate not so much what the teacher has done, but what has happened to the students. It was also important to recognize that students do not simply enter law schools as "empty vessels," waiting to be filled with knowledge. Learners come with a broad background of experience and the instructor should focus attention on how knowledge can be constructed by building on previous knowledge in a learning context. In recent years research has perceived the learner less as a passive recipient of information and more as a self-determining agent who actually selects information from the environment and who constructs new knowledge in the light of what that individual already knows. (Biggs: 1989)

Participants in Focus Group #1 were somewhat critical of the "hands-off" policy of the law faculty in respect to what actually goes on in the class-room. As one participant pointed out they do not "police" courses. Other members of the group agreed that there was no monitoring of either what was taught (course content) or how it was taught, including assessment of the instructor's abilities. As course evaluations are now conducted as a rule at the end of most courses it was not clear

whether participants were referring to ongoing evaluation throughout the year or assessment at a level other than student evaluation. It was apparent, however, that members of Focus Group #1 perceived the present evaluation systems to be inadequate in ensuring the quality of course content and delivery.

There are three ways for an instructor to solicit information in respect to the evaluation of effective teaching:

1) student evaluations;
2) independent (or peer) evaluation; and
3) self-evaluation.

It is informative for the instructor to solicit and receive ideas about good teaching from many sources including students and fellow-instructors. Ramsden (1992:89) draws upon research where individual teachers have described good teaching. He has compiled a list of what he terms the properties or characteristics of good teaching and these can provide guidance to the instructor in setting areas for evaluation and improvement.

Student Evaluation

> Numerous studies support the use of students as sources of data about teaching effectiveness and student opinion (collected primarily by the use of end-of-course, standardized student-rating forms). This continues to be a major source of evaluation of faculty effectiveness in institutions of higher education. Abbott et al.:1990).

While it may be useful for the instructor to use these traditional methods to improve teaching there are also other methods of gathering information from students throughout the year that are equally effective. In fact, the study conducted by Abbot et al. (1990) found the students prefer to complete student evaluations at mid-term. While further research has been recommended on this topic, instructors were well advised to consider other approaches and discontinue over-reliance on the current individual, standardized student-ratings.

The comments of participants add support to the statement made by Ramsden (1992) that,

> ... the research findings on good teaching mirror with singular accuracy what your students will say if they are asked to describe what a good teacher does. College and university students are extremely astute commentators on teaching. They have seen a great deal of it by the time they enter higher education ... Moreover they understand and can articulate clearly what is and what is not useful for helping them learn. (p.89)

Independent Evaluation

One example of the types of educational resources that are being developed in higher education is the "Seven Principles of Good Practice in Undergraduate Education" (Chickering, Gamson & Barsi: 1986) These principles are grounded in higher education research about teaching and learning. There are two parts to the Inventory which can be used jointly or separately. The developers of the Inventory (Chickering et al.:1986) described the instrument as follows:

> The Faculty Inventory has seven sections, one for each Principle: Student-Faculty Contact, Cooperation Among Students, Active Learning, Prompt Feedback, Time on Task, High Expectations, and Diverse Talents and Ways of Learning. It can be useful to faculty members, student services staff, and administrators who also teach. The questions address activities consistent with Good Practice in Undergraduate Education and help respondents identify activities they might wish to pursue.
>
> The Institutional Inventory has six sections: Climate, Academic Practices, Curriculum, Faculty, Academic and Student Support Services and Facilities. These questions deal with various aspects of the institution as a whole. They address policies, practices, institutional norms, and expectations that support good practice. This section can be used by persons or groups associated with the institution, whether or not they teach. (p.2)

This type of instrument which was, according to the authors, anchored in decades of research, provided one example of the tools for assessment available. The Faculty Inventory was developed to assist instructors and the Institutional Inventory was

intended for use by the entire faculty/administration. Both are aimed at improving the quality of education offered. While financial considerations are often given as a reason for the lack of change or improvement, the cost of using either instrument is minimal as the Inventory can be reprinted with no charge to either the individual or institution. It has been generally recognized that the first step in any faculty development program is a "needs" analysis. Once areas for improvement have been identified through a needs assessment for either the individual instructor or the faculty over-all, then specific resources can be sought to satisfy those needs and thereby improve educational practices.

Self-evaluation

In respect to Principle 6, the following are all important:

1) to define quality,

2) locate a means of assessing present performance (measure quality); and

3) developing a program to improve quality.

In addition, it is equally important to foster a climate of positive self-improvement particularly in respect to teaching performance. Otherwise the individual will not be encouraged to engage in ongoing reflection and a personal program of self-improvement. Without faculty motivation little will be gained by adopting external standards of assessment. Peters and Waterman (1982) made it clear in their widely read work "In Search of Excellence" that passion and commitment are as important to quality as the adoption of rational models for quality assurance.

One instructor Hantzis (1988) stated that, "Many of us have struggled with the difficult and complex question of how best to teach our students?" (p.155). Her practical advice to the law instructor is threefold:

a) Spend time with your students; (For example arriving in class a few minutes early and talking about the days material.)

b) Show your students that you care; (For example, provide written hand-outs, exercises and practice exams.)

and;

c) Find a new experience for your students. (p.162-163)

Nothing moves students more effectively than a new experience or experiencing a familiar thing from a new perspective ...

It is worth considering for every class whether there are any experiences that would help your students understand not just the legal theory but the way in which that theory affects people's lives. Field trips for a large class may be hard to arrange, but the educational benefits are likely to outweigh the practical difficulties. (p.163)

"Peggy" would provide support for innovative classroom experiences. When she was asked to give a final comment on how her legal education experience could have been improved, she said, "...a field trip or two would be good because when you (are in) law school you have no idea what it's like out there." She then related a specific personal experience about going to cells at the police station prior to court one morning. The law school had arranged for her to meet a defense lawyer and follow him through the "grimy cells" - "I mean ... it's just, just a real eye-opener, and I'll always remember the lawyer that I was with and you just never forget an experience like that!"

It was apparent that if the instructor was able to incorporate some of these suggestions into practice, and become a more effective teacher, then the students motivation to learn the law would increase. This would, in turn, promote student learning. While not to minimize the importance of effective instruction it is only one part of the equation. Instructors should do what they can to facilitate learning and best utilize the student's time, yet ultimately the learner has the responsibility of selecting their approach to learning. (Ramsden:1992) Research has shown, however, that,

... some types of teaching and assessment definitely induce narrow, minimalist approaches to studying

> ... (the) deep approaches are fragile things; while we can create favourable conditions for them, students' previous experiences and other unmeasured factors may mean that they remain unexercised.
>
> ... No one can ever be certain that teaching will cause students to learn. In the last analysis, excellence in teaching cannot guarantee that students will understand. (p. 80)

In order to assess how teaching can facilitate learning it was essential to ask participants:

> **Question: What learning strategies did they find to be particularly effective?**

The responses to this question are considered in the next section on "student learning."

EFFECTIVE STUDENT APPROACHES TO LEARNING

It was important to appraise the learning experience from the student's perspective. This included uncovering the ways in which participants engaged in learning. Law school for most students was the end of their formal education and the beginning of their professional experience. It was, therefore, a vital connective point between the structured learning environment of the classroom and the unstructured learning environment of the larger world. Analysis of the approach taken to learning in law school provided valuable information about legal education at the pre-professional stage. The learning approach adopted may also play a determinative role in the future adjustment of that individual to the profession and the ongoing learning required by a career in law. According to Johnstone (1992) in an ideal law school environment, students should be intrinsically motivated to learn law and learn about law. Research in higher education has also established a link between the approach taken by the

learner and the outcomes of the education experience in terms of the quality of learning (Ramsden:Säljo) and the over-all satisfaction expressed by the learner. (Davis & Murrel:1993)

Powell (1985) conducted a study in which he examined the autobiographical accounts of graduates and he concluded that students attached most importance to the acquisition of general intellectual skills, attitudes, and values. In fact, specific content knowledge was rarely mentioned in these written accounts. Descriptions of learning included references to the development of problem-solving ability, logical thinking, and information-gathering skills, together with a growth in self-confidence and independence. Criticisms of higher education included comments on the negative effects attributed to excessive competition and inappropriate assessment. (p.133)

Students do learn differently and this was evident in the comments of the participants. Learners differ in the organization of their work and in the way that they make the material that they are learning meaningful. There existed, however, many examples that demonstrated the commonalities in approach which participants preferred and felt were worthwhile. Similarly there were other situations where the learning experience had been frustrated by factors which led participants to adopt more superficial approaches to learning in order to simply "achieve the grade."

Participants were unanimous in their agreement that meaningful learning was more likely to occur if they were engaged with the subject matter for its own sake and not for the purpose of an extrinsic reward. Intrinsic interest and self-motivation were the key to student satisfaction with the learning experience. The difficulty, however, was that participants often found a "deep" and intrinsic approach to learning was simply not possible under the circumstances of law school. This decreased their perception of quality in the legal education environment.

Participant comments - Many of the participants commented on the fact that they "crammed" for exams and that they felt they had no time available other than to "skim the material" and rely upon short-term memorization in order to pass exams. The volume of work and the reliance on evaluation methods such as 100% finals were the two elements most criticized as being to blame for these superficial study methods.

"Peggy" - "I just did a lot of short term memory ... that's the sad part, it's just short term memory. I can't retrieve anything of it, it's gone! I mean it got me through the exams." When she was asked why she relied on short-term memory so much, she responded, "Just because of the volume."

Four of the participants referred to "CANs" as being essential in helping the student get through law school. The "CAN" is an acronym for "Cases and Notes". It was defined by participants as a brief overview of the material covered in class in summary form usually prepared by a fellow student. "Victor" was one of the participants who admitted that he relied exclusively on a Summary or "CAN" after completing first year. The most effective learning strategy he adopted was that he, "Learned not to try and read everything they gave you in great depth ... I could skim most things so that I was familiar ... with all the material. He justified this approach, saying that it was simply too time-consuming to read everything in depth and he found that,

> ... it wasn't a productive use of my time. It certainly didn't relate to how well I would do in the course or how much I learned ... (in fact) the outlines (CANs) wouldn't exist if everybody had time to read whole cases and brief them.

Other participants mentioned the use of pre-prepared summaries as a study guide and several others spoke about making their own "CANs" as a method of preparing for examinations.

> "Benjamin" - there was a lot of memorization and use of ... what were those summaries called? CANs ... they summarized important principles and laid them out in a contextual format that was easier to remember.
>
> "Mable" - Because I was so involved extra-curricularly, I did very little reading throughout the year and I just cram, cram, cram(ed) at the end of the year and I don't thing that's the best way to learn. ... I made those CAN's that everybody makes and I found that writing stuff out by hand and making my own summaries and that sort of thing helped me study.

Participants in this study recognized that there were different levels of learning and they often commented upon the fact that they had chosen very superficial methods of learning as students, as evidenced by the above quotations. Generally the choice of the "surface" or superficial learning strategies was justified by the participant as being necessary because of lack of time or the fact that the evaluation methods (i.e. 100% finals) either didn't discriminate between those students who used "surface" approaches or worse appeared to penalize students who took a "deep" approach to learning.

Ramsden (1992) referred to an interview study conducted by Säljo (1979) which led to the description of five different understandings of what learning consists of, amongst adults. Säljo asked students to say what they understood by learning and he found that he could classify their replies into five different categories:

> 1. Learning as a quantitative increased in knowledge. Learning is acquiring information or knowing a lot.
>
> 2. Learning as memorizing. Learning is storing information that can be reproduced.
>
> 3. Learning as acquiring facts, skills, and methods that can be retained and used as necessary.
>
> 4. Learning as making sense or abstracting meaning. Learning involves relating parts of the subject matter to each other and to the real world.

> 5. Learning as interpreting and understanding reality in a different way. learning involves comprehending the world by reinterpreting knowledge.
>
> ... conceptions 4 and 5 in Säljo's system are quantitatively different from the first three. The first three conceptions imply a less complex view of what learning consists of. They resemble the early stages of Perr's and Hasselgren's schemes; learning in these conceptions is something external to the learner
>
> ... Conceptions 4 and 5 emphasize the internal, or personal aspect of learning: learning is seen as something that you do in order to understand the real world. These conceptions imply a more relativistic, complex, and systematic view of knowledge and how it is achieved and used. (p.26)

Generally the difference in approach was based upon the student's intentions. In the "deep approach" the student seeks to understand. In the more superficial "surface approach" the student simply aims to reproduce. The approach taken by the student is largely determined by what the learner perceives as the requirements of the learning experience. Whether time and energy can be saved in the balance against what effort or type of effort is believed to be required in order to achieve a good mark. According to Grant et. al (1988),

> Broadly speaking, deep-processing is characterized by a search for overall meaning and active attempts to connect an author's arguments to previous knowledge and experience, whereas surface processing involves memorization of information bounded by the type of questions the student expects to be asked later. (p.144)

The work of other researchers (McKeachie:1986; Smith et al.(ed) (chapt.13):1995; Ramsden:1992) has indicated that the choice of deep and surface approaches was more dependent on the learning context rather than a fixed personal characteristic approach of the learner. The majority of students vary in their approach from context to context, using a surface approach for one task and a deep approach for another. Ramsden (1992) suggested that students may adopt a deep approach to learning: if the curriculum is designed to encourage active long-term engagement in learning tasks

and if relevant material is presented by an instructor who demonstrates interest in the subject in an engaging, meaningful and considerate manner. The following table sets out the conditions in the teaching and learning transaction which foster either a deep or a superficial (surface) approach to learning by the student.

WHY "SURFACE" APPROACHES TO LEARNING ARE ADOPTED BY STUDENTS

Characteristics of the context of learning associated with deep and surface approaches

Surface approaches are encouraged by:

- **Assessment methods emphasizing recall or the application of trivial procedural knowledge**
- **Assessment methods that create anxiety**
- **Cynical or conflicting messages about rewards**
- **An excessive amount of material in the curriculum**
- **Poor or absent feedback on progress**
- **Lack of independence in studying**
- **Lack of interest in and background knowledge of subject matter**
- **Previous experiences of educational settings that encourage these approaches**

Deep approaches are encouraged by:

- **Teaching and assessment methods that foster active and long-term engagement with learning tasks;**
- **Stimulating and considerate teaching, especially teaching which demonstrates the lecturer's personal commitment to the subject matter and stresses its meaning and relevance to students;**
- **Clearly stated academic expectations;**
- **Opportunities to exercise responsible choice in the method and content of study;**
- **Interest in and background knowledge of the subject matter;**
- **Previous experiences of educational settings that encourage these approaches.**

Ramsden (1992) Table 5.1 (p.81)

Accordingly, the instructor should state clearly what is expected in the course so that a deep approach to learning is fostered. The course objectives should be carefully thought out in advance and they should be reflected in the method of evaluation selected as appropriate for the class. The elements of considerate and stimulating teaching have already been covered in the previous section on the exceptional instructor. Unfortunately, there were also examples illustrating those circumstances set out by Ramsden (1992) which often lead students to adopt a surface approach:

1) Perceived need to recall or apply trivial knowledge

"Janet" offered an example of learning the law which illustrated this first element,

> ... it was almost like times-tables sometimes! ... that was literally how people studied! It was how I studied
>
> ... If you looked at the CANs, the notes that were produced and the flash-cards that people would write out. They would have the case name, the citation, and then they'd have 3 lines that was the *ratio decidendi* and if they got really ambitions they would have a couple of important *obiter* comments ... and professors would do this too, take this 150 page Supreme Court of Canada decision and boil it down into a flash-card!

An example related directly to the type of exam, was provided by "Lynne" who choose her approach to studying the material based on the method of assessment. "If it was a closed book exam we'd do more quizzing. If it was open book we'd do more actually reviewing the concepts and applying them."

2) Assessment methods which create anxiety

"Beatrice"

> (Law school) breeds that deep, deep insecurity in students. There's something really wrong there ... a part of that is the 100% final (exam) strategy ... it is a terrible thing to impose on people ... What that did to my learning strategy was I became almost paralyzed ... to say nervous wouldn't even begin to capture the feeling. I was so over-whelmed and stressed out by this insecurity about doing well academically, or just passing, that it would take me a good four to six weeks in each term to get my anxiety level down to a low enough level

> that I could study properly ... in the end, I think, this terrible anxiety is very counter-productive.

"Raymond"

> I had a friend, a very brilliant guy. He had A+ in undergrad because he wrote essays ... but the whole law school thing, he dropped out because of the whole exam thing and the whole pressure ... he actually failed a course, and he had never failed a course or failed anything in his life ... It just decimated him. There's casualties of any education system, I guess, but it's a shame when you lose great minds like that just because ... he just didn't know how to write these law exams.

The reaction of law students in the face of the intense pressures of exams was unfortunate even for those learners who were able to "succeed within the system, as the atmosphere of stress and anxiety has been shown to interfere with a quality education experience. According to Grant et.al. (1988),

> Surface approaches to learning appear to be common among students motivated by a fear of failure and learners tend to revert to ineffective surface approaches under conditions of high anxiety, such as tests and examinations. (p.145)

A surface approach nearly always leads to poorer quality learning outcomes including little understanding of the course material and only short-term recall of information (Smith et al.:1995).

3) Cynical or conflicting messages about rewards

"Timothy" - The most effective learning strategy that anyone got out of law school was how to get somebody's notes from the previous year so you didn't have to do any of the reading yourself ... I mean your job offers depend on your marks, and that's what everybody cared about. Nobody cared about what you knew, it's how much it looked like you knew." Child & Williams (1996) found that the sentiment expressed by "Timothy" was very common in higher education where learning has essentially become in their words a "mercenary activity."

> Students engage in learning for the sake of rewards (grades, praise, jobs, etc.) which are not intrinsic to the learning itself. The problem of mercenariness; seems to be endemic in education - particularly the education that is organized around classrooms. (p.32)

Child & Williams (1996) found that the problem resulted from a lack of legitimate student involvement in their personal learning due to systemic issues that have long plagued higher education. (Rousseau (1762) was cited by the authors where he noted that when students are expected to memorize knowledge, then through mimicry they will sell portions of it back to the instructor in exchange for rewards) Instructors were encouraged to actively engage the learner and several approaches were recommended to proactively address this issue. Student involvement cannot be forced by external rewards or punishments if the ultimate intent is to provide a quality learning experience. This was found to be true even in situations were the student keenly desires the external rewards that are being offered.

> Students are seldom personally and passionately involved in things which they feel essentially forced, cajoled, bribed, or threatened into doing, even if doing so gets them something they want (grades, jobs, recognition, etc.) (p.32)

4) Excessive amount of material in the curriculum

When one participant was asked if he knew anyone that managed to read all of the assigned materials, he answered in the affirmative, however the conclusion of his story indicated that there are legitimate fears on the part of students which motivate their decision to take a "surface" approach to learning:

> "Timothy" - "I knew a women in my class in first year (and I) had her study notes. She not only read everything, she read head-notes to the footnotes in the casebook."
>
> "Interviewer" - "I wonder where she is today?"
>
> "Timothy" - "Well apparently, she failed her first year"

For many participants, including "Raymond", law school was described as "a blur":

> What do I remember from law school? I don't know. I mean, it's sort of a big haze of thousands of pages. Nobody would be able to contain all that. It's all short-term memory, right? You just work your a-- off. You study, study, study, study, memorize all this stuff, spew it out, and forget it and move onto the next course. And that's the unfortunate thing, is even in law school, the things that I do remember are higher level courses where I had to write a paper ... or I had to create a statute ... It was more interesting to do that.

Smith et.al (1995) confirmed the perceptions of participants that "Students tend to take a surface approach when the workload is perceived to be heavy and where the assessment system is perceived to demand, reward or tolerate memorization ..." (p.24) In an article entitled, *Work-load and the quality of student learning*, Chambers (1992) found that until recently student work-load has been a neglected issue in the research literature. Recent research, however, has provided support for the argument that a reasonable work-load is a pre-condition of good studying and quality student learning. Participant responses in this study have many similarities to the findings of other studies referred to by Chambers:

> A summary of all this research reveals that students themselves believe they are taught most effectively (that is, learn best) when what they are taught is perceived as interesting, and relevant, is presented in a well-organized, clear and coherent way, openly and with enthusiasm, is assessed appropriately, and when there is not too much of it (Entwistle & Tait:1990) (emphasis added) (p.142)

In order to learn well students must have sufficient time to devote to their studies. Chambers (1992) found that it was simply not logical for teachers to over-burden students and demand more work than the student has the time to do. This simply creates conditions in which what was to be learned is likely to be unintelligible, and in which students cannot possibly learn well. "Having sufficient time to do the work required should be seen as a pre-condition of good learning, rather than just one among many conditions in which it may flourish" (p.145) After all, to take the argument to its logical conclusion, if students do not have the necessary time to learn then all discussion about what might constitute good learning is simply irrelevant.

5) Poor or absent feedback on progress

> Giving really helpful feedback on students' work is an equally essential commitment. (Ramsden:1992:p.99)

The lack of feed-back in law school was perceived to be particularly unsettling. In fact, several participants recommended that the law faculty make more of an effort to provide information to the student throughout the program. For example, "Raymond" stated:

> How they mark, I don't know, I never quite understood. I've never had any idea how they marked. I never knew what was more important, putting the name of the case down or putting the concept down or putting the facts and the ratio. I mean, no one ever explained this to me so I have no idea. All I know is that you do a three-hour exam and you get this mark at the other end.

The most serious criticism levelled by a participant was "Beatrice" who felt that she had been purposely kept "off balance" by the law faculty by this lack of feed-back. She found that it prevented her from ever adopting any particular learning strategy that she found effective:

> ... it seems to me part of the essence of law school is that you never really are allowed or supposed to have confidence in your learning strategy ... part of the law school experience is not being confident of your learning strategy, not being confident of your test-taking ability as a result.
>
> I mean, when I was in first year, the woman who placed first in our class over all people, came out of our property law final (exam), crying, convinced that she had failed. Now this is the woman who got virtually perfect marks in first year law school, who was so insecure about her learning strategy over the course of eight months that she believed that she had failed. Now, what does that tell you?

6) Lack of interest or background knowledge of subject matter

> Smith et. al. (1995) Good teaching is teaching which helps students to learn. It discourages the superficial approach to learning and

> encourages active engagement with the subject matter ... it encourages in the learner motivation to learn, desire to understand, perseverance, independence, a respect for the truth and a desire to pursue learning. (p.27)

When "Richard" was asked whether there were any other factors that influenced his teaching and learning experience at law school, he reflected that,

> ... if I could find something interesting in the course then that's going to help a lot. If it's something that makes me really think about a certain issue then it would probably stick in my mind a little bit more than some of the courses ... (where) I'd probably start nodding off.

When "Peggy" was asked the same question she commented that she remembered the students who asked a lot of questions and the different attitudes that professors took in responding to queries and class-room discussion. She found that some professors "... encouraged people to think about things rather than just go "through the moves" and memorize it." In contrast she recalled her first year criminal law class which she had thought would be full of ethical and moral issues to question and debate but she remembered only,

> ... the teacher just cutting it off and saying, "Well, we don't have time to discuss that now.", and off you go to the next chapter. Well, I mean, people were wanting to discuss ... all those grey areas - about criminal responsibility and the death penalty ... social issues that I thought were interesting ... to study the way that decisions had been made and why. But that didn't seem to be "stuff" that was on the exam or in the text-book.

Participant responses and the research literature cited have both focused on the active role of the learner. The instructor, however, can have an important influence on the student's intrinsic motivation to learn, particularly where greater student participation and responsibility is encouraged. Many participants stated that they found it particularly helpful when the professor was able to relate the material in class to their own experiences or include practical real-life examples of the legal principles being taught. McKeachie et. al (1986) found that,

> Among the most important characteristics of effective teachers were high levels of interaction with students outside the classroom, striving

> to make courses interesting, using frequent examples and analogies in teaching, referring to contemporary issues and relating content to other fields of study. (p.83)

ADDITIONAL LEARNING STRATEGIES: STUDY GROUPS

Many participants referred to study groups as being a very effective approach to learning. According to "Lynne", she found very little that was helpful except meeting with other students and discussing cases and preparing for exams. "I think I tried just about everything ... one of the things that I found particularly effective (was) I started working in study groups when I was in first year ... ".

"Jonathan" found that study groups were both a tool for learning and a means for developing necessary skills such as legal analysis,

> Study groups, I found to be quite useful ... they would get old exams and everybody would be given a question and then you would present your answer, and you would be subject to the critique of 4 or 5 people who, by the time they'd finished their critique you would have a pretty good sense of a good answer for that exam question ... (and) you were forced to critique other peoples answer. That's a good way for you to sharpen your analytical skills.

Participation in study groups as a learning approach were found in the research literature to be beneficial for two reasons:

1) It has been found that higher education classrooms which are organized in more cooperative ways can increase student motivation and lessen the anxiety of students (McKeachie:1986:p.59) Presumably this was equally true in those situations where the students themselves created the participatory and collaborative learning environment; and

2) Students teaching other students has been found to be a very effective learning strategy. According to McKeachie et. al (1986) "There is a wealth of evidence that peer teaching is extremely effective for a wide range of goals, content, and students of different levels and personalities." (p.63)

CURRICULUM FOCUS: ACADEMIC VERSUS PRACTICAL

One of the key issues in legal education has been the two competing aims of providing law students with the traditional broad-based academic university education and yet also giving them the necessary training for their future professional role. In Canada the law faculty has relied to some extent on the division of labour between the university and the one year of articling experience which is required following graduation if the individual intends to become a practicing lawyer. During this one year apprenticeship, the student ideally learns the practical aspects of lawyering in a work environment under the supervision of a senior lawyer. There has been constant and increasing pressure upon the law faculties in Canada to reconsider this divided approach to learning which separates the academic acquisition of theory from the practical experience and skills necessary to practice law. The debate has become more pronounced in recent years as legal education becomes increasingly academic in nature.

> Law schools have left the aegis of the legal profession to become full-fledged faculties on the university campus. Formerly centred on practical training of the legal apprentice, the study of law is now conceived of as an intellectual discipline, warranting a central place in the scholarly community. This is the most significant event in the transformation of Canadian legal education. But was this a change for the better or for the worse? (Weiler (Gold(ed.):1982:p.3)

According to Arthur (1985) the result has been that, "law professors and law students (have) come to think and talk in ways more in keeping with the conventions of higher education than with those of the practicing bar" (Matas & McCawley (eds) Arthur:1985 at 163). The reason for the concern relates back to the outcomes of a legal education. If law schools are to prepare students, or the majority of students, to ultimately become lawyers then it is necessary to consider whether the present system supports the transition to the profession. Weiler (Gold(ed):1982) drew on the concerns of practicing lawyers who believe that the ivory tower is not a setting in which to train people for the real world of legal practice,

> ... a law school may be a fine place in which to turn out the occasional legal Pericles - equipped for legislating and judging - but it cannot do a good enough job in turning out the legal plumber who daily serves the citizen-client with a legal problem. (p.3)

Yet there were also critics on the other side of the debate who believe that law faculties are in danger of becoming too practice-oriented. They argue that the law schools have lost their true identity as members of the intellectual community of the university by tailoring the curriculum to the perceived needs of the practicing profession. (Matas & McCawley (eds) Clark:1985 at 222)

Unfortunately, the result of these dual demands on legal education has meant that it is often difficult to address any critical issue relating to legal education in Canada without falling into the rhetoric of one camp or the other - an "Academic" versus "Practical" education in law. This has been exacerbated by the lack of formal study into legal education in Canada. Little that has been recommended in terms of improving legal education is grounded in objective research and many of the books and articles which allege to tackle the issue of "quality" legal education, particularly in Canada are simply the product of unsubstantiated opinion.

As the struggle between academic versus professional orientation appeared part of the intrinsic character of legal education, it was considered necessary to address this issue in determining what constituted a "quality" legal education experience at law school. While there has been little objective research in Canada, there have been many American studies concerning the appropriate balance of legal education in terms of theory versus practice since the turn of the century. (Stevens:1983;MacCrate:1992)

In the United States which has Bar Examinations but does not have a required year of articles, the pressure on law schools to adopt a more practical component has been intense. Gradually legal clinics and work-experience have been offered at most law schools as an option. A recent report, *Narrowing the Gap* (MacCrate:1992),

recommended that there be even more of an emphasis on lawyering skills in legal education and that the university has a key role to play. The reaction has been mixed with some concerned that the proposals contained in the report will undermine the good work that the law faculties do now in teaching the traditional skills of legal analysis and research. Others welcome the report as a long-awaited confirmation that law schools have not been as fully involved as they should be in the over-all transition of the student to lawyer.

One of the primary contributions of the MacCrate report (1992) however was the complete list of values, skills and attitudes considered necessary to be an effective lawyer and serve clients well. No equivalent list of substantive (content) knowledge was developed by the committee as this was considered unnecessary for two reasons:

1) the content of substantive law was unique to the given area of practice; and
2) there was an underlying belief that in respect to substantive knowledge little guidance was required by the law faculties as this was a function that was already being performed well.

There has been little reaction to this report in Canada. At the present time, while there have been some developments in terms of offering clinical courses, most of these legal clinics are simply appended to existing programs as options. In fact, a few participants in this study discussed how difficult it was to get into these more practical courses. This was an interesting contrast to the MacCrate Report (1992) which stated that students should not only have the option of practical courses, but they should be entitled to participate in clinical courses as a right.

INSTRUCTOR FOCUS: ACADEMIC FACULTY VERSUS PRACTITIONERS

1) Focus Group #1

The issue of an instructors style of teaching being tied to whether or not the person

practiced law was raised by participants. There was a mixed reaction from the group on this issue and as one individual pointed out it would be difficult to determine with any accuracy as most practitioners were hired by the law faculty to teach the more practice-oriented courses. Another participant noted, however, that there was a distinct difference in the way that cases were presented when a practicing lawyer instructed the course, and that this difference persisted even when the subject being taught was substantive law or legal theory.

The majority of participants in Focus Group #1, did agree, however, that law school should provide students with the opportunity to learn practical skills and knowledge within a clinical setting. This was stated to be both practical and helpful for the student. An individual who strongly agreed with this premise, stated that everyone should have experiences throughout law school that give context to the legal concepts which are being taught.

2) Focus Group #2

During the session participants were asked if they noticed any differences in the approach taken by instructors who were practicing lawyers as opposed to full-time faculty members. From a learner's perspective, this question generated very few comments other than the fact that practitioners provided, "... a more practical approach because they are immersed in the day to day practice of law." ("Mary") In fact, most participants in Focus Group #2 seemed in agreement that effective instructors shared common characteristics regardless of their background or orientation to the course.

The more animated debate was in respect to whether the course of studies should be altered to incorporate a mandatory practice-oriented or clinical component. This was much more controversial and was discussed at length by participants. "Ella" proposed that law schools should offer only 2 years of academic study which was primarily theory and then the final year could be a clinical year that was,

> ... very practical oriented ... this is what you do, here's how. There are some law schools in Australia that do that and I think that's really a neat idea and I think it would really benefit everyone before you do your articles to have that type of year.

"Kent" and "Jake" agreed with "Ella" that cutting back the traditional law school program to two years would be beneficial. According to "Kent", "... (you) certainly get enough theory in two years!" "Mary" was also in partial agreement with this proposal although she felt that students should have the choice,

> I'm sort of torn, I'm of two minds about that, on the one hand I think they would have graduates who are better lawyers if they did something like that (one year practicum) because there are lots of things that you have no clue about when you graduate, that would be useful to know ... but on the other hand I also see law as having a valid purpose for the faculty promoting ... a more theoretical perspective.

"Mary", therefore proposed that there be two "streams" in law school where students could choose either a practice oriented program if they planned to become a lawyer, or an exclusively academic program for those who planned to continue on to a Masters degree.

"Brad" thought that there are many years to learn the practical aspect of law and there are only three years for law school, so he felt that the academic focus of the program was not a problem. "Kent", while he stated he didn't necessarily disagree with Brad, countered that he personally was better able to learn theory in law school when it was combined with the opportunity to do some practical law that required him to learn the theory.

3) One-to-One Interviews

When participants were asked if they noticed a difference between full-time academic instructors and practitioners (generally part-time) many participants noted that there were indeed differences. Again, some participants commented that this was partly due

to the subject matter of the course as practitioners were often teaching very practice oriented courses such as Civil or Criminal Procedure. Most of the substantive law courses which provided a theoretical over-view of a legal area were taught by full-time faculty members. Yet the comments of participants indicated that there was a difference in the way that practitioners approached the course materials and the students, even when the practitioner taught a substantive law course.

When the participants were asked if they had a preference to the type of instructor, the results were very interesting. Of the sixteen participants who answered this question only two participants found that the quality of instruction was unrelated to whether the individual practiced law or was a full-time faculty member. "Penny", one of the two, stated that, "... a good professor was a good professor no matter what their focus, (or) whether they were a true academic or practitioner." "Mable" agreed, "As long as the professor was really interested in what they were teaching, I learned a lot from them." Although she recognized that, "The nature of what they taught was different ...".

Five participants stated that they preferred practitioners and found them to be better instructors. An equal number of participants (5) commented that the two types of instructors, each had their strengths and weaknesses which differed depending upon whether the instructor was a practitioner or an academic. These participants believed that it was best to have both types of instructors. Finally, three participants commented that the very best instructors were those who were able to demonstrate both an academic (theoretical) and practitioner (practical) perspective. "Jonathan" commented, however, that these individuals were quite rare. No participant in the one-to-one interviews indicated that they preferred instructors who were full-time academics over practitioners as a rule.

The following Table 3.1 sets out the summarized responses of the participants in the one-to-one interviews who had commented or compared instructors who were

academic faculty as opposed to practitioners teaching a course in law. This question was only pursued with those participants who raised the issue in the interviews. Four individuals: Peggy, Raymond, Natalie, and Victor were not included in the following Table 3.1, as they were not asked whether they perceived any difference between the two types of instructors.

Table 3.1. Academic and Practitioner Approach to Teaching - Strengths and Weaknesses sets out the summary of participant comments in respect to the apparent differences of the approach taken by full-time academic staff versus practicing lawyers who taught law classes.

TABLE 3.1: Academic and Practitioner Approach to Teaching - Strengths and Weaknesses as Identified by One-to-One Interview Participant Responses.

Participant	Traits of Academic Instructor:	Traits of Practitioner Instructor:
Heather (*)		Results oriented - More policy reasons
Brian (*)		Concise and organized lecture style. Able to apply law to real fact situations - law came alive!
Peter (*)		Flavour of practice through War stories.
Richard (*)	More history & theory	War Story - Practical Focus on law.
Casey	*I think both types of instructors are bad, just in different ways.*	Both types of instructors are bad, but I found one practitioner who was able to "marry" practice and theory
Janet (***)	*Academics had no sense of application - only abstract.*	Interesting - had practical knowledge
Penny (****)		
Benjamin (*)		Teaching more meaningful because it was in context.
Dennis (**)	Provided legal theory *Intellectually pretentious*	Practical - "This is what you do and how to do it"
Jonathan (***)		

Table 3.1 (cont)	Traits of Academic Instructor:	Traits of Practitioner Instructor:
Beatrice (****)	Noted that many full-time academics actually practiced law "on the side."	Able to give examples from practice although not sure that this was important but made course more interesting
Lynne (***)		Practice oriented - War stories entertaining and gave credibility.
Mable (**)		More procedure
Charles (*)		War stories were good. Able to relate learning to practice.
George (**)	Better for substantive subject areas.	Better for practical subjects.
Timothy (**)		Practical - but did not teach academic subjects *Hard to contact*

NOTE: Italics were used to indicate negative comments or criticism of the common characteristics a particular instructor type.
NOTE WHEN REVIEWING THE TABLE: The number of asterisks by the name of the participant indicates an over-all assessment:

Practitioners were the best (# of participants)	= * (5)
Each was different / good for different courses	= ** (5)
Professor who had both backgrounds was the best	= *** (3)
Good Professor was good regardless of background	= **** (2)

In *Narrowing the Gap - the MacCrate Report* (1992) recommended that full-time academic faculty staff members who are readily accessible to students be the preferable choice for instructors if the practical component of legal education was combined with course instruction. These full-time academics, however, must demonstrate a dedicated approach to practice-oriented teaching which included a "... commitment to teaching skills, experience training, knowledge of the growing literature of clinical scholarship, an ability to contribute to that scholarship, and reflection and attention to educational theory ... " (p. 245)

> In order to meet the challenge of making skills instruction broadly available, law schools should assign primary responsibility for instruction in professional skills and values to permanent full-time faculty who can devote the time and expertise to teaching, and developing new methods of teaching skills to law students. (p.245)

Yet the use of practitioners as instructors should be continued according to the MacCrate Report (1992),

> In addition, law schools should continue to make appropriate use of skilled and experienced practicing lawyers and judges in professional skills and values instruction ... on a part-time basis (as this) adds to (the) law faculties' knowledge of practice and to the practitioner's understanding of legal education. (p.245-246)

There were many different reasons given for why a practitioner was generally a more effective instructor. "Heather" stated that they tended to be more policy oriented and provided a practical delivery. "Brian" thought that practitioners were concise, very organized in lecture style and they were able to apply law to real fact situations. He also mentioned the use of "War Stories" which were raised by four other individuals using exactly the same terminology. ("Peter"/"Charles"/"Benjamin" and "Lynne"). Other participants referred indirectly to these stories by referring to the benefits of using real-life illustrations in classroom instruction. They stated that it gives the "flavour of practice" and students are better able to then relate the learning of law to practical situations in the future. "Benjamin" also thought that practitioners were able to make the teaching more meaningful because it was in context and the instructors were better able to answer questions in class particularly in respect to specific procedural or practical enquiries.

Professors at the Albany Law School have set up a first year course entitled: Introduction to Lawyering, which attempts to incorporate the teaching of practical and theoretical aspects of law at the same time. The course simulates a legal file from the beginning (first interview) to the end (trial) including research, several drafting exercises (interrogatories, affidavits, letter to client) and an attempt at negotiation of the issues. The professors of this course report that students are highly enthusiastic about this approach. They seem to acquire through the simulation, a better understanding of, "... the life of a case from its inception, before it is sanitized and compartmentalized within a casebook devoted to discrete law subjects". (Maurer & Mischler: 1994:p.101).

In support of their premise that it is important to, "integrate theory with practice - substance with skills - from the beginning of law school," they cite Schneider:

> ... (the) dichotomy between theory and practice, doctrine and skills, is false - it must be rejected by both clinical and non-clinical teachers and leadership must be given to the project of eradicating these distinctions by deans ... The intellectual process of connecting theory and practice must be a major focus of legal education.
>
> Although many academics believe that a law school education should focus on doctrine and theory, and that practice skills can be learned after graduation, legal educators are in a unique position to instill values and influence budding professionals at an impressionable time of their lives. Law students are particularly receptive to new ideas in the first year of law school. (Maurer & Mischler: 1994)

In discussing traditional legal education, Spiegelman (1988), noted the frustration of first-year students when they explored the fixed appeal court records and could take no part in the resolution of the issues, "... the role of the student is that of a detached observer whose reasoning is an internal, self-contained process that manipulates plastic principles to fit predetermined facts." (Spiegelman: 1988 at 249)

Both Maurer & Mischler (1994) and Spiegelman (1988) stressed the importance of first year law school. There was certainly a similar consensus in Focus Group #2 as the first year of law was perceived to be most consequential year in law school. "Jake" attested that, "I think we learned about 95% of stuff in the first year ... " Another participant stated that most students learned the basics in first year and "Mary" commented that "... after first year it was much less important to go to class." One of the reasons that the first year was perceived to be critical was that most students learned the key skills taught at law school, such as the study of cases and the fundamental "building blocks" of substantive law during that year.

The statements of the participants confirm the observations of other legal educators that law school has not utilized the second and third year of law to the best advantage.

(Rowles:1981) "While diagnoses of the ills of current legal education differ in critical respects, there does seem to be a general consensus as to two central points. First, the initial year of law school, is by and large a successful affair:

> The first year remains, as before, the critical time in which the student learns to "think like a lawyer". Second, the remaining two years in law school are dull for many students, and can certainly be improved. (p.375)

One possibility for improvement may be the incorporation of a more practical component to the second and third year of law school. This would provide students with more specialized knowledge, skills and values instruction and use the time to full advantage. This could assist students in their transition from law school to the practice of law or alternate career.

OTHER FACTORS AFFECTING THE LEARNING EXPERIENCE

TABLE 3.2. One-to-One Interview Participants Summarized Responses Identifying Other Factors Affecting Their Learning Experience

Question: Were there any other factors that affected your law school experience?

Name	**Any other factors effect teaching and learning?**
Heather	SLA - First chance to apply what she learned. Mooting. Preferred papers over exams.
Peggy	People in class who asked questions. No discussion of ethical/moral/social issues. Formed friendships in criminal clinic other-wise did not associate with other law students.
Brian	Cooperation despite competition. Old exams. Helped each other.
Peter	Socratic method good in smaller classrooms.
Richard	Needed something of interest in class to hold attention. Conceptual frame-work was important. Time of class (AM/PM) had an impact.

Table 3.2 (cont)	Any other factors effect teaching and learning?
Victor	Progressive law school which attracted certain type of faculty and students. Some people felt that they could not express their opinions because of the political climate. Good faculty in (his) area of practice. Law school was more expensive than he thought it would be so had to work part-time. Smaller classes were better.
Casey	Stated that age affected learning (young student - only 2 years undergrad). Still maturing & most other students were much older.
Janet	SLA - Chance to see how law applied in real cases rather than just in Ivory Tower - Law school was primarily rote memorization.
Penny	Profs who intimidated resulted in difficulty in concentrating (focusing on learning). Good profs were interesting and enjoyable.
Benjamin	Class size - learned more in small classes - more participation and less rote memorization. SLA - real people with real problems. Applied the law - very meaningful.
Dennis	Didn't get along with law students. Friendships were all pre-law.
Jonathan	Personally motivated to do well and get high marks. Wanted good articles and therefore aimed for Dean's List.
Raymond	N/A
Beatrice	Became very insecure about academic skills (victimized by pressure and lack of feed-back) Found law school undermined good learning strategies acquired prior to law school - became superstitious and regimented about study practices. Also appalled by how group dynamics and social culture changed after marks were released in first term (top of the marks hierarchy)
Lynne	Need to be self-directed. Need to cope with the volume of material. Animated profs who encouraged discussion. Small group size (beneficial).
Mable	N/A
Natalie	Stress. Evaluation system affected motivation and increased stress. For some students, finances were a big issue.

Table 3.2 (cont.)	Any other factors effect teaching and learning? (cont.)
Carl	Pure enjoyment - if liked course then learned more but did not necessarily mean a better mark at end.
George	Might have got more out of law school if took break between under-grad and law. Law school would be better for people with some work experience.
Timothy	Some people picked classes based upon who was in them because of the bell curve. Example of friend who dropped a course because there were too many high achievers in the class.

These comments ranged over a spectrum of concerns. Specific issues raised included smaller classes, benefits of SLA experience, intrinsic interest in the subject matter, methods of evaluation (marks) and the impact in terms of stress and finally connection to other students through friendships and working relationships. These factors have already been covered in some detail in the paper or will be discussed in greater depth in Chapter 4. Two areas which will be considered briefly at this point as they were not covered elsewhere in the paper are:

1) Expense or the financial cost of going to law school; and,
2) mature students experience of law school.

1) Expense of Law School:

There was a recommendation made by one of the participants that universities in Canada should consider allowing part-time studies in law. According to this participant while it may now be a possibility in at least one University in Western Canada this should be expanded as an option at more law faculties. She recommended that students take as much time as possible to complete their program of legal study as she believed that they would graduate with a better understanding of the law and be subject to less pressure.

In addition, more than one participant referred to the fact that they were forced to work part-time throughout law school. For example, "Peter" indicated that he worked 30 hours a week throughout law school. This certainly placed these students under additional stress considering the overwhelming work-load in law school. Participants who reported that they worked throughout law school also tended to be less connected with the more informal or social aspects of law school although that was not always the case. The work was a necessity for these students as most indicated that they either were supporting a family or were without the means to attend university full-time for 3 years without some financial income. There are few bursaries or scholarships available in Canada that are large enough to assist these students in any meaningful way.

2) Mature Students:

Some participants commented on the benefits of taking a break between the under-graduate degree and going to law school. Those who did return to law school after engaging in another career or life experience through travel generally found that they were more focused and had clearer expectations about what they thought the outcomes of law school would be. Other responses of participants in this study indicated that there was some evidence for the proposition that law school may be a very different experience for the "mature student." While not a focal point of this research, MacFarlane (1991) has provided support for this premise through a thorough analysis of the adult learners law school experience in her unpublished PhD. thesis.

SOCRATIC METHOD

There are two methods of instruction which were considered by the participants and the research to be specific to law school: the Socratic and case law method of teaching law.

Morgan (1989) defined the Socratic method as, "... a form of teacher-student interaction in which the teacher vigorously cross-questions a student on her or his understanding of a particular case or legal principle. The vast majority of the interaction occurs between teacher and student (rather than student and student) and is teacher-initiated", (see also Peairs (1960) for a more detailed description of variation in the use of the Socratic method). One of the best known representations of the Socratic method was found in the movie the *Paper Chase* where the instructor introduced the method of teaching to a class of first year students in Contracts at Harvard Law School:

> We use the Socratic method here. I call on you - ask you a question and you answer it. Why don't I just give you a lecture. Because through my questions you learn to teach yourselves.
>
> Through this method of, "Questioning - Answering, Questioning - Answering" we seek to develop in you the ability to analyze that vast complex of facts that constitutes the relationships of members of a given society. Questioning and Answering. At times you may feel that you have found the correct answer. I assure you that this is a total delusion on your part. You will never find the correct, absolute and final answer.
>
> In my classroom there is always another question, another question to follow your answer ... You teach yourselves the law, but I train your mind.
>
> Professor Kingsfield (Paper Chase - 20th Century-Fox, 1973)

According to Hantzis (1988) the "Kingsfield model" has come to personify the Socratic method. The Hollywood version, however, was not necessarily the method or style of this form of teaching that was supported by the majority of instructors. In fact, in recent years it has been perceived as a "male model" of instruction which was not conducive to learning, particularly for female students. The Socratic method has been criticized strongly by feminist legal scholars. Hantzis (1988) commented that,

> The Kingsfield image is, one hopes, frightfully out of date. It is not just that the picture is exclusively male but that his classroom is awash with silent tension ... surely legal education has better teachers than

> Kingsfield - teachers who favour humour over tension, policy over doctrine and encouragement and instruction over competition and ridicule. (p.156)

A brief history of the development and use of the Socratic and case method of teaching would not be amiss as these techniques were developed as a unique educational approach, specifically aimed at teaching law. According to Levine and Saunders (1993), in Canada, similar to British and American legal education, there was a move to divorce the teaching of theory from the actual practice of law. In the 1870's

> ...the case method was introduced and refined at Harvard Law School by Christopher Columbus Langdell, who believed that the scientific method could be adapted as an instructional model for legal education. The case method was directed by logic and systematic study of precedent as a means of rationally discovering legal rules. Langdell and other proponents of the case method viewed law as an empirical science ... (p.111)

The standardization of legal education in North America was predominantly affected by the approach that Langdell introduced. In the words of Schlegel (1985),

> In advocating that law was a scientific discipline worthy of study, Langdell provided American law schools with an "intellectual Model-T", a wholly complete, conceptually unified universe to put in the mind of the standard student. (p.323)

In fact, for most legal educators, the conception of teaching law came to mean a combination of the Socratic method complemented by a case book comprised of appellate decisions. Included as part of this approach was an underlying premise that private law was more important than public law. Further, all political and economic theory was stripped away so that law could appear as a system of coherent, stable, certain and predictable rules which governed the actions of people in society. In other words, law became a "science."

The reaction of students to this fundamental change in the way that law was taught was not particularly positive. According to D'Amato (1986),

> When Langdell introduced the Socratic method in 1870, at a time when all the other professors at Harvard lectured to the students, student attendance in his course rapidly declined and there was great discontent with his teaching method. (p.474)

Students still find the Socratic method of instruction disconcerting and it can leave students feeling mentally insecure rather than intellectually challenged. Students have found the approach particularly threatening if the class room experience of instructor - student debate was confrontational rather than instructive in nature. D'Amato (1986) who supports the use of the Socratic method, was critical of students who do not appreciate the challenge that is demanded in learning law. He contended that the Socratic method was a superior teaching tool which was necessary in law school to instruct students in thinking about problems in completely different ways. Yet he recognized that the Socratic method encompassed both good and bad methods. He found that;

> ... in the Good Socratic method the answer is not implicit in, or deductively derivable from, the question. Instead, the professor "plugs in" to the students's mental wavelength, making sure, by question-and-answer, that the student's mind is precisely at the point where the existing mental pathways will lead to the wrong answer.
>
> The professor's challenge is to the pathways, not to the "bottom line" conclusion; the point is not to instill in the student a new bit of substantive memory but rather to force the student to shake up existing mental K-lines (thought processes) so as to learn how to arrive at a better solution to the professor's question-puzzle. This technique actually leads to mental growth by the multiplication of path-ways of thinking. (p.466)

He stated that the reason this method has been so disparaged by students, is that it forces them to learn and that learning or growth of the mind requires effort, risk and insecurity all of which may appear as unpleasant to the learner. According to D'Amato (1986),

> They think that learning law is a matter of memorization, recall, and regurgitation - that is what college learning was, and how they got their

> good grades in college, so why should law school be any different. (p.474)

Participants in this study who had experienced this method of teaching confirmed D'Amato's observation as they tended to be critical of the socratic method. Yet, while most of the participants would have agreed marks are based on "memorization, recall and regurgitation," this was found to be the case whether or not the socratic method was used. Other reasons for not liking the method do not relate to student laziness but rather to fear of failure as a result of work over-load and time pressures which precluded adequate preparation for class.

There has been no research evidence to support that this approach was superior as a teaching method at law school. According to Teich (1986) in an article entitled, "Research on American law teaching; Is there a case against the case system?", studies to date have not been definitive and he recommends more research in this area. If this teaching method has the potential to impact negatively upon the student then careful consideration should be given to the potential benefits and draw-backs before justifying re-introduction of this method to the classroom. In addition, all steps should be taken to engage the learner without the more negative aspects of this approach which include intimidation, sarcasm and teacher-focused orientation to class-room discussion.

When participants were asked what their experience with the socratic method was, there were several negative comments, including the belief that it should never be used:

> "Ella" - I thought that it was awful, I hated it!"
>
> "Sara" - "I thought that the best professors didn't really use it."
>
> "Jake" - The socratic method is too difficult when you have so many people that have to learn at the same time, it's too time consuming. As, "Sara" noted, "Socrates wasn't really teaching 150 people in a lecture theatre."

Other participants provided only mixed support with recommendations on how the benefits of the method might be achieved in other ways. Advocacy skills for example might be developed in classes where students had time to prepare, or knew that they were to be called upon during class in advance. Others stated that this approach might be an option for those who sought to develop specific skill, such as learning to "think on your feet" which may be valuable for those who aspire to practice law as a court-room barrister.

The overwhelming majority of participants rarely or never had experienced the Socratic method in law school. Ironically, the most positive comments about the Socratic method came from the more recent graduates who had never been taught by a professor using this approach. While it has been true for many years that, "The lecture hall remains the center of education at law school." (Stuesser:1989:p.55) there appears to be an increasing trend to move away from more interactive teaching methods, possibly as a consequence of instructors attempting to cover the increasing amount of information in a given subject.

The fact that it was the participants who had the least exposure to the Socratic method that professed they would have preferred this approach was not an entirely surprising finding, given the research by MacFarlane.

In an article which summarized the findings of his research, entitled, "Students and practicing lawyers identify ideal law professor," MacFarlane (1986) stated that,

> ... one of students' ideal personae, the Socratic trainer, follows closely these professors' rhetoric about the value of the socratic method. Importantly, however, this personae is idealized strongly by entering students who have never experienced a law school class, and it declines steadily to almost nothing among third-year students.
>
> ... apparently the students' ideal is a quickly fading product of prior impressions from unknown sources ... (they) may have read or seen fictional accounts of law school. Their ideal was a reality, but the reality changes when it encounters the law school experience. (p.103)

What MacFarlane (1986) discovered was more in keeping with the research in adult and higher education generally, that, "In fact a consensus among all personae is that a teacher should use an accepting and encouraging style in the classroom." (p.104) This was the one characteristic upon which both practitioners and students agreed according to the MacFarlane study.

METHODS OF EVALUATION

Focus Group #1 - Members of this group identified the whole issue of student assessment as being critical to the consideration of a quality legal education. Marks have a profound effect upon students in the highly competitive environment of law school. This was reflected in the earlier story related in Focus Group #1 of the individual who "broke" under the strain of evaluation and become violent. The group members were somewhat sympathetic to his plight and similarly recalled their own personal experiences which one person termed the "pain and glory" of law school marks.

In Focus Group #2, one of the clearest recommendations, was for the law faculty to abolish 100% final examinations. It was thought to be poor method of evaluating learning and it exerted too much pressure on the student for a very short concentrated period of time. It also encouraged a particular style of learning. In the context of 100% final exams, one participant commented that there were, "... a lot of people who got good marks by learning to write a good law school exam ... ", and "Greg" stated that, "I can't imagine why they should stay with 100% finals except to minimize work for professors." "Brad" commented that "There's no feed-back at all! You have no ideas what the answers were." and the group unanimously agreed with his analysis.

Only one of the participants, "Dona" commented that marks were immaterial to her legal education experience and she thought that this was probably due to the fact that she was older when she went back to law school. "I had no problem with the evaluation system because what "they" thought really didn't matter to me. What mattered to me is what I came out with learning." In response, "Greg" agreed and said that while that wasn't his attitude while he was in law school, that was how he feels now. "Looking back on law school, I think, Oh well, I mean as long as I learned something, who cares about the marks ...".

Other members in the group, however, pointed out that marks can have a long-term impact on some individuals, particularly in terms of future academic pursuits and job opportunities. As "Mary" explained, "... grades can sure have an impact on your career after, even outside of academic circles, depending upon what kind of articling position you were looking for". Despite the potential of marks to influence future career opportunities, it was interesting to note that "Mary" had not discovered any correlation between law school marks received and suitability for practice. In fact, she reflected that, "I found it very interesting when I graduated that ... the best practitioners in my area were people who were not particularly distinguished in their law school years. Yet there was no question that they were excellent, excellent lawyers".

One-to-One Interview Responses:

TABLE 3.3 Summarized Comments of Interview Participants on Marks and Method of Evaluation, sets out the responses of participants in the one-to-one interviews who responded to the questions about the marking systems and methods of evaluation used in law school. Of particular interest was the general sense that marks did NOT reflect the individuals learning in a particular course. Comments made by participants in respect to this issue are in bold print:

What comments do you have on the marking system and methods of evaluation used at law school?

Did the marks that you received in a particular class accurately reflect your learning? *(Responses in Bold)*

NOTE: (*) placed by participants who found that there was a correlation between the mark received in a class and their learning or mastery of the course material.

TABLE 3.3 Summarized Comments of Interview Participants on Marks and Methods of Evaluation

Name	Marks and Evaluation
Heather	100% finals are not good. Need more practical methods (i.e. mock chambers) on giving feed-back. Task should be related to subject. **No correlation between marks received and learning.**
Peggy	Pretty good. Never really thought about it. Don't know if it could be done any differently. **Marks and learning is unpredictable.**
Brian	Problem with the bell-curve - requires that a certain % of people fail. **Marks do not reflect learning.**
Peter	Difficult to understand marking system. Simply a function of knowing "how to" write exams. **Marks did not reflect his own knowledge of a topic.**
Richard	Frustrating. Not sure how things were marked. Problem with the bell curve. **No correlation - only reflects ability to spout off in 2 hours.**
Victor (*)	Fair enough. Ranking great for those at the top but is discouraging for those at the bottom. **There was a correlation - but some profs marked too subjectively** - gave opinion rather than quality.
Casey	Totally arbitrary. Worked extremely hard and then began to work less and less and marks went up slightly. No matter what effort made in law school it didn't make a difference. Don't think courses should be graded on a curve. **Marks not an accurate reflection of learning in course.**
Janet	Not a huge issue. Type "A" people took a huge ego beating. Caused anxiety and frustration. System of marking did not reflect knowledge. **No correlation between marks and what was learned - did not reflect learning but ability to memorize.**
Penny	Extremely stressful and frightening. Better to have more testing throughout the year and not 100% finals. Thought that one failure would mean the end of her career. **No huge correlation between marks and learning.**
Benjamin	Some profs were tough markers and others were easy. The system of 100% grading did not make a big difference. **Some correlation.**

Table 3.3 (cont)	Marks and Evaluation (cont.)
Dennis	Was a "mystery." Did well when liked a course and even in some courses that he didn't like. 100% finals were okay particularly when you didn't go to class. **No correlation between marks and learning as stopped learning after first year.**
Jonathan (*)	Anonymous marking was a good system. Marking on the curve meant that you were not sure how you did which could be nerve-wracking. **There was a correlation between what was taught and marks.**
Raymond	100% finals - never understood how these were marked and there was never any feed-back. **There was no correlation between marks and what was learned in a course.** Papers were more reflective.
Beatrice	100% finals had terrible impact on people and did NOT evaluate true ability. Anxiety caused by exams and lack of feed-back impacted on learning. Very stressful! Marks determined social standing and promoted an extremely competitive environment. **Not a good correlation. Marks actually discouraged real academic inquiry. Only got good marks for giving back what professor wanted, real learning was not important.**
Lynne (*)	Unfortunate if 100% exams used because not the best indicator of ability. Should be alternatives. **Generally marks correlate with learning.**
Mable	Always baffled by marks. Personally don't like exams - prefer papers. Bell curve does not encourage supportive learning environment. **Marks are not an indication of how much is learned.**
Natalie (*)	Bell curve is unfortunate and 100% finals are a "crap shoot." **There is about a 70% correlation between learning and marks received.**
Charles	Giving marks is useless - everyone passes. 100% exam is not representative of learning. Possibly a take-home exam would be more indicative. **There is no correlation between learning and marks received.**
George (*)	Paper courses meant that there was less cramming at the end of term. **With one exception marks were a fair reflection of what was learned.**
Timothy	100% finals provide the type of pressure that is appropriate in training to be a lawyer. But does not accurately reflect what you know.

Turow (1977) "One of the clearest messages that emerged to me as a member of the first-year class ... (was) the paramount importance of grades. During the first weeks of school, I had thought that our marks were used only to measure off the lofty types fit for Law Review. but ... it became apparent to me and my classmates that grades were a kind of tag and weight fastened to you by the faculty which determined exactly how high in the legal world you were going to rise at graduation. (p.91)

"Beatrice" confirmed that this was the situation she had experienced in law school. She recalled that marks were considered so important by the majority of students that there actually developed a phenomenon she termed, "mark groupies":

> ... the hierarchy that law school creates directly influences the dynamics (of teaching and learning) ... I was fascinated and appalled at the way the class dynamics changed and the way the class stratified after the first round of marks came out. I didn't think that grown adults could be such groupies of the students who got excellent marks ... there were these sort of fan clubs formed around these students that formed the top of the marks hierarchy.

Her final comment on the marking system and the ensuing social culture of law school was that it may have felt, "... good for a select few people who feel very included, and very validated by it. ... (but for others) it is either neutral or has a negative impact on many law students. Or else they opt out, particularly older students will just opt out of the law school culture."

ADVICE TO FACULTY

The following question was developed for the one-to-one interviews after the completion of both focus groups. It was:

> **What would you say if you were talking to the faculty at your law school today?**

The question was used in the one-to-one interviews as a probe following the query about the participants opinions on the improvement of legal education generally. The question helped to personalize the responses. The participants were mixed in their answers with two participants providing very positive comments while three participants gave very negative feed-back to their faculty. As an interesting contrast to the original break-down on practitioners versus full-time academics, five participants

would have liked their professors to have been more practical. There were no requests, however, for professors to have taken a more theoretical approach. "Jonathan" continued to promote the idea that each instructor has strengths and the way to improve legal education was by professors addressing their short-comings particularly in respect to finding the appropriate balance of theory and practice. "Jonathan" stated,

> Don't forget that we're not pure academics, that we have to go out there and practice. So for the academics, those academically inclined, I'd say, "Don't forget the practical context of the law!" and for those who have an over-emphasis on the practical, I'd say, "Don't forget that we are also dealing with an academic structure in the law! ... try to find that balance.

The other advice offered to faculty is that:

1) the methods of evaluation should be changed; and

2) to remember that law is a service profession.

"Peggy" encouraged professors to "... try and convey to their students that grades and money isn't everything (and) that being a lawyer is a service profession. I think you should try and encourage people to develop their sense of wanting to help people rather than just make money from them."

ADVICE: IF YOU WERE TO TEACH A COURSE ...

This question was only added mid-way through the one-to-one interviews so only eight participants were actually asked this question. Responses repeated some themes but from a very different perspective as participants were considering what they would do as instructors. This helped them to provide examples of their out-look on education through envisioning their own application of the key elements of a quality education in the classroom role of the instructor, rather than from the perspective of the student. As a result the eight participants responded to the question and provided

insights into how they would have liked to have been taught.

1) Never pretend to know the answer. - Know course material inside-out so that you can respond confidently to questions. Use practical examples.

2) Get students to discuss issues. Provide variety, not just traditional English case-law. Would not use socratic method. Provide field trip opportunities.

3) Provide a good basis in law and history as well as how law is applied today. Teach using a mixed approach which incorporates the law in context. Use practical examples.

SUMMARY

Teaching and learning dynamics are a fundamental element of a quality legal education. Participants explored the characteristics of effective instructors which were related to key principals developed by Ramsden (1992). They also related information about the approaches they adopted as learners. Over-all teaching and learning and the quality of the experience were found to be symbiotic in nature. The learning approach was affected by the quality of the education experience. In turn the quality education experience particularly effected the learning. In fact, certain teacher-learner interactions were found to foster very superficial or "surface" methods of learning. While other factors, encouraged a deep learning approach. A number of elements were identified including work-load and stress as well as teaching style, course material and methods of assessment which could encourage students to take either a superficial or a deeper approach to learning. Participants comments and related research indicated that the deep approaches to learning are an essential part of a quality education experience.

Other aspects of the education experience that impacted upon student learning, particularly in the legal education context, were also considered. This included consideration of:

1) two types of instructors at law school - practitioners and full-time academic faculty; and
2) the Socratic case-law method of instruction.

According to Daloz (1986), "We learn as much from the way we are taught as from the content ..." (p. 144) This was important as the learners themselves have indicated, there were more lessons that were learned at law school than were necessarily intended by the instructor. Despite the general agreement amongst participants that much of the material can be self-taught and that the learning experience was in large part in the control of the learner, this did not mean that effective instructors were not highly appreciated and part of a quality learning experience.

In addition, there were also other elements of the learning environment that were perceived as a message that was transmitted through the learning process. Whether or not this message was intentional it also, as part of the over-all learning environment, had a profound effects upon the learner and the learners perception of the quality of the educational experience. These other elements of the learning experience will be explored in greater detail in the next chapter which will review the "informal" aspects of learning.

CHAPTER 4

"INFORMAL" LEARNING IN A QUALITY EDUCATION EXPERIENCE

INTRODUCTION

A key theme identified by participants was that a "quality" legal education had to include more than the "formal" learning experiences of law school. "Jonathan" - "If you only went through law school and just attended the classes, and that's it, I think that, it would be a very narrow experience ... I don't think it would be fulfilling at all!" Another participant referred to the need to do this from the perspective of simply understanding the law, "... you should have experiences on the way, throughout law school, to give context ..." to the legal principles taught.

The emphasis on "informal" learning experiences was evident when Focus Group #1 participants were asked to recall significant law school incidents. In response they rarely recounted situations which occurred as part of the "formal" teaching and learning experiences in law school. Instead they recalled anecdotal stories which were drawn from extra-curricular activities. These incidents were an important part of their law school education but they were certainly not a required part of the course-work. Involvement in these activities was not necessary to acquire the degree but seemed to be essential in guaranteeing a quality legal education experience according to the participants.

The participants in the study who indicated that they had not sought to engage in these "informal" activities were most likely to comment that their law school experience was constrained or limited. The over-all experience was disappointing for those who focused solely on course work in law school either by choice or by default. More than one participant when talking about their law school experience used the words "narrow" or "restricted".

This theme was explored further by asking two questions. The first question was used with both Focus Group #2 and the one-to-one interviews. The second question was developed following the second focus group and was used in the one-to-one interviews to conclude the interview:

1) How could your legal education experience have been improved?;

2) Any final comments on how legal education can be improved now, based upon your past experience both educational and professional.

IDENTIFYING ASPECTS OF A QUALITY LEGAL EDUCATION EXPERIENCE

Question: How could your legal education experience have been improved?

In response to the question on improving their educational experience in law school, several participants focused on formal teaching and learning dynamics and recommendations included issues discussed in previous chapters. Smaller class size was one suggestion as this would improve class participation and allow greater access to professors. More feedback was another recommendation made and this included both better methods of evaluation systems over-all and ongoing assessment throughout the term. Finally suggestions were made in respect to improving the quality of teaching and the importance of addressing situations where it was well known that the professor was inadequate as an instructor.

In order to establish whether Focus Group #2 considered extra-curricular experiences to have the same merit as indicated by Focus Group #1, it was necessary to use a specific probe. The group was asked to consider the "larger picture" of the law school

experience and to provide details about any other activities (outside the class-room) that helped make law school meaningful. The aim was to discover whether members of the two focus groups agreed in principal that extra-curricular activities were important. The query was also intended to gather information on the types of "informal" experiences, if any, which impacted upon the quality of a law school education.

The members of Focus Group #2 responded to the probe by placing a significant emphasis upon the importance of their voluntary involvement in non-classroom learning experiences. This confirmed the importance of this aspect of the law school experience which the responses generated from Focus Group #1 had suggested. Participants discussed three different activities:

1) mooting;

2) client communications and counselling; and

3) participation in the Student Legal Aid[1] (SLA) Clinic which generated the most over-whelming interest and commitment.

1) Mooting

The first activity identified - mooting - has an established tradition in law school. Clark (1987) commented that, "Mooting programs and the techniques of legal research and writing have long been universal components of the LL.B. regime; (while) clinical courses designed to provide training in other practical aspects of the lawyering process have emerged only within the last decade." (p.225)

2) Client Communications and Counselling

Interviewing and counselling are two of the critical skills that the participants recalled as being part of their informal law school experience. Courses which incorporated a

[1] Generic name given to the variety of volunteer legal clinics run by students which provide information and advice to other students and disadvantaged members of society.

skills component were rare when the members of Focus Group #2 attended law school. While these types of courses have rapidly gained recognition, most law schools still offer skills courses as options and not as part of the required core curriculum. The skills identified by the MacCrate Report (1992) as essential for competent representation of clients include: problem solving; legal analysis; legal research; factual investigation; communication; counselling; negotiation; litigation and alternative dispute resolution; organization and management of legal work; and recognizing and resolving ethical dilemmas. (p. 135) (emphasis added)

Review of the legal education literature revealed an increasing number of articles suggesting ways to incorporate a skills component in the core curriculum of substantive law classes. One example, was the article by Maurer & Mischler (1994) which described a first-year course developed at Albany law school which the authors stated could serve as a model for other law faculties:

> In, Introduction to Lawyering, students examine the life of a case from its inception, before it is sanitized and compartmentalized within a casebook devoted to a discrete law school subject. They encounter the complexity and ambiguity inherent in case development, and they experience firsthand the series of decisions a lawyer must make in handling a case from initial client interview through appeal. (p. 101)

Participants commented on the importance of learning these skills and the few individuals who had chosen to attend, on a non-credit basis, the Client Interviewing and Counselling sessions, expressed how helpful the had found this experience.

3) Student Legal Aid (SLA)

Participation in Student Legal Aid provided the opportunity to participate in a clinical law experience which was otherwise unavailable to participants in Focus Group #2. For these individuals, there had been no clinical courses for which they could have received credit when they attended law school. The majority of these participants had, on their own initiative, volunteered at some point during their three year program in a

student-run (SLA) clinic. A few of the participants had been very involved either as a clinic supervisor or administrator in the SLA program. These are a few of the comments they made about their experience in SLA:

> "Greg" - "I thought SLA was really important."
> "Mary" - "I found that I learned most of my skills ... that I ended up using in practice at SLA." ("Kent" and "Greg" agreed)
> "Kent" - "I guess that SLA was the single most valuable experience for me and I have never hired an articling student who didn't have it."

Unfortunately, the law faculty did not appear to necessarily support student involvement in the clinic. In fact, participants expressed their disappointment with the faculty for not recognizing the importance of the volunteer work that they were doing. This was illustrated by recollections of the ongoing disagreements between students and faculty over continued allocation of space within in the law school for the clinic.

"Kent" continued his praise of SLA and noted that, "... if we all agree that the SLA experience assists in your legal education, you shouldn't have to fight the faculty to get it!" Interestingly participants in different provinces recalled similar situations where faculty had either been disinterested or completely non-supportive of the SLA clinic, so this situation was certainly not unique.

"Ella" made the comment that law school should consider making the SLA clinic a mandatory part of the university experience. She suggested reducing the theory component in the present law school curriculum to two years and then offering a one-year clinical program in the third year where students could learn the law and assist clients. This comment created strong debate in Focus Group #2 on the merits of an academic versus a practical legal education. The group were almost evenly split on whether there should be a required practical skills component to law school or whether all three years should be focused upon acquisition of legal theory. Support

for the latter position was based on a belief that there is very little time for theory once you enter the actual practice of law. The views of "Brad" and "Kent" are representative of the two positions:

> "Brad" - "... there's lots of time for practice. There's only three years for law school. So I think the type of experience that you find in the first year (there) should be still more in the other years."

> "Kent" countered this position, however, by saying, - "I don't disagree with you necessarily, except to point out that ... I learned a lot more theory when I was doing some practical law that required me to learn the theory. And I still know the theory eight or nine years later because of that, because I learned the two together in certain areas.

Clark (1987) in a study of curriculum in law schools found that while the first year was very similar in terms of required courses the second and third year programs were quite diverse at different law schools. One of the key differences was the number of electives particularly clinical courses. He noted, however, that,

> By their very nature such courses involve major commitments of time, energy and scarce budgetary resources. Nevertheless, their number and range has grown steadily as experience and experimentation have brought increasingly sophisticated methodology. Opposition within law faculties to their inclusion within the curriculum lessened as they were seen to provide a bridge between the theoretical and the practical. (p.225)

Clark also discussed the importance of either real (SLA-type) experience or simulated clinical courses in assisting the student to develop their analytical skills and apply intellectual insight into situations which might be faced as a practitioner.

Essentially without using the terminology, Clark was describing "Reflection in Action" and affirming the important learning that can only take place when the

student must apply past learning to new and indeterminate situations. Clark then asked a question which encompassed a proposal similar in nature to "Ella's" comment. Clark considered whether this type of experience was so critical to the professional development of the student, that it was questionable whether it should be relegated to the status of "option in a core program."

> If, however, the benefits of such programs are so great to those students electing to take advantage of them, the question naturally arises whether a clinical component should not be built into the mandatory curriculum. Put another way, should development of the primary skills required in the practice of law be regarded as being as much a part of the "core" of the university legal education as substantive coverage? (p.226)

The fact that some law faculties have not adopted clinical programs or offer only limited number of placements appeared to be part of the ongoing tension between academics and practitioners. This was set out by Clark (1987) as follows:

At one end of the spectrum are those who strongly believe that law schools have lost their true identity as disciplinary units of the intellectual community of the university through tailoring the curriculum to the perceived needs of the practicing profession. (p.222)

The end result is that faculty members who take this position are not easily persuaded to move in a direction which is practical in orientation. On the other hand, those faculties that have actually accommodated a practical component particularly those which offer legal clinics as part of the law school experience have found that these courses can encompass both theory and practice. While Clark (1987) found that clinical programs could "bridge" the chasm between academics and practitioners, he also recognized that a serious draw-back was finding the necessary resources to fund this more expensive teaching method.

Three other lawyering skills discussed by Focus Group #2 were drafting, procedure and the interpretation of statutes. There was general agreement amongst the participants that these subjects were either given minimal coverage or so poorly presented, without any contextual frame-work, that they were "of no assistance what-

so-ever!" In commenting on the attempts to learn practical skills in a classroom setting divorced from any context, "Jake", stated that the experience of drafting a Statement of Claim for the first time was very much like "that first Star Trek episode ..." presumably referring to the exploration of uncharted alien territory where, "... no person has gone before." Another participant, "Sara" thought that there was now more recognition of skills courses by the law faculty which she perceived as a positive change that had taken place since she graduated from law school.

"Raymond" was the only participant who had taken a course specifically on legislative drafting and interpretation. He said he found the course interesting and challenging as the primary assignment in the class was for students to prepare a statute. "It was the best mark I got in law school because I actually got something out of it. I had to actually create something and it was fun!".

Stark (1994) agreed with the comments of participants that, "Statutory analysis is a vital component of the practice of law, but law schools pay too little attention to it." (p.579) He personally teaches a course in statute law and has found that there are numerous direct and indirect benefits. One of the less obvious benefits is that,

> Forced to teach statutes, law professors would be forced to alter their teaching methods, and that might lead many of them to reflect more carefully on their instructional goals and methods. That ... could benefit law students. (p.580)

An increased emphasis on statutory law not only made legal education more effective and interesting, it also helped correct the error of over-emphasizing case law according to Stark (1994).

ADVICE TO FUTURE LAW STUDENTS

Table 4.2, Summarized Participant Responses Giving Advice to Prospective Law Students, which is found at the end of this chapter, sets out in summarized form, the

responses which members of Focus Group #2 (Part A) and the participants in the one-to-one interviews (Part B) gave to the following question:

> **Question: What piece of advice would you give to a law student (like yourself) who was entering law school today?**

This was the last question asked in Focus Group #2 and it was one of only two focus group questions where every participant was asked to respond. The participants in Focus Group #2, gave a variety of advice which were broken into the following five themes:

> 1) Understand what it means to be a lawyer before you commit to going to law school and don't continue in the program if you don't like what you're doing.
>
> 2) Remember who you are. Be true to yourself and be very conscious of the deliberate process of socialization in law school.
>
> 3) Maintain a healthy balance between school, social life and family.
>
> 4) Get involved! Particularly in Student legal Aid as this will help you to stay grounded and remember why you are in law school.
>
> 5) Don't expect a job once you graduate.

Each of these categories affects the quality of the educational experience and will be explored in more detail using the literature on legal education and confirming the initial advice with further comments drawn from the individual interviews.

Theme #1 - Understand the Role of the Lawyer

> "Kent" - "My advice ... would be to go out, meet a lawyer, hire one to talk to if you have to!

One participant stressed that it was important to meet with practitioners from the perspective that it might help the student find an area of law that interests them. This might assist them in law school by providing the direction and motivation that the student needs to get the most out of their legal education.

> "Heather" - If they can they should try to get out and meet some lawyers or spend some time with some lawyers so they can figure out what lawyers do and that's going to help them choose what they want to do in law school and choose what they want to get into when they get out of law school.

"Timothy" gave his advice to a prospective law student based more upon the quality of life which he considered to be poor in the profession of law "... go spend some time with a lawyer, and talk to a whole bunch of lawyers, and (have) somebody honestly tell you what it's like to practice law ... (because) if you don't really enjoy what you're doing, it's a terrible way to make a living. That's what I would tell them to do."

A student who was motivated to attend law school and become a lawyer based upon financial considerations would be well advised to carefully reconsider this decision based on the comments of participants. The most practical advice was given by "Kent" who recommended that the student, "... get him (the lawyer) drunk, get a look at his tax returns ..." and over the laughter of the Focus Group members, he justified this statement by saying that students should understand before they make the commitment to law school what it is like to practice law today.

> I think that people would avoid some disappointment and resentment, if they had a better understanding of what a practicing lawyer is, before they go through that very difficult, not necessarily unhappy, but very difficult educational process.

Finally "Penny" spoke about the importance of contacts within the profession - "... get to know the law firms, the area of law that you want to practice in and if possible to work at law firms during the summer to get experience." She recommended that

students start as early as possible learning what it means to be a lawyer, not just intellectually but through actual practical work experience.

Schön (1988) identified the need for there to be greater congruency between the education that professionals receive and the actual skills and knowledge required in order to make a successful transition to their professional career. He stated,

> ... professional educators have voiced with increasing frequency their worries about the gap between the school's prevailing conception of professional knowledge and the actual competencies required of practitioners in the field." (p.10)

If law schools are not prepared to provide a more grounded or realistic education for future professionals then the participants are giving essential advice to future students when they suggest that they acquaint themselves with members of the profession. If students are to acquire a "quality" education experience they need to first develop an accurate representation of the practice of law if that is their future ambition.

As participants have noted, the prospective student will not only determine whether or not the difficult educational experience is worth the sacrifices but they may also discover personal direction which will assist them in getting the most out of their educational experience. They will also have to, in the words of the participants, take responsibility in ensuring that their educational needs are met. The student must engage in those situations that will bring about the requisite knowledge, skills and attitudes whether or not those educational opportunities are available in the "formal" learning situations provided by the law faculty.

Participants noted that there were very limited opportunities for students to acquire the necessary practical experience in the formal curriculum. Students were therefore advised to connect with alternate or informal educational experiences that would help to provide them with some conception of the "real world." This issue of incorporating a practical component in the academic scheme and giving students a "hands-on"

exposure to the profession is an issue which has long been settled in almost every other school of professional education. (Stark et. al:1986) Researchers in a far-reaching study of university education in ten pre-professional fields, including law, found that,

> Although law and journalism debate the role of clinical and field experiences in the professional program, professional educators in the other areas seem to have resolved that issue and have incorporated such activities into the curriculum. In architecture, dentistry, education, engineering, library science, medicine, nursing, pharmacy, and social work, some kind of mediated work entry forms an important element of professional preparation." (p.45)

Some have argued that in Canada the year of articling which follows law school provides sufficient opportunity to learn the practical side of law. The unfortunate consequence for the individual, however, can be the discovery following this traditional route, that after a three year investment of time and intense energy, they do not like the practice of law. In addition, when learning does not occur "in context" for a three year period of time it is simply not realistic to expect that the years of theory will coalesce in the term of articles where frequently supervision is not ongoing and mistakes can have serious consequences for client.

Theme #2 - "Remember who you are"

In Focus Group #2, "Sara" was critical of law school in fostering an education environment in which the law student could "lose themselves":

> I would say remember who you are when you go into law school and be conscious of the fact that it's a socialization process. Whether or not it's deliberate, it's happening to you ... right at the very beginning when they say - "Look to your left and look to your right and someone isn't going to be there a year from now!" ... have a healthy scepticism ... and realize these are pretty much the same techniques they use in cults."

Unfortunately, her comments while extreme may be justified as the psychological pressure of a law school education has long been the subject of study. Benjamin et.al (1986) researched the role of legal education in producing psychological distress in

law students. In reference to an earlier study by Taylor (1975), revealed that research in this area had resulted in four behavioral assumptions about the professional development of lawyers:

1. Certain procedures of legal education produce an uncommonly high degree of stress in students.

2. The high degree of stress leads the student to adopt typical and shared kinds of attitudes, behaviours, values, and traits, as ways of reducing anxiety.

3. The attitudes, behaviours, values, and traits are personally or socially undesirable and may be inimical to the process of law.

4. Such pernicious attitudes, behaviours and values are in part adopted because they are transmitted by faculty precepts. (p.252)

Another study cited by Benjamin et.al.(1986) was a test of law students using the Omnibus Personality Inventory which showed an increased level of anxiety and feelings of internal conflict in first year law students.

> Hedegard (the researcher) proposed that the scores increased because the students unsuccessfully attempted to resolve conflicts between the value systems they brought to law school and what they are learning about the law and how it works, which may introduce ambiguity." (p.227)

Benjamin et.al (1986) reported that "The pattern of results suggests that certain aspects of legal education produce uncommonly elevated psychological distress levels among significant numbers of law students and recently graduated alumni." (p.247) The researchers found that the higher distress levels were not the result of certain types of people choosing to enter law, rather it was the law school educational process itself that affected the individuals.

> ... only 3 - 9% of individuals in industrial nations suffer from depression; prelaw subject group means did not differ from normative expectations. Yet, 17 - 40% of law students and alumni in our study suffered from depression, while 20 - 40% of the same subjects suffered from other elevated symptoms.

> Another way of understanding how stressful the legal educational process appears to be is to compare the symptom scores of law students with those students from another professional program. In our initial study, medical students and law students were compared .... law students developed significantly more distress than medical students for all symptoms ... (p.247)

Although clearly not able to follow his own advice, "Raymond" stressed that students have to realize that the whole law school system should not be taken so seriously by law students:

> ... I'd love to just say, "Look, this is the system. Think of it as hoops you have to jump through! ... try and get through it without getting overly anxious about it ... (yet) I know for me I got so worked up in my first year, that, you know, it was a health risk ... it was really bad stress ... "

Benjamin et.al (1986) attempted to address what elements in legal education cause such elevated stress levels. The researchers noted that, "First year students are generally overwhelmed. The work-load leaves many without time to sleep and relax adequately or to enjoy relationships with friends and relatives." (p.247) "Kent" was one of the participants who found that law school was essentially a gruelling test of personal stamina, particularly during the period of exams. How well you do at law school was, "... really a reflection on how well you can do without sleep for two weeks and concentrate."

"Jake" commented that he would advise prospective students as follows: I would say don't, don't forget you have another life, a real life. Be sure to enjoy it! Don't get caught up in the whole thing ..." He also cautioned not to try and become what, "... the people who (are) hiring you, what they want you to be like. *Be yourself!*" But participants agreed that the advice to resist the socialization process of law school was easier said than done.

When the researchers (Benjamin:1986) asked, whether it was possible that law schools could have such a pervasive socializing influence on students the answer that

they gave was a resounding - "Yes" (p.251) "In fact, law schools appear to be the most invasive among all graduate education. Thus it should not be surprising that law students "learn the requirements of the system and turn themselves into the kind of people the situation demands." (p.252)

Turow (1977) in his book "One L", recalled his experiences in first year Harvard Law School. The following conversation with a friend in the early weeks of law school, as related by Turow provides a personal illustration of the research findings above:

> "They're turning me into someone else," she said, referring to our professors. "They're making me different."
>
> I told her that was called education and she told me, quite rightly, that I was being flip.
>
> It's someone I don't <u>want</u> to be," she said. "Don't you get the feeling all the time that you're being indoctrinated? (p.83)

Turow (1977) supplied a further scenario of the "education or indoctrination" process in which a particular law students' strongly-held principles were challenged and dismissed as unimportant in class. In the following scenario the student (Mr. Vivian) has just suggested that in solving the specific legal issue in question it is important to remember that:

> ... All persons are created equal.
>
> "Oh, are they?" Perini asked. "Did you create them, Mr. Vivian? Have you taken a survey?"
>
> "I believe it," Vivian answered.
>
> "Well, hooray," said Perini, "that proves a great deal. How do you <u>justify</u> that, Mr. Vivian?" (p.84-85)

The demand to examine and justify all opinions was recognized as not only difficult, but disconcerting by Turow and fellow-students. Yet he noted that within a month, discussions between students changed fundamentally as students became more skilled in reconciling and justifying positions. The new style of debate, however, precluded emotion. This was not an easy nor in the larger scheme of things a desirable transition. As a fellow-student of Turow's stated;

> "I don't care if Bertram Mann (the professor) doesn't want to know how I feel about prostitution," she said that day at lunch. "I feel a lot of things about prostitution and they have everything to do with the way I think about prostitution. I don't want to become the kind of person who tries to pretend that my feelings have nothing to do with my opinions. It's not bad to feel things." (p.85)

The impact of law school has been considered in two published personal journals - Turow (1977) who attended Harvard Law School and Goodrich (1991) who attended Yale. Despite the discrepancy of almost 15 years, the experiences related by the two authors about the impact of law school, are remarkably similar. Goodrich attended only the first year of a law school program as part of a Masters of Studies in Law. He stated that,

> Before going to Yale Law I had joked with friends that I would consider my year a success if I convinced a few law students to drop out. Now, drawn to law's power as much as repulsed by its effects, I redefined the joke. The year would be worthwhile, I told myself, if I convinced a few law students to stay enrolled - and then, as lawyers, to change the legal culture from within. (p.57)

Benjamin et.al (1986) combined study data with a review of the literature and made three recommendations on how legal education could be restructured in order to reduce distress levels amongst students:

1) excessive work-loads which result in time management problems need to be monitored more closely by faculty;
2) chronically high student-faculty ratios should be reduced; and,
3) increased development of students inter-personal skills with a corresponding decrease in emphasis on conventional law school curriculum which concentrates solely on the development of analytical skills at the expense of inter-personal concerns.

A legal educator, Berger (Dvorkin et.al:1981) also found that the key criticism of a law school education is the over-emphasis on analysis and reasoning and the devaluing of emotions.

> ... I believe that legal education is too single-mindedly absorbed in affairs of the head and too inattentive to - indeed, rejecting of - matters of the heart. Legal education is an intensely cerebral pursuit. The highest praise we can bestow upon our students is to tell them that they "think like a lawyer," which requires a wholly analytical matrix for dealing with problems ...
> ... Students learn quickly that if we, their instructors are to judge them highly, they must prove themselves with their heads. (p.33)

The over-emphasis in a law school education on teaching rational thinking processes and stripping away emotive content has serious affects on the student. The teaching style and emphasis in law school also has potential ramifications for society.

> I do not assert that legal education makes our graduates evil, but I do believe that legal education makes our graduates less feeling, less caring, less sensitive to the needs of others, less tolerant of the frailties of their fellow creatures, even less alarmed about the in-justices of our society, than they were when they entered law school.
>
> What concerns me is the mind-set and the heart-set into which we mould our students; that it is better to be smart than passionate; that people who feel too deeply tend not to think too clearly; that a fine intellect can rationalize any position or state of affairs, no matter how outrageous or indecent or unjust ...
>
> At the risk of sounding simplistic, we should train our students to deal with other human beings, so they will begin to understand that when a client comes into a lawyer's office he is usually a disturbed person, so they will begin to appreciate that very often what surfaces as a legal problem has its roots in deep-seated social problems. Above all - and this has nothing to do with the curriculum - I think that we as teachers must let our students know that we value them, and not only for their intellectual abilities. For unless lawyers value the compassionate in their own beings, I think they will be incapable of caring about the human needs of others. (p.33-34)

"Greg" recognized the distancing of oneself from others which was created by the legal education received. "As lawyers we may completely ignore the emotional contents of the situation. ... I hope it's not the way we practice but (it's) the way you're taught to think in law school."

Theme #3 - Maintain (a healthy) balance

In Focus Group #1, there were some very strong sentiments expressed about the law school experience which bordered on suggesting that it was damaging to one's personal psyche. These comments were taken very seriously by the group members. In fact, many participants in both focus groups and in the one-to-one interviews considered that the only way to maintain one's sanity was by achieving a balance between law school and other aspects of their life. Establishing friendships and focusing on the social aspects of law school were one of the more important recommendations made in respect to maintaining balance. Quotations from six participants reflect the range of coping mechanisms adopted and illustrate the need for the individual to maintain personal connections and a balanced perspective and life-style.

> **"Heather"** - "Enjoy it! ... Get involved! ... get to know (the) professors ... make some good friendships.
>
> **"Janet"** - "Get involved, like get involved in study groups and things like that."
>
> **"Peggy"** - believed that she took the wrong approach to law school and she recommended that students "Connect with people with similar interests rather than being so narrow. The mind-set I was in, I didn't want to spend a second longer at the law school than I had to ..."
>
> **"Richard"** - "... get involved ... get to know all these people ... get involved in committees, in sports teams, and those other things ... (it is) really sacrificing an important part of the law school experience if (you) just focused purely on the studying ... try not to lose that perspective and try to have a balanced life when you go into law school."

"Jonathan"- "Take advantage of the social opportunities because the friendships and the bonds that you make will last a lifetime."

"Victor" - "Don't take it too seriously ... (law students should) maintain a balance in their lives, law school is not everything. Ten years from now when they're a practicing lawyer, what happened in law school will seem very dim and very unimportant, probably, so don't get caught up in the "Paper Chase" devoting your entire life and soul to law school."

This final comment was an interesting analogy to the movie for in the final scene, the central character - a successful law student - was seen making a paper air-plane out of the marks he has just received and sending them out over the ocean without finding out his "standing" in the class. In the beginning the hero allowed the whole experience of first year law school to overwhelm him. All of the students surrounding him are portrayed as trying desperately each in their own way, and for the most part unsuccessfully, to cope with law school. He eventually comes to terms with the fact that law school will absorb all of the time and energy any individual cares to give.

So in the end, the message, is similar, to the one repeated by the comments of participant in this study - get involved, live law school to the fullest, try your hardest but in the end do not let the experience over-whelm your equilibrium. The message was also clear that strictly focusing upon marks will in the end diminish your law school education experience at best and at worst, it can completely undermine your self-confidence and self-esteem!

Theme 4 - Get Involved!

Volunteer Involvement (Student Legal Aid)

Three perspectives were identified on the recommendation to become involved in Student Legal Aid programs either as a volunteer, or as part of similar clinic

experience offered as part of the "formal" law school curriculum. Generally participants concluded that it provided the student with the following opportunities:

i) to learn the law in context;

ii) to acquire the necessary skills; and

iii) to contribute to society through community service.

i) Law in Context - The first benefit of working in Student Legal Aid clinics was that it provided the student with an understanding of the "law in action." The premise behind participants who saw value in this as an educational experience was the capacity of such activities to help the student to better understand the law which was being learned in the classroom.

In the words of "Benjamin", working at SLA enhanced the learning experience:

> There is so much knowledge being acquired in three years of law school, but in addition to all the academic or core knowledge that you're acquiring, it's also very helpful to acquire some sort of a perspective, practice perspective.
>
> ... one of the things I would definitely recommend to a student is to participate where possible ... in clinic or field experiences to add meaning ... I think it helps the over-all learning experience and retention and understanding. So much of what you learn at law school could have more meaning and more application if you had some fuller understanding of the practice context.

"Heather" - "Get involved ... do something such as Student Legal Aid" ...(it is a) chance to put all that theory to a test."

"Brian" - "Experience as much of it as possible by not only working hard but also ... getting involved with the people at law school."

One key area of involvement that "Brian" recommended was Student Legal Aid as he found this to be important for two reasons. It was, "Extremely valuable for meeting

people that you might remain in contact with after you graduate and, learning how you're going to apply all this academic stuff."

Some participants were clearly less motivated to continue in law school when their studies were solely presented from an academic perspective. The opportunity to engage in practical application of what they were learning, often helped to motivate them as students to "see the light at the end of the tunnel" and continue on in law school. For example, "Janet" recommended involvement in order to get practical experience which she found was often sorely lacking in law school,

> Get involved in something like Student Legal Aid or get a job at a law firm in the summer to give you some sense of why you are learning these things."

ii) Skills Acquisition - A second purpose for involvement in SLA was that it helped students acquire the necessary skills for practice that were not found in other courses. Participants indicated that ultimately they were better able to help their clients, once they begin articles, as a result. This makes the clinical or volunteer experience part of a well-rounded legal education experience.

"Jonathan" - "... lastly, I would say get involved in some of the other practical things such as Student Legal Aid ... mooting programs because the skills you learn there and the experiences that you have will stay with you. Because you're looking, I think, in law school for as broad a range of experiences as you can."

iii) Community Service - A third reason for involvement in SLA was altruistic in nature. It was premised on the idea that the lawyer as a professional should feel an obligation to repay society for the privilege of being a member of the profession. Working in a volunteer legal aid clinic can help to set the student on the course of service to the community.

"Greg", in Focus Group #2, did not see SLA as being necessary from the view-point of the student, he simply recommended involvement in SLA, because it, "... is just a very practical, rewarding, socially important thing to do."

"Jonathan" thought that his experience at SLA had given him a perspective on the law that was critical to his present legal philosophy. As a law student, he was able to help two disabled people fight the welfare system to get their full benefits. "I came away from that experience thinking, there is tremendous power in the law! It can have a tremendous impact on people's lives. While we tend to, sometimes, forget that and just treat a file as a file, it's one thing I try not to forget, is that how important the law is to a person."

Theme #5 - Don't Expect A Job (as a Practicing Lawyer)!

In recent years a new element has come to the forefront of legal education - the prospect that a law degree is no longer a guarantee of employment. This will have a significant impact on future law students and may result in changes to their own personal aims and expectations as well as affecting the over-all objectives of law school.

In Focus Group #2, "Dawn" commented that prospective law students should not expect to get a job, but she disagreed with "Ella" who suggested that it was not worth going to law school. "Dawn" - "Oh, I don't agree with that, I think it's a really wonderful educational experience, but don't go in expecting that law school is going to get you an articling position."

"Peggy" suggested that law school can be a good entry level degree for many different careers. She suggested that graduates, "Keep an open mind about what you can do with a law degree. Because I don't think it's realistic that people are all going to get jobs in the private sector ..."

The following four quotations express further commentary on the current job situation from the perspective of the participants:

"Benjamin" - He would not recommend law school from a strictly economic perspective because, " ... it's become such a competitive field with relatively few opportunities at the end."

"Peter" - "Get out! Don't go!" was his advice to the student who was considering entering law school today. His reasoning was strictly financial - "Things have become so competitive, we, I literally just scrape. I've been doing this for eight years and I don't know where our next months expenses are coming from yet!" He did acknowledge that if the individuals reasons do NOT include the practice of law then it may be worth going through law school. "If you want to do it for academic, or self-enhancement reasons than go right ahead." but he cautioned that you may wish to consider another degree first preferably in a trade that you can fall back on.

"Dennis" - "Go to Thailand" was his advice to prospective law students, presumably rather than beginning or continuing the three years of law school. His advice was not surprising given that he continued by relating that as recently as a few days prior to the interview he was contemplating leaving the legal profession himself. Yet by his own admission he is one of the few of his class-mates that actually enjoys the practice of law. He stated in the interview, "I'm having a great time! It's a lot of fun!" but his advice to law students was that, "If you don't like it - Get out! Because there's nothing else to recommend it!" He agreed that would be difficult to determine whether or not a person would like the practice of law until they actually enter the work-place. "... it's really hard to know until you try. It's kind of a big gamble I think."

"Richard" - "You may come out with a degree but ... it's not like you're to have an article, let alone the you're going to have a job that's kind of secure after that ..."

"Raymond" encouraged law students to be proactive in seeking out the skills and knowledge required if it was not available as part of the "formal" law school curriculum.

> I'd say, ... realize that the system is not adequate to prepare you. If you're planning a career in law, if you're planning a sole practice I'd say take the extra time ... to learn about office management (and other "basic skills" because) ... It certainly doesn't prepare you for what you're going to need at the other end, so you have to take personal responsibility for yourself. And don't <u>expect</u> the law firm or the Law Society or the academic world to give you what you need to be a lawyer. It's not going to.

Two final areas referred to in advising law students about how best to approach their law school education were:

1) the impact of law school marks on securing articles and;

2) the choice of electives.

<u>Marks and Articles</u>

While most participants advised students not to make marks the focus of their legal education, a few individuals disagreed with this general consensus. While definitely a minority view-point, they stressed that law school marks are a legitimate and important goal and advised students to consider their standing in the class if they hoped to expand their options in the tight job market.

> a) "Jonathan" - "Study hard to get the marks because then you will have many more doors open to you at least at the outset. Your marks become much less important ... after you have been practicing.

> b) "Penny" - "Do <u>very</u> well in your first and second year! Make sure you get a good article!"

<u>Choice of Electives</u>

One last issue identified was the caution to prospective law students to be careful in setting out their educational program. Members of Focus Group #2 were concerned over the recent tendency of law schools to offer increasingly "esoteric options" which

had little relevance to the actual practice of law. Participants believed that the trend to offer more obscure "flavour of the month" courses confused students. The courses may look good in the calendar but they will not help the student find a job upon graduation or assist in day to day legal practice. This must be contrasted with the opinions of Focus Group #1 members who thought that law schools in the future would adapt by offering increasingly more specialized courses and perhaps developing fields of expertise within the law faculty.

An underlying belief apparent in the comments of Focus Group #1 participants was that law students must not neglect core courses which are necessary for the practice of law. Yet it was agreed that as the law changes, the obscure subject matter courses of today may be seen as tomorrow's hot topic. But even more interesting was the apparent paradox of those individuals who justified the non-inclusion of skills courses based upon the argument that law school must be academic in orientation. Yet these same individuals saw no double standard in restricting options so that students do not neglect core substantive area courses that are necessary for the day to day practice of law. The argument against the electives, was simply that they are not practical enough to justify inclusion in the law school curriculum. Yet practical courses are found to be unacceptable because law school should not gear its curriculum towards training for the practice of law. This was a very interesting incongruity.

In responding to the request for advice that participants could give to prospective law students, the responses indicated which aspects of the law school experience were perceived to be most beneficial. The following TABLE 4.1 sets out the responses which members of Focus Group #2 gave to this question. This was the last question asked in this Focus Group and it was one of only two questions where every participant was asked to respond in turn to the question.

Question: What piece of advice would you give to a law student (like yourself) who was entering law school today?

TABLE 4.1 - Summary Participant Responses (Focus Group #2) - Giving Advice to Prospective Law Students

Focus Group	Piece of Advice to A New Law Student
"Joan"	Maintain balance. Practical versus theory. Involvement in SLA to keep grounded. Balance with family life.
"Dawn"	Don't expect a job. Law is good educational experience.
"Ella"	Don't go. Educational experience is not worth it.
"Sara"	Remember who you are, otherwise you will find that you are lost. Be conscious of socialization process. Maintain a healthy scepticism and remember law school is like a "cult".
"Mary"	Understand what it is to be a lawyer before commit. Don't expect to get a job.
"Kent"	Talk to lawyers and find out about what they do and their income. Understand what it is to be a lawyer before commit.
"Jake"	Keep life balanced. Treat it like a 9:00 to 5:00 job. Don't get caught up in competition. Be yourself and if you don't enjoy it then quit!
"Brad"	Don't be consumed by law. You need to step back and reflect.
"Greg"	Learning is the individuals responsibility. Get involved in SLA as it is both practical and rewarding socially.

TABLE 4.2 - Summary Participant Responses (One-to-One Interviews) - Giving Advice to Prospective Law Students

Name	Piece of Advice to a New Law Student
Heather	Meet with lawyers and find out what they do. Choose what you want out of law school. Enjoy law school - get involved. Form friendships. Do SLA work.
Peggy	Go to medical school instead. If you go, keep an open mind about what you can do with a law degree. Connect with other people.
Brian	Experience as much as possible. Work hard but get involved. Meet people. Do SLA work.
Peter	Get out. Don't go! Unless you are simply going for academic self-enhancement. Stay on top of readings. Forget high marks.
Richard	Realize what you are getting into. There are no guarantees on getting either articles or a job. Don't concentrate on marks. Lead a balanced life.
Victor	Don't take it too seriously. Maintain a balanced life. Find out what you want to practice and specialize. Law school can open the doors to business and alternate careers.
Casey	N/A
Janet	Get experience working with the public either before or during law school. Increase ability to question. Practical experience - law related. Get involved with other students.
Penny	Do VERY well in your first and second year. Get good articles. Know your law firms.
Benjamin	Economically don't go to law school. If you do go get clinic and field experience. Practice helps over-all learning in law.
Dennis	Go to Thailand. You should only go to law school if you really want to be a lawyer - if you don't like it then get out because there is nothing to recommend the actual practice of law other than an interest in the law.
Table 4.2 (cont.)	

Table 4.2	Piece of Advice to a New Law Student One-to-One Interviews (continued)
Jonathan	Study hard to get good marks because this will open doors as firms take marks very seriously. Get involved in SLA, mooting and make friendships.
Raymond	Tell them, "Look this is the system - think of it as hoops you have to jump through ... and don't worry about it so much." Stress can be a health risk so just try to understand the basic concepts and get through the system. Also realize that law school will not prepare you for the practice of law so if you want to be a practitioner than you should take time to learn basic skills.
Beatrice	Quit while you're ahead. It depends on what the students goals for law school are - why they want a legal education. Student should choose a law school based on area of interest. Have lots of social support and find like-minded people in the law school for social support. Good luck!
Lynne	Keep open mind and take off "blinders".
Mable	You really have to fight to keep confidence. Law is a very conservative profession and if you are not that kind of person it tests you.
Natalie	N/A
Charles	Consider law school your life - not simply as a stepping stone. Enjoy it! Don't focus on marks but on the whole experience
George	Take well rounded classes and maintain outside interests. Keep in mind that you may not be a practitioner when you graduate.
Timothy	Spend time with lawyers and find out what practice is like. Be realistic. Find area of interest and focus in that area. Handle stress (in his case he participated in sports on a regular basis). Maintain balance.

SUMMARY

The focus on the "informal" learning experiences of law school emphasized the importance of students being connected to the experience of law school and yet maintaining a balanced approach. Those participants who established friendships, and found positive ways of coping with the stress of law school, ended up having a much improved perception of the quality of their legal education experience.

Students who were connected to peers and clients through SLA found this to be a beneficial experience from both a legal and personal perspective. It was considered important for students to take responsibility for finding out the necessary information to plan their own education program. Students were advised that their needs may not be satisfied by the "formal" learning experiences offered in the traditional law school curriculum. Participants also recommended that students foster early connections with members of the legal profession. This helped students by giving them a realistic appreciation of the current state of the legal profession as well as providing information on the necessary skills, knowledge and attitudes required for the successful transition to the legal community upon graduation.

CHAPTER 5

CURRENT CHALLENGES AND FUTURE DIRECTION

INTRODUCTION

Education still holds the promise of a "better world" and many students enrol in law school on the strength of this promise. The better world may be societal, or it may be personal but most students believe that admission to law school is a turning point in their lives for the better. The current challenges in legal education, as identified by participants, provided a sobering glimpse, however, into a future where hopes of a "better world" may not be so easily realized. The participants expressed not only discontent with the outcomes of legal education in the nineties but a real concern for future graduates who face an increasingly difficult transition to the working world and the legal profession.

Unfortunately, law schools are generally focused on tradition and do not tend to be future oriented. According to Neave (1990) legal educators have continued to discuss the direction of legal education from very narrow and introspective positions that assume life will continue in much the same way as it has in the past. Despite rapid changes in the world outside, many developments are either ignored or minimized as being of little concern to the law school itself. Neave (1990) stated that,

> Debates about legal education (often) ... fill me with a sense of unreality, because they are so inward looking ... the legal education questions which are so hotly debated at faculty and law society meetings seem trivial ... (and) there is a danger in focussing discussion on the minutiae of legal education and divorcing it from a broader vision of the role of lawyers and law in our society. (p.150)

Therefore, in preparing law students for the 21st century, Neave insisted that as, "... legal education does not exist only for lawyers but for the community which the legal profession exist(s) to serve ..." it is necessary that law schools be aware, "... of the profound changes which are likely to occur in legal and social institutions in the

future and to discuss the implications which these changes will have for those involved in legal education." (p.149)

MacFarlane (1994) agreed that law schools continue to promote a very narrow view of legal education in Canada. The curriculum content, methods of delivery and evaluation often fail to take into account a changing Canadian society or even changes in the make-up of the student body. MacFarlane criticized the law faculty for failing to broaden the definition of knowledge. She characterized the narrow perception of knowledge and learning in the law school environment to be the most significant root cause of the general lack of awareness of developments in the larger society.

> Classroom teaching methods, assessment processes, and the shape and substance of the law school curriculum are crucially shaped by how we understand the nature of "knowledge" and "learning". Law school pedagogies are still heavily influenced ... by a rationalist model of knowledge which assumes that knowledge can be objective, certain and universal, and which measures achievement against those standards. (p.359)

According to MacFarlane this, "... continued dominance in legal education of a rationalist model of knowledge ... (which) reflects a narrow view of what is "real" knowledge inevitably fails to reflect or respond to the radically changing conditions of a pluralist society." (p.359) MacFarlane concluded her assessment of Canadian law schools by recommending several changes including the use of experimental teaching and learning methods as, "... an alternative to the didactic, lecture-style teaching methods that (are) predominant in law school." (p.359)

A key criterion for Neave (1990) in assessing a quality legal education was a consideration of the role that lawyers will ultimately play in the society of the future. In fact,

> Questioning the role of lawyers may well result in the conclusion that they should be performing quite different functions and being educated in a very different manner from the way in which they are being educated at present." (p.159)

It was therefore considered critical to canvas the opinions of participants about their perceptions of the primary legal education issues facing law schools at present, and in the future.

It was apparent from the literature and from the comments of the participants that there needed to be further discussion, and decisions made, in respect to the aims of university legal education in the nineties and beyond. Yet the most common issues which are the subject of debate in recent years tend to be those topics which focus upon the more immediate concerns of funding. In fact, much of the conversation about the direction of university education, generally, and legal education, specifically, has centred around discussion of economic issues. The lack of adequate financial resources and the ongoing debate about student enrollment, particularly the question of whether to reduce the number of law graduates have been two central issues for law schools in Canada.

Participants identified both of these issues as affecting legal education, but were generally more concerned, and directly impacted by, a third issue - the challenge of obtaining rewarding and fulfilling employment after law school. Unfortunately the issue of post-graduation adjustment and the impact of societal change on the overall effectiveness of legal education as a preparation for future employment have often been considered to be marginal or irrelevant to the majority of law professors. According to Neave (1990), however, the law faculty must think seriously about the future of legal education as it is no longer responsible to simply consider the development of legal education from within the "box" of law school - as if legal education could be taught separate and apart from the real world context.

Development of the Question

Focus Group #1 - Issue Identified

Focus Group #1 expressed strong concerns about the future of law school studies and the legal profession. It was generally felt that the changes which have already

occurred and which are imminent will have a profound effect upon legal education. Certainly it was apparent that in order for law schools to remain relevant there must be attempts made to adapt to the changing times. One method of adaptation which Focus Group #1 participants identified was the increasing specialization of law schools. Participants commented that law schools in Canada would be likely to continue the current trend of offering unique programs in certain specialized areas. Examples generated by the group included a law faculty known for its Corporate Law program; another school which offered an Alternate Dispute Resolution specialization and a third law school which offered courses specific to the law and legal concerns of the Pacific Rim. In this way a law faculty was seen to secure a particular niche by demonstrating a marketable specialty which attracted certain students and faculty.

The central concern which emerged in Focus Group #1, however, was in respect to the number of law school graduates. This issue was discussed in some detail. The group recognized the importance of avoiding exclusionary measures such as quotas on law school admission which would only protect the members of the legal profession with little consideration for society. Yet this position was balanced by the recognized need to protect the quality of legal services which would ultimately be compromised by poorly educated practitioners. Participants in Focus Group #1 were also concerned that the need to compete with the increasing number of recent graduates in an already saturated market would mean a lowering of standards as practitioners were forced to sacrifice quality in order to cut costs.

Focus Group #2 - Question

In order to expand upon the general theme of "issues in legal education" which Focus Group #1 identified, the following question was developed and used in Focus Group #2:

What do you see as the greatest challenge in legal education today?

From the responses of Focus Group #2 participants the following sub-themes were developed:

1) Change:

(a) Information Age/Computerization:

- Changes in technology have resulted in the need for students to be computer literate.

(b) Cost & Quality of Legal Education

- Funding of university education has decreased at a time when the need to provide a quality legal education has increased. More effective teaching and learning methods are compromised by the lack of adequate funding.

2) Too Many Graduates:

Focus Group #2 participants recognized that it is a very grim situation for many recent law graduates. The general consensus was that law schools must consider encouraging law students to pursue alternate careers and assist them in this regard. If this issue was not addressed then the necessary alternative would be stricter quotas on the number of students admitted into Canadian law faculties in numbers more reflective of societies' need for lawyers.

3) Core Courses - Relevance:

There was a perceived need to determine and offer those core courses considered to be the fundamental building blocks for future practice. The law faculties should be careful not to adopt "flavour of the month" topics in response to public and student pressure or to satisfy faculty interest without carefully considering the value of these courses for the student in the future.

4) Balance Between Theory and Practice:

The ongoing debate between training and education continued and most participants

indicated that it was likely this issue would not be resolved in the near future. Again, it was agreed that in order to determine the appropriate mix of theory and practice it was first necessary to determine the purpose of law school. Participants in Focus Group #2 recommended that this issue could be settled by a joint effort of the law faculty in conjunction with the respective Law Societies. Both should be considered equal and necessary partners in creating a clear statement of the aims and objectives of a law degree. While this should occur at the National level, it was not foreseeable in the near future according to the participants.

One-To-One Interview Questions

As the foregoing question generated pertinent information on current issues in legal education two very similar questions were used in the individual one-to-one interviews:

> **What do you see as the greatest challenge in legal education that law schools face .... (1) today? (and) ..... (2) in the future?**

Comments made by participants in the one-to-one interviews generally supported the sub-themes identified by the two Focus Groups. The following two issues were predominant:

1) rapid changes in technology & law practice; and
2) the impact of the increasing number of law graduates.

It was interesting to note that when asked about challenges in legal education, most participants chose to answer this question by referring to negative problems that law schools face now and in the future. Participants were generally very animated in discussing these issues. They demonstrated a genuine concern that law schools need to carefully reconsider their current practices and develop more appropriate responses which signify a better adaptation to contemporary Canadian society.

Another interesting phenomenon was that when asked about challenges facing law schools in the present, and then asked to consider future challenges, most interview participants commented that these would be the same problems. A common answer to the second question was that current issues will simply become increasingly serious in the future, particularly if no action is taken soon. In some cases the question about future challenges generated additional issues but the issues identified by participants as "being in the future" were clearly current problems which could be addressed now by law schools. There were simply no issues perceived as a problem "in the future" that another participant hadn't identified as an area that was already causing concern today.

ANALYSIS & REVIEW OF RESPONSES:

1) Technology & Change

Law schools in Canada are facing a difficult time of transition. Rapid changes in recent years have forced the modification of the traditional legal curriculum. Technological developments, in particular, challenge the relevancy of the law school curriculum. "Benjamin" noted that the advent of the information age posed one of the greatest challenges in legal education. "... since all law relates to information." The increasing use of computers results in the need for ongoing training of all legal personnel ... (as) everybody moves to greater use of computers for everything from searching and precedents, to research and doing case law." He concluded by stating, " That's probably a whole ... field unto itself!"

"Raymond" agreed that the law school must accommodate the new technologies and encourage students to actively seek learning opportunities involving newly developed computer programs. When asked what he saw as the greatest challenge in legal education, he answered,

> Well, I think adapting to the reality of the new millennia, the new paradigm, in practice and in business and in society ...
> I don't know what they (the law faculty) are doing about the computer and the revolution of the Internet ... when I went to law school and asked a senior practitioner, "Should I learn how to type?", he said, "That's what secretaries are for." Right now I do all my own work on my computer and that's the way all the young lawyers are working now.

In an article entitled, "From Quill Pen to Computer," Smith (Esau & Penner (Eds): 1990) stated a similar premise,

> It is no doubt trite to speak of the computer age as a second industrial revolution, but ... what is happening is certainly revolutionary. The amount of information that lawyers are required to deal with in legal process is constantly increasing, and the technology for handling it in electronic form is developing at a fast pace. (p.19)

Smith (1990) reviewed the impact on the actual practice of law and finished his article with the statement that, "Legal education has the challenge of training lawyers for the practice of law in the 21st century. In the ensuing years there will be a great demand for young lawyers who can practice law within an electronic environment." (p.25)

Yet "Raymond" was critical of law schools, particularly when they are not adapting to the changes in society or moving too slowly to "provide adequate service" for the students. He saw the "computer revolution" as being a "... real change in the whole way that the system is working ... and if a lawyer comes out of law school and doesn't know how to use the Internet, doesn't know how to word process his own forms, doesn't know how to use basic Excell or spread-sheets ... " then the comment that "Raymond" would make to that student is, "You're out of luck!" in trying to adapt to the new working world.

Arthurs (1995) also expressed concern about these changes, particularly the phenomenal increase in information and the impact this will have, both on what is

taught and ultimately how lawyers perceive their role and function in society. The primary job of the lawyer is to deal with information. Therefore, in the age of the "information explosion" lawyers, for better or for worse, will be one of the most affected groups in society. Arthurs (1995) stated that we are entering the Information Age with a resulting shift in the central paradigm. In his article, "A Lot of Knowledge is a Dangerous Thing: Will the legal profession survive the knowledge explosion?", he commented,

> We are in the midst of a crisis which encompasses the creation, management, transmission and validation of all forms of lawyers' knowledge - technical knowledge, craft knowledge and systemic knowledge." (p.300)

He then considered two options which face the legal profession. The ultimate decision will have serious ramifications on both the way in which law is taught and the content of what is taught: "Essentially, we have two choices: either we will continue to insist that lawyers can and should know everything, or we will accept that lawyers must become expert in some fields of knowledge and know very little about others." (p.301).

This leads to a consideration of two other issues identified by participants; 1) the increasing specialization of the practice of law; and 2) the need to become a life-long learner in order to cope with the demands of ongoing change in the information age.

Legal Specialization and Life Long Learning

In respect to the future, there will be an ongoing need to respond to change. In fact, "Raymond" stated that the "new social paradigm is change itself." A persons career used to be much more stable and predictable and this was reflected in all walks of life.

> It used to be that in the 50's you'd get called to the bar, and join a big firm, and that was your job for the rest of your life. It wasn't just law, it was the same in the mechanic shop or the automotive industry, or wherever you were - you were a "firm guy." You'd go into the corporation - you'd go up the corporate ladder. Nowadays, everybody

> expects change ... so if the universities, and this isn't just law school, if the universities can't produce people who are independent, then the whole system falls down, and who is going to win? ... the technical institutes, the ones that are actually preparing people to function and adapt ... you learn something, (and) get out. You can move quickly.

"Raymond" thought, however, that it was unlikely individual faculty members could do much without a major over-haul to the legal education system. "They've probably pushed the limits of the box as far as they could, but they're still in a box." When asked what was imposing the limits on the law faculty, he answered that this was a good question,

> I think the system is just perpetuating itself ... certain conventions just continue because that's the way it's been done over the last three decades and nobody wants to really challenge it. And if you challenge it, you're a heretic. I think there's definitely room for a paradigm shift in the whole approach to legal education.

One way participants recommended law schools remain competitive, was the adoption a more practice-oriented approach which incorporated the option of specialization. More than one participant favoured the "medical model" over the present legal model as there was more emphasis on practical training and preparation for the transition to the profession.

If the law faculty cannot adapt to change then the consequences could be quite harsh according to "Raymond":

> ... this whole telecommunication thing (is) going to change the whole fabric of society ... it's happening quickly (and) ... the academics who are sitting in their little Ivory Towers really haven't figured it out yet
>
> But one day ... the changes are going to come and there will be this ugly reckoning. Because you can't have students going to university for four years and learn nothing about how to be practical in society, whether it's law or otherwise. It's not going to happen. I think there's going to be a real brain-drain away from the Universities toward the Technical Institutes.

Certainly there has to be a better fit between the law school curriculum and the ultimate needs of students and law graduates. Yet there also has to be a realization that the student can no longer expect a complete education where every future educational need is satisfied. To assist in this transition, the law faculty have a responsibility to foster independent learners who will be able to cope with the demands of a changing world.

Naisbitt (1983) wrote about the impact of the information age in his book, Megatrends: Ten New Directions Transforming Our Lives. He stated that, "In the new information society, where the only constant is change, we can no longer expect to get an education and be done with it. There is no one education, no one skill that lasts a lifetime now. Like it or not, the information age has turned us all into lifelong learners." Naisbitt (1983) recognized that both the learner and the institutions of learning will have to adapt to new roles. He continued his analysis of education in this new age by emphasizing that the primary aim can no longer be the acquisition of knowledge itself but the skill and means to access knowledge, "In a world that is constantly changing, there is no one subject or set of subjects that will serve you for the foreseeable future, let alone for the rest of your life. The most important skill to acquire right now is learning how to learn."

Ultimately the skill of life-long learning is also essential from the perspective of continued competence in future practice as a lawyer. Cervero (1988) found in respect to continuing education for professionals that "Both anecdotal evidence and rigorous research support the notion that professionals' participation in educative activities is related to their zest for learning. Those who have a great deal of interest in learning participate in a greater number of activities as well as different types of activities." (p.69). Law schools must take a role in fostering self-directed learning with the assumption that lawyers must continue to develop their own educational program following graduation. Law schools should also help to ensure that learning itself is an enjoyable experience which will encourage future learning initiatives.

While there may be divergent opinions about how law schools should adapt to changing times, there has been at least a general consensus that the ultimate impact of technological change and the exponential increase in information has resulted in much greater complexity and sophistication of even the traditional study of law. The consequence for both the law student and the legal practitioner has often been a sense of being overwhelmed by adjusting to change and the sheer quantity of information. London (Esau & Penner (Eds): 1990) stated that,

> There is no question that the computer, the fax machine and the Xerox copier have changed the practice of law ... (but) the most important difference between then and now is the overwhelming increase in personal stress. I don't think I can emphasize that phenomenon too much ...
>
> When I look at the difference in practicing in the tax field, for example, between the sorts of business concerns, let alone legislation, that one has to take into account today as opposed to 27 years ago, it's the difference between kindergarten and university, to use an educational metaphor. It is incredibly complex. (p. 6-7)

The ever-expanding body of knowledge will by necessity require corresponding changes to teaching methods. The result has been that law schools have tried to find the often elusive balance between imparting knowledge and yet offering an appropriate mix of breadth and depth in specific legal subject areas. Unfortunately, there has been little done to provide guidance to law faculties in Canada. This has been further exacerbated by the increasing division between practitioners and academics. There has been little serious dialogue about the necessary skills and knowledge from a practitioners view and what is thought to be of value from an academic perspective. Arthurs (1995) predicted that serious consequences for the future of the profession would result from,

> ... (the) serious divergences between the academy and the practicing Bar. To offer you a thumbnail history of Canadian legal education, law teaching was once dominated by part-time lecturers who epitomized the values, knowledge and preoccupations of the practicing Bar. Today, legal academics look pretty much like other university professors, with

> similar credentials, career patterns ... and with essentially similar intellectual interests. Precisely because of these intellectual interests, the law teachers' drift, away from the Bar and towards academe is likely to accelerate ...
>
> We can already see the early effects of this process. Senior - and not-so-senior - practitioners are often surprised and occasionally alienated by what recent graduates regard as legitimate forms of professional knowledge - especially by "radical" forms of knowledge. (p. 302-303)

Law schools need to take the initiative in restoring contact with the profession. The law faculty should be prepared to teach a broad range of courses or find sessional or adjunct professors from the private bar to assist. In addition to developing the capacity to teach more practice-oriented courses, the faculty should also provide a balance between these types of courses and others of a more highly theoretical nature (i.e. perspectives on the law courses). Legal analysis and reasoning and legal research are standard courses but other lawyering skills are equally important and are often neglected in the law school curriculum. Through the development of clinical programs and courses with a practical component it will be possible for the law school to offer a more diverse program that allows students more practice oriented options. MacCrate (1992) stated that

> ... observations suggest a continuum in which law schools and the practicing bar should participate jointly in the professional development of lawyers, it is important for legal educators and practicing lawyers to recognize that they have different capacities and opportunities to impart these skills and values to future lawyers. (p.234)

The resource of practitioners as instructors should therefore not be forgotten by the faculty and every effort should be made to make the education of future lawyers the joint responsibility of the private bar lawyers and the law professors.

2) Too Many Graduates? - Not Enough Jobs

There was a general consensus of participants that there are too few positions in the profession of law for the number of law graduates. This has meant in recent years that a certain percentage of graduates cannot enter, or continue working in, the legal

profession. This percentage, who are either unable to find articles, or keep working after completing articles, has been increasing each year. It is a fairly recent phenomenon which is particularly disturbing as it is occurring at a time when record number of more senior practitioners are also leaving legal practice. Despite the attrition of lawyers leaving the profession this does not seem to be resolving the problem.

The issue of the number of graduates has been of significant concern in Canada for at least a decade. In 1987, "... the problem of numbers and the widespread belief within the profession that there are too many lawyers now and that law schools should not be releasing nearly so many ..." (p.147) was the subject of discussion between Wilkins and an official of the Ontario Bar Association (Wilkins:1987). The issue at the time was that the official was concerned because he had been visited by,

> ... (a) number of lawyers one and two years after joining the bar who had not yet found positions ... He was struck, he said, by the strength of their sense that the legal profession owed them something in return for all they had given up to equip themselves for practice. (p.147)

Le Brun & Johnstone (1994) similarly identified this as being a significant problem in Australia. "Some people face the prospect of long-term unemployment, while others fear that they will never secure jobs. Even those who succeed may find that they are locked out of opportunities for promotion as various "glass ceilings" are encountered." (p.15)

Unfortunately, those interviewed indicated that the problem has not only continued but has, in fact, become more serious and widespread. Of the individuals interviewed, there were two participants who had been unable to find work as lawyers following the year of articles and a third participant who since the interview has been given notification that her contract position will not be extended. The situation continues to worsen and now, in addition to the problem of securing work after the one year of articles and passing the Bar examinations, there are a growing number of law

graduates who are unable even to secure articles. If a graduate is unable to find an articling position they cannot complete their professional education and are precluded from admission to the bar and the right to practice law.

Lowering the number of students admitted to the law program was one solution raised by the participants. Although it seemed "necessary", it was not favoured as a response to the problem. In considering the issue of quotas, "Brian" felt that the law faculty should at least consider a "... policy about whether they should admit fewer students. While he recognized that "... at some point that becomes elitist ... on the other hand do you allow people to enter law school so that they can, broaden their horizons and get a good education ... knowing that there isn't going to be jobs for everybody (who) graduates." "Mable" also stated that she felt cut backs in enrollment were absolutely necessary, although she was similarly worried about the impact of quotas. Her concern stemmed from the fact that at the present time law schools are not reflective of the general population and there was a definite need to attract a greater diversity of students from the general population. This would potentially be thwarted if stricter quotas were enforced and marks were the sole determinant of entrance to the law program given that traditional methods of determining admission tend to favour certain groups in society. The research into current admissions processes, would lend support to this view. According to Alvi et. al (1991):

> ... (admission criteria) favour students from family and cultural situations that encourage them (the student) to aspire to such educational opportunities in the first place ... reliance upon success at the undergraduate level of the existing educational system fails to take into account the impact of systemic discrimination on many less advantaged communities.

In fact, Thornhill (1995) reported that law schools as the prime gatekeepers of the profession have failed to equally allocate access to all groups in Canadian society:

> A 1992 Justice Canada report surveying ten law schools in Canada concluded that discrimination attributed to race or ethnicity both observed and experienced by "Visible Minorities" and First nations peoples was reported: outside the law school; within the law school;

> perpetuated by both students and professors alike; and also during the application for admission process. (p.814)

Quotas, of course, have always been an issue in professional programs but in recent years debate on this topic seemed particularly acute in legal education. The realities of the post-graduation struggle for employment in law was a harsh contrast with the high expectations of students entering the profession. Participants each had their own variations on the theme of securing or attempting to find satisfying work. Much interest was generated by this topic although the sentiments expressed were often very grim particularly for future law graduates.

Alternate Careers

One solution recommended by participants was to re-think the purpose of the law degree. Law graduates may have to be prepared to see a law degree as a general preparation for a broad variety of careers rather than as a specialized degree which only leads to one career path. "George" was one of the four participants who had voluntarily left the practice of law. In his case he had been in a large firm, then practiced as a sole practitioner and at the time of the interview had chosen a lucrative and rewarding alternate career. "George" would not want to see legal education limited in terms of decreasing enrollment or restricting the focus of law school to a more practice orientation. In fact, he thought that the greatest challenge of law schools today was bridging the gap between expectations of law students and the realities of the work-place.

> I think that my own expectation going into law school was that I would be practicing law for the balance of my professional life and I think ... the over-whelming majority of people both those who apply to law school, and members of the general public, believe that (the training of lawyers) is the function of law school.
>
> I think that (it) should be made known both to people who apply to law school, and to members of the general public at large, that law schools can serve a more diverse function and that a legal education can be a very useful background for many different areas of endeavour.

"Peggy" was clearly in agreement when she expressed that law schools should take the initiative of encouraging students to broaden their perspective of what a legal background can mean in terms of employment options. The greatest challenge, in her view, was,

> ... the number of people still wanting to go into the traditional law practice given that there aren't the jobs anymore ... I think their (the law school's) challenge is to show people what they can do with a law degree other than practice in a big downtown firm.

Law Schools Role in Post-graduation Transition & Placement

Participants recommended two alternatives to stricter quota's on the number of law students admitted to law school. They were:

> 1) the law school could assist students to access employment opportunities both in the field of law and also in alternate careers; and
>
> 2) the law school could ensure that graduates have the requisite knowledge and skills necessary to compete effectively in the work-place if graduates found that the only way they could practice law was to open their own sole-practitioner office following articles.

According to "Brian" - The greatest challenge for law schools was, "... not guaranteeing but providing employment opportunities." Clearly in agreement with this position was "Benjamin" who stated that "... law school should be doing placements ... of students and ensuring that they continue through to meaningful careers." The role of the law school was not limited to simply assisting in the placement of students. "Brian" suggested that the law school must ensure that students are adequately educated to meet the challenges of the work-place:

> Balancing traditional education (and) core curriculum ... keeping the education contemporary and meaningful ... (and providing) a practical aspect to your education as well, especially with a career focus, so that

> you come out not with just a purely academic understanding, but also an ability to move fluidly into your practice.

"Peter" - agreed that law schools must consider offering practical courses that would assist students in the transition to the business realities of the nineties. He commented that students are coming out of law school and many of them are not getting kept on at the law firm where they articled. These graduates are then, "... faced with the problem of looking for either alternate careers, or having to learn very quickly how to run a small business. We were taught nothing about running a business in law school, and that is probably one of the things that should be included in the practical side of things in school."

Need For Action

"Richard" commented that he was fortunate that he was able to find an articling position and is now called to the Bar. For close to two years, however, he had been unable to find work as a lawyer. He stated that law schools either need to incorporate a more practical focus or consider shortening the law school and extending articles which will provide the necessary practical work experience to the graduate. In this way, the person would be better prepared to become a practicing lawyer. Particularly for those who are unable to find permanent work in a law firm after articles, if they want to practice law it means that they,

> ... are coming out of articles and having to start their own firms. I don't know if a lot of the people are really adequately trained to have all the skills to really give people adequate legal advice, to adequately represent them in court ...", when they have only had one year of articles following an academically focused degree.

"Richard" continued his reflections, "I think it is really disillusioning, a lot of people ... come out of law school and find that there's really no work." It's not only a struggle to find work but also to maintain employment, as much of the work is simply short-term contracts. "Richard" was divided on the question of "limiting the flow" of people into law school as this means denying some people the opportunity of a legal

education. According to "Richard" this would be unfortunate, for, in his words, " ... people are entitled to a legal education, for its own sake" whether or not they ultimately go on to become practicing lawyers.

While quotas were not favoured, even fewer participants supported the option of maintaining current admissions and simply failing more students. Generally the law school program was perceived as stressful. A higher failure rate would only exacerbate this situation. Many participants also expressed little faith in the law faculty as arbiters of later success as a lawyer. In fact, current evaluation systems were perceived to be poor indicators of an individual's capabilities, either as a student or as a future professional.

It was beyond the ambit of this research to consider the impact on society, or the profession, of the phenomenal growth in the number of law graduates which has led to difficulties in securing articles or employment. The ever-increasing numbers of law graduates have created at least one serious problem for law schools, however, which participants believed needed to be addressed: the role that marks play in determining future prospects of employment. Whether or not law schools chose to restrict the number of graduates, they must recognize that in the present market-place, a student's marks largely determine whether or not that individual will have the opportunity to ultimately practice law.

"Richard" has personally experienced the frustration of a thwarted career in law, yet he was emphatic that all graduates should, "... have the opportunity ... to become a lawyer and it shouldn't necessarily be all on marks." In the final analysis he concluded that it was a difficult issue that the, "... law societies and the law schools are going to have to really address ... they owe people that."

In the past the marks that a student received had an initial impact upon the options that were open to that individual. (Wilkins:1987) Options increased in terms of the

range and quality of articling positions if higher marks were attained. Students who performed well generally had more choice in terms of area of practice and type of law firm. Alternatives such as articling with the Courts or pursuing a Masters of Law degree were only open to those with the highest marks. After articles, however, the marks that an individual received in law school generally became much less important and success in practice was perceived to have little correlation to academic achievement at law school.

Unfortunately, the present situation has become much more serious as graduates with lower marks may find that they are unable to find a law firm willing to take them on for the requisite year of articles due to the saturation of the market-place. If marks preclude the graduate from securing articles then the law school has effectively determined who has the right to practice law in the future and who does not have this opportunity. This would only be justified if the current marking system measured future effectiveness as a lawyer. Those who were interviewed agreed with leading legal educators that marks do not assess or indicate future ability to practice law.

(Feinman and Feldman:1985) "Ranking in legal education is misleading because it does not make a meaningful statement about student ability. Grades that are the product of a learning system with a defective critical process and a limited scope of evaluation do not provide a meaningful statement of the students promise as a lawyer." (p. 547) (emphasis added)

Wilkins (1987) also criticized the marking system of law schools particularly the over-reliance upon the use of examinations as a tool of evaluation. Marks are not only a poor indicator of future effectiveness as a lawyer, they are often not even an adequate measure of current performance.

Wilkins (1987) continued by commenting that,

> The problem is not with their precision; exam results can, no doubt, be used - or gerrymandered - to produce a discrete ordering of all students

> in every case. The problem is to understand what relevance such rankings could possibly have, when they result so obviously from measurement of the wrong thing.

He goes on to add,

> Law school grades are engineered and produced to help the wholesale legal trade tell different law students apart ... All this makes final exams untrustworthy indicators of real legal competence, unfit instruments for use in checking readiness for more advanced work, or for the responsibilities of law practice. (p.128).

As marks may now be instrumental in closing the door to future prospects of practicing law, the law schools have an increased responsibility to demonstrate that marks indicate future ability to practice law. Otherwise maintaining current methods of evaluation become a grievous injustice, if the impact of the marking system is to preclude certain individuals from the practice of law. Law schools can no longer rely on later career developments in an individuals life to rectify an inadequate evaluation system. This issue will become increasingly important as more and more graduates are directly impacted by a negative law school evaluation.

Wilkins (1987) stressed the power of the law faculty to determine future careers even before the problem of finding and securing an articling position arose, " .... (the law faculty) cannot fail to appreciate just how much leverage they have over the shape and the inflection of their students lives during those three years. Careers and relationships can be forged or broken, opportunities realized or irretrievably lost in the space of that time." (p.115-116) This is not a position to take lightly, particularly in these more competitive times when there may be little opportunity for graduates to over-come their past ranking in law school whether relevant or not to their future endeavours.

Law schools must address the question, whether it is "fair" to admit students into a professional degree program, with the attendant investment of time and money, when

the ultimate prospects of employment or potentially even entering the profession as a full-fledged lawyer are not the best. Le Brun & Johnstone (1994) thought that as a result of the current employment situation, there would ultimately be a readjustment in the number of students in law schools.

> ... we must anticipate that the demand for legal education will level off and probably decrease once prospective students think the market for law graduates is saturated. (p. 381)

There has been little evidence to suggest that enrollment has declined as predicated and many participants believed that it was unrealistic to rely on a market-place adjustment. Nor was this considered a responsible position for the law faculty to take. "Raymond" asserted that,

> There's no way that the law community, society, can accommodate the number of lawyers that get "spewed" out every year. There's just no way. And maybe the market will take care of that, but it's not fair to have these people come out...

The result of not finding work on graduation is not simply a statistical problem, it is an issue with a "human side" according to "Penny". She identified the greatest challenge in legal education to be,

> The fact that we're producing too many, too, too many lawyers. And that these poor kids are coming out right now with no jobs or very poor jobs and no hope of ever recouping the money they've spent for student loans over a LONG education.

The lack of evidence to support any re-adjustment in enrollment has been evidenced by the fact that there continues to be many more applicants, than there are positions in Canadian law schools. The optimism may be accounted for, at least in part, by the confidence that each individual brings to law school. Acceptance into the law program is based on increasingly exceptional performance in an under-graduate degree. Each student enters the program believing on the strength of their past successes that law school will reward their efforts with meritorious marks similar to those achieved in the past. Unfortunately the majority of students cannot maintain their past standing in

the top 10% of the class when they are now competing with other students with similarly exceptional education back-grounds. Clearly 90% of the students must lose in the law school lottery of marks.

The competitive struggle for marks and recognition in law school often leaves deep feelings of inadequacy and failure for the majority of students who no longer pull top grades. When this translates into the inability to find articles or work as a practicing lawyer than the result can be an over-all loss of identity, loss of peer group and even loss of friendships. Law schools need to carefully consider the dictates of a new economic climate and the impact this has on the law school environment. Those elements within the control of the law faculty should be addressed including the ramifications of the job market on aspects of law school including current evaluation systems.

"Timothy" believed that, "Finding jobs for all the people who graduated." was the greatest challenge in legal education. He estimated that "... 30% of the people coming out now, cannot find a job at all!" and he criticized those who contend that law school should not be geared toward producing practicing lawyers. The fact that a significant proportion of the recent graduating classes cannot find work is, "... not a problem if law school is purely an academic exercise, but everybody sure talks about it like it is a problem ..."

In concluding this section, the comments of three participants provide a summary of the central theme: "Too many graduates - not enough jobs!"

a) Law schools have an obligation to re-think legal education and incorporate practical experience;

"Janet" discussed two key issues in legal education which are inter-related: 1) the quality of the articling experience; and 2) the "... huge number of graduates that are

coming out of law school, with the idea that all they can do is practice with a law degree." She criticized law schools for not accepting the challenge of either cutting back the number of people admitted or taking a more responsible role in the transition to either legal or alternate careers. Particularly in respect to articles, she was disturbed by the "hands-off" policy of the law school. "The law school party line is that, "We're not here to train lawyers, we're not here to give you your practical teaching, that's the law firms job when they hire you for articles." ... (then - the law schools) have a responsibility to really take a good hard look at the quality of articles out there and ... in fairness communicate to people that you may or may not get decent practical training."

b) There will be a serious back-lash if legal education does not properly prepare students for the current work environment;

"Jonathan" - "Well I think that the law schools today are dealing with (a) very practical, very difficult problem, in that, they have to prepare the students for a very competitive world. You know, the lawyers in (this province) have probably doubled in the last ten years." He considered the question of whether or not it is the role of law school to address this issue. In response to those who would argue that laws schools need not consider these issues because they are only dealing with theoretical legal education, he stated,

> I think that they cannot divorce themselves from the realities of the market-place out there ... they are graduating too many, too many individuals, it's not healthy for the system ... (although) there's all kind of alternate careers ... the expectation is that most of these people will want to practice as lawyers.

"Jonathan", similar to "Raymond", also predicted a negative back-lash if law schools do not address this problem: "... right now law schools are trying to say, "It's not our problem, it's the professions problem ...". It's going to become more and more of their problem because I think there's going to be more and more resistance and

criticism as people get out and say, "Hey! I thought that I'd be able to earn a living at this and I really can't! - There's just not the places or not the demand, so why didn't you tell me the reality of this at the start?"

c) If nothing is done to address the situation then it will reflect badly upon the law school and the legal profession;

"Victor" considered the question of whether the law schools were graduating too many students and believed it was an issue that must be addressed, "... if for no other reason than in a purely human sense in that you put somebody through three years of school and a year of articling and then for there to be no jobs or un-fulfilling jobs, it's in the end counter-productive. It will reflect badly on the profession and the institutions that graduate the lawyers".

3) Core Courses & Relevance

"Heather" commented that "... one issue has to be quality, to make sure that the candidates that are coming out of the law schools are at a certain, at least threshold level." Participants generally agreed that law schools should continue to emphasize the teaching of legal analysis and reasoning and legal research. What was often a matter of contention was whether clinical programs, which have the capacity to teach lawyering skills other than just the study of cases, are of any value.

"Dennis" emphasized that the key element in determining a core curriculum was setting the aims and objectives: "I mean what do you want a law school to be? I mean that's the question that has to be answered." He continued by stating that,

> Given my idea of lawyers as technicians ... I don't think there's any reason that it couldn't be held at (a local trade school) ... you could teach the basics but most of it has to be learned on the job.

While other participants were less extreme in stressing the practical component, the majority supported a curriculum which would balance theory with practice. The practical component would include the teaching of skills associated with practice. While many law faculties have been reluctant to take on this role, the law school is, in fact, in a unique position to expose students to the full range of these practice skills. This was seen as an opportunity which might not be readily available to graduates in actual practice.

Another issue identified by "Heather" in respect to core curriculum was the following challenge

> ... (to) stay relevant with the changes that are going on in the profession, so that the courses they are offering are still at the brink or the forefront of what's happening in the law.

Teaching the core curriculum was central to the law school program, according to "Heather" and there was a need to keep "... a focus on teaching despite all of the pressures for academics to be publishing or writing or researching."

"Lynne" believed that,

> ... the greatest challenge they have is giving each individual student the education that they want. I think there are a lot of people demanding very different things from their legal education. There are people who want to come out as practitioners and people who want to come out and do Master's degrees and teach and what they want is very different.

She would not like to see law school become a "... trade school, but there are a lot of people pushing for that." She believed that the situation would become increasingly intense,

> ... I think they're going to find more and more pressure again to make practitioners coming out of Law school because law is becoming much more of a business than a profession and in some respects you have to hit the ground running ... where you used to have the luxury of being trained for a year or two by a mentor that's just not happening anymore and students are having to become a little bit more self sufficient.

> ... you need the background in practical matters that law school just doesn't give you, but at the same time law schools will still be expected to provide the theory and the background that is necessary to practice as a lawyer.

"Betty" thought that the biggest issue in legal education was the same as the challenge for the university in general - "... resisting privatization and resisting the encroachment of business interests into the curriculum." She was concerned because of the budget cut-backs, that the universities "... are trying more and more to get private funding which means big business a lot of the time. Big business is demanding that graduates of universities come out job-ready ... with qualifications tailored to their businesses." Students who are worried about getting a job may allow the practicalities of the market place to unduly influence their individual program of study. On the other-hand, students who take a less practical bent may be penalized when the search for work begins.

One of the strongest statements on the importance of core courses was made by "Greg" who stated,

> I think law schools are trying to respond to every pressure group and it is a challenge for them to remember that there are some fundamentals that they have to teach and if you don't get the fundamentals first, you can't get anywhere else.

One of the central problems has been the lack of guidance in respect to courses which might constitute a "core" curriculum particularly in second or third year. There has never been a thorough, formal identification of the objectives or requisite course work of law school's in Canada. It was therefore not surprising that law schools simply add or drop courses from the calendar, often with little regard for an over-all strategy to legal education. Unfortunately this can have serious ramifications for the individual student who may actually lose out on employment opportunities as a result of a poorly selected law school program.

In fact, several of the participants of Focus Group #2 had been members of hiring panels for their law firms and many agreed with "Greg" that while certain courses may look good in the calendar they won't necessarily impress the lawyers who are hiring law students for articles. While participants commented that students should be told that their course selection was a factor in not getting a job, it was recognized that it was already too late at that point in time to be of any assistance to the individual. Certainly a significant number of the participants expressed the belief that a program of courses should reflect essential subject area content. This provides the necessary background for the practice of law. Yet participants recognized that students often lack any guidance in selecting courses and making appropriate choices. There needs to be a clearer statement on what is necessary if the individual intends to practice law and some recognition by law school faculty that the vast majority of law students DO intend to practice law. "Ella" stated that "99% of the people there, are there to get an article. That is the reason that they're in law school."

While little has been done recently in Canada to further discussion on the setting of core curriculum, the importance of this issue has been recognized in other countries in the past decade and a number of major reports have been generated. The American Bar Association in the United States has recently issued a comprehensive review of the issue in, "The Report of the Task Force on Law Schools and The Profession: Narrowing the Gap" (1992), commonly referred to as the "MacCrate Report". In Australia, Pearce, Campbell and Harding in 1987 published the Australian Law Schools: A Discipline Assessment for the Commonwealth Tertiary Education Commission. The "Pearce Report" criticized current methods of legal education in Australia and challenged legal academics to consider significant changes to the traditional curriculum and methods of teaching and learning.

The only major Canadian report on the education of law students and lawyers was published as a summary of a 1985 National conference on legal education sponsored by Federation of Law Societies of Canada with the cooperation of the Canadian

Association of Law Teachers and the Committee of Canadian Law Deans. Unlike the other two reports, however, there were no recommendations made in respect to the development of a core curriculum. In fact, the objectives which were developed were quite basic and primarily aimed at sharing information and simply fostering consultation and cooperation between law schools. (Matas & McCawley (eds.):1987:p.83)

In contrast, the "MacCrate Report" actually listed ten fundamental lawyering skills and four specific values of the legal profession which were considered to be essential in the inclusion of a quality law school curriculum. (p.325-338) While less detailed then the American study, the key contribution of the "Pearce Report", was it's over-all critique of current Australian legal education practices. These practices are similar to Canadian law schools, particularly the reliance upon Langdell's Socratic method and case analysis as the primary methods of instruction. According to Le Brun and Johnstone (1994) the "Pearce Report" faulted "The preoccupation of many law teachers with rule orientation, legal reasoning, and curriculum coverage ... (and) linked (this) with the work of Langdell and others of similar vision." (p.21) While the report was not necessarily well-received by professors, it was crucial in the initiation of necessary changes. Le Brun & Johnstone (1994) stated that,

> The Pearce Report (Pearce, Campbell, and Harding, (1987)) contained some of the most swingeing criticisms of legal education in Australia. The Report, which has not been warmly embraced by all legal academics, may well have acted as a catalyst for reform in some Australian law schools, at least in the area of piecemeal curriculum reform. If nothing more, it provided a justification for change which many scholars needed. (p.26:Note 84)

Unfortunately Canadian law schools have not had the benefit of a comprehensive report on legal education and therefore any modifications which are made to individual programs are not part of a coordinated, over-all plan. In many cases there has been little motivation to change particularly in this era of budgetary restraints which often encourages entrenchment rather than initiative.

4) Balance Between Theory and Practice

One of the problems identified by participants was the lack of consensus or clear direction on the aims and objectives of a legal education. According to "Charles" an over-all lack of understanding between the law student and the law faculty as to the outcomes of a legal education accounted for much of the dissatisfaction expressed by graduates. Criticisms that former students have of their law school often stem back to this mis-communication of objectives. Expectations that students bring to the law school experience often result in disappointment when faced with the reality of law school studies. "Charles" stated that "... a lot of students going in (to law school) want to be lawyers, so they're looking at it as more of a trade school, where it is still an academic school." Once he identified this issue, "Charles" continued by stressing that the law faculty has a responsibility to let potential students know that it is not a "trade school" and if there is no intention on the part of the law faculty to change law school to meet student expectations then, "It's got to really be "sold" as an academic endeavour, if that's the way they're going to keep it."

The decision to "keep it academic" would not be "Charles" preference. He believed that law school needed to change so that it was less academically oriented and more in line with what the majority of students expect - a preparation for a career in law. In summing up, "Charles" voiced the opinion of many participants, when he stressed that there were only two options available:

1) either law schools must cut back on the numbers; or

2) they have to change the focus of the program so that graduates are better able to enter the field of law.

At the very least there should be a closer alignment between the practical needs of students and the aims of the law school. McCormack (1987) stated that it was,

> Only after graduation (that) young attorneys come to the depressing realization that 90 percent of what they were taught in academia will never be used in practice; and conversely, 90 percent of what they need to know was never taught to them at school. (p.28)

If true, this would be an unfortunate reflection on legal education. While the academic focus of instruction was faulted, the author felt that this was largely predetermined by the selection of non-practitioners as faculty. McCormack (1987) commented that,

> Law school professors are admirably equipped to teach reasoning and theory. But it is the rare academic who has the foggiest notion of what really goes on in the trenches. So the fact remains that law school doesn't teach people the things they'll be doing day in, day out, as lawyers. (p.47)

One way of addressing this issue would be selecting alternate methods of hiring faculty in order to ensure a better representation of practitioners. Another alternative would be the use of clinics or simulations where students could learn practical skills and knowledge while actively engaged in the practice of law. The majority of participants found that when law was learned in context, combining theory and practice, this was very beneficial as it fostered long-term learning. In response to those who favour the current curriculum and contend that focusing on practical skills somehow diminishes the law school program, Le Brun & Johnstone (1994) countered that,

> Many skills and attitudes which are vocationally focused in fact provide an appropriate framework within which broader educational goals can be best achieved. By placing learning in a meaningful context, learning becomes relevant and, thus, more meaningful. (p.13)

Participants generally agreed that curriculum at law school would be much improved if in the future the law faculty were to explore ways of combining theory with practice. In fact, advice from participants to the law faculty suggested that much could be learned from simply following the Chinese Proverb:

> Tell me, I'll forget. Show me, I may remember. But involve me and I'll understand.

5) Brief Review of Legal Education Reform Movements

There has been ongoing criticism of the law school curriculum in both Canada and in the United States. The primary difference between the two countries has been, however, that the United States has allocated significant time and resources towards producing several reports on legal education. As early as 1920, the United States developed several legal education theories which were critical of the education practices in law schools at that time. It is unfortunate that past criticisms of the curriculum are often as valid today as they were then, particularly in respect to the need for practical instruction of law students.

In 1921, an American report - Training for the Public Profession of the Law - urged a second "track of studies" for more practice-oriented students. The Carrington report (1971-72) - New Directions in Education - elaborated on this two-track scheme and recommended that there be a further differentiation of training, more representative of the different kinds of tasks within the legal profession. The most recent study in the United States - the "MacCrate Report" (1992) broke some-what with this tradition as it was proposed that skills training and preparation for actual law practice be included as a of a single, core law school curriculum. Students would have the option of selecting a more or less practical orientation in their program of legal studies. Law schools would, in turn, be required to provide a sufficient practice component for all students who selected this option and some practice-component or skills courses would become part of the required curriculum.

In addition to the numerous studies and research reports, the United States has also had the benefit of several "movements" which focused on improving the law school curriculum and methodology from a particular philosophical perspective. Legal Realism was an early example of such a movement and it was very influential on the curriculum of some American law schools. The main proposition of the Legal Realist movement was that it was artificial to study legal rules where these are divorced from the social context. Gorman (1982) stated that as early as the 1920s, Columbia Law

School attempted to, "... break through doctrinal course barriers and to design teaching materials around ... functional themes." (p.315)

In contrast, Jerome Frank (1933) advocated for clinical training in law schools. He emphasized the need for more practice and less theory. This, in many ways was the polar opposite to the legal realist movement. Since the 1930's, when his recommendations for change of the curriculum were made, there has been a significant body of literature developed in the United States on clinical legal education.

According to Gorman (1982) this body of literature,

> ... tak(es) to task American law schools for their inattention to training in lawyering skills ... (this included a) 1979 report entitled Lawyer Competency: The Role of the Law Schools (prepared for the American Bar Association Section of Legal Education and Admissions to the Bar) and known as the Cramton Report. Although critical analysis of case materials is not altogether disparaged the clinical advocates would supplement it by closely supervised training in writing and drafting, advocacy, negotiation, counselling, interviewing, and fact-gathering. (p.316)

Although there have been significant developments in terms of diverse clinical programs in the United States, these clinics have generally not been well integrated into the core or main-stream curriculum. Unfortunately even in the United States where there has been significantly more research, informed debate, and recommendations made, change in legal education has been slow.

The "MacCrate report" (1992), was the most comprehensive American study of lawyers' educational and professional development needs to date. The written report was the result of an ambitious and thorough investigation by an American Bar Association (ABA) task force which studied the over-all issue of legal education between the years of 1989-1992. Rose (1994) described the process as follows:

> The task force operated through 7 subcommittees, held 4 public hearings and 7 plenary sessions, engaged in 1200 hours of work, conducted a survey of law school skills training, and produced an American Bar Foundation empirical study (Learning lawyering: Where do lawyers acquire practice skills). (Note 10:p.550)

Numerous recommendations were made in the "MacCrate report" on what more needs to be accomplished in legal education in the United States. This set the stage for ongoing dialogue between practitioners and academics based on not only the identification of core subject areas but also transferable skills and attitudes (values) which graduates should possess. Unfortunately, less has been accomplished in Canada, partially as a result of the lack of research and literature in respect to legal education.

A very brief reference to three other views on legal education was made by Gorman (1982). These include:

a) the use of electronic technology;

b) humanism; and

3) critical legal theory.

Each of these topics will be reviewed briefly with respect to the Canadian legal education environment.

a) Use of Electronic Technology:

In respect to electronic technology there was an identified need to ensure computer literacy of recent graduates which included familiarity with electronic research. There was also the need to explore alternate forms of course delivery including the use of (CAI) computer-assisted instruction. This has received some attention in the United States but generally multi-media including video demonstrations and CAI are still very much undeveloped fields in legal education in Canada. Computer literacy, whether or not it was used in the actual teaching of courses, was identified by participants as being a key component of a quality legal education.

b) Humanism:

Humanism was very popular in the 1970's and into the early 1980's as a philosophical approach to legal education but it has generally disappeared from the literature as an alternate teaching methodology in recent years. Beyond the incorporation of client counselling and interviewing as an option at most law schools in Canada, little else of the humanist movement has been adopted by law faculties in the 1990's. The comments of participants that touched on concern for the client, the revision of current impersonal teaching methodologies and the over-emphasis on a business centred curriculum suggest the need to revisit the incorporation of humanist principles in law school.

c) Critical Legal Perspectives:

The most influential educational philosophy at present is the critical legal education movement which has gained significant momentum in Canadian law schools in the past decade. Most law schools now offer courses from a critical legal perspective and students at some law schools are required to take at least one critical perspectives course. This development has not been referred to in this study as very few participants mentioned critical legal studies and there was no clear indication whether these courses were viewed as either beneficial or disadvantageous by participants.

The following two individuals found that "perspectives courses" were an important part of their legal education:

"Peggy" indicated that one of her more effective instructors taught a course on feminist jurisprudence. She was not sure whether it was the professor or the material that she liked so much but it was clearly one of her favourite courses from law school:

> I was just totally astounded by the kind of material that he would give us to read ... It was just nothing I'd heard about and it really opened my eyes. That was the one thing that I always liked about law school, was that course.

"**Beatrice**" found that she came out of law school more politicized, with,

> ... (a) much deeper and more articulate understanding of power relationships and politics ... I think that it's opened my eyes to other areas of interest. My reading interests have expanded. It's prompted me to want to go back to school again and maybe do a Masters of Law.

It was interesting to note that both participants used the phrase, the course "opened my eyes" in discussing their "perspectives" courses. This phrase was not used by any of the other participants to describe their legal education experience. Commentary on these courses was somewhat mixed, however, as a couple of participants criticized instructors of critical perspectives courses for "getting on a soap-box." Clearly a need for further study of this new area of legal education from the students' view-point was illustrated by discrepancy of opinion of the participants although it was not a focus of the research.

SUMMARY:

Law schools need to look seriously at the issues identified by the participants. One of the most pressing concerns is the number of graduates. While there was no agreement amongst participants in respect to tighter quotas, this must be seriously considered by law schools. If the law school decides to continue to graduate the same number of students then all other aspects of the law school program must be assessed. For example, the present system of evaluation was criticized by participants as being a poor method of determining who will do well in the practice of law. When the economy was growing it was possible for all graduates to find work and prove themselves in their profession. At that time there was less pressure on the law schools to revamp their marking systems. At present, however, there are a significant number of graduates who cannot even find articling positions and often members of this group are predominantly those students who received lower marks. As a result the law faculty has become a "gate-keeper" for the profession - not only in determining those

who are admitted but also in the allocation of marks. This is simply one example of how the over-all legal education program must be revisited and reviewed to determine if it adequately meets the needs of the 1990's.

In addition, if the law school continues to admit the same number of students on the premise that not all law students will ultimately become lawyers and there are worth-while alternate careers for graduates then:

1) this should be clear to prospective law students;

2) the stated objectives of the law school should be changed according;

3) the law school should provide a broader range of curriculum options with the opportunity to gain transferable knowledge and skills identified as necessary in alternative careers;

4) the underlying emphasis on "success" at law school as being the right to article with a large firm must be actively dismissed and replaced with a recognition that there are a broad range of ways to succeed with a background in law;

5) the law school should assist those students who intend to practice law in the future by providing skills courses and facilitating the transition to practice recognizing that individuals can no longer count on being kept on with a law firm after articles; and

6) for those who are willing to consider alternate careers, assistance should be provided in the consideration of options available and in the transition to the alternative career choice.

Law students, similar to law schools, will also have to be proactive in preparing for the future. In the words of "George," who recognized that law students had a role to play in setting their career focus, he advised them to, "... keep an open mind as to what your professional choices will be after graduation. You may not be doing what you think you're going to be doing when you enter law school."

The issues that participants identified must be adequately considered and addressed by law schools. The importance of determining the aims and objectives of law school, again surfaced as a fundamental consideration. The following questions must be considered:

> i) What do law schools set out to achieve?
> ii) Do the 1) members of Canadian society; 2) the Law Society; and 3) the students agree with the purpose of legal education as set by the law school?

The agenda should be clear and explicit. It must incorporate consideration of:

1) the recent changes in technology;
2) the rapidly expanding knowledge base in law;
3) the realities of the job market; and,
4) the needs of the three identified client groups.

While participants recognized that law schools could choose to do little about meeting the challenges they had identified, the impact of not dealing with these issues will only increase with each graduating class. If the situation is not addressed in a timely manner, then to repeat a common sentiment of the participants, the challenges will only become greater for law schools in the future!

CHAPTER 6

SUMMARY - CONCLUSIONS

INTRODUCTION

Quality in university education has long been a contentious subject particularly in the sphere of professional education. Student evaluations have become commonplace in recent years to assess individual courses and to provide feedback on elements of good teaching. Rarely, however, are entire programs of study reviewed. Participants in this research study were all law faculty graduates but individuals had attended different law faculties located in three provinces in Western Canada. Thus the program under review - law school - remained constant but the broad range of experiences provided an overall view of pre-professional legal education in Western Canada generally which would not have been possible through the evaluation of a single faculty.

It has also been uncustomary to canvas the reflections of graduates on their learning experience rather than students currently enrolled in a given program. Graduates, however, possess a unique perspective for they have gone on to work as professionals and have used the knowledge, skills and values acquired in university. The participants review of their legal education experience as former students provided a breadth and depth of commentary about program effectiveness and quality. This would not have been possible through an alternate research approach.

The findings of the study illustrate that the quality of legal education in Western Canada was a topic of great interest to former graduates. The primary message was balance. Participants responded to key legal education issues by mediating, divergent and often extreme, entrenched positions. Dissention which has arisen in the past between those who actually practice law and the academically oriented faculty who teach future lawyers was reflected in the study, but many participants tried to find the

"high road" in this ongoing debate. Participants proposed changes and made recommendations which combined the best of both worlds in the improvement of legal education in Western Canadian.

Participants in this qualitative study identified some of the elements of a "quality" legal education experience. Any criticism's of, or praise for, the university law programs were grounded in actual experiences and there was much to be learned from the participants in respect to their experience of law school. The focus of the study was concentrated upon the teaching and learning of law, from a law student's perspective. While there were many positive experiences recounted by the participants, there were also situations recalled which indicated a definite need for improvement.

Change in over-all objectives, current methods of teaching, course content and a greater emphasis on practical skills and knowledge were recommended by participants. While a failure to change can frequently be the result of a lack of knowledge on how to change, the information from the participants was often quite specific. Centra (1993) criticized typical student evaluation forms for providing so little useful feedback. He stated that they are,

> ...long on judgement and short of helpful advice ... offer(ing) few suggestions for change except, perhaps, to make course objectives clearer. Many changes (recommended) in teaching practices are ... (simply) "tinkering," or minor course and instructional adjustments ... (p.11)

That was not the case in this study, where participants gave some very far reaching and detailed direction to law faculties in Western Canada, advising how programs could be significantly improved.

The importance of this research was, in part, related to the timing of the study which coincided with an increased demand for accountability in higher education facilities.

Within the next decade there will likely be increasing pressure brought to bear on the law faculties in Canada. In addition, much can be done to better meet the legal needs of the community by addressing the teaching of skills, knowledge and values that legal professionals must possess in order to better serve the public.

There was a recognized need to seriously evaluate what was being taught and to improve the teaching of future lawyers. There was no doubt that in this era of fiscal accountability, the day-to-day work of university professors as teachers will come increasingly under scrutiny. Canadian law schools are at a disadvantage as they have not been the subject of careful study in the past and therefore have been lulled into a false sense of security that whatever change need occur can happen gradually. The comments of former students have established that this would be a misguided presumption. The world has changed quickly and the university, particularly the law faculty which has been steeped in tradition and precedent, must be vigilant in responding to future challenges.

Throughout the research it was apparent that the relationship between theory, practice and research cannot be viewed as linear in nature. In order to understand and study in the field of higher education it was first necessary to understand that university professors are practitioners in education. According to Jarvis (1995), since adult and higher education are "... practice based, it is important for research into practice to discover both what actually occurs in the field and what is considered to be good practice." (p.265) Jarvis (1995) suggested that theory does not determine practice, nor does practice determine theory but that there was an indeterminate relationship between the two that allows for growth and change. This study has considered both the practice of pre-professional legal education, drawing upon the words of the participants, and related these comments to educational theory. In this way the theories of higher and adult education were combined with the study of the actual practice in law schools.

A set of principles or key themes arose from data analysis and a review of the literature, which supported comments of the participants. These were included in reference to quotations from the graduates, who provided valuable insights drawn from their education experiences at law school. The data were gathered and analyzed in order to assess and make recommendations on how to improve the quality of pre-professional education in law in Western Canada. The themes are compiled below in a summary of the research findings.

RESEARCH FINDINGS

To summarize, each theme has first been presented in a very brief over-view equated with the respective chapter in which the theme or themes were explored in greater detail. A more in-depth analysis of the data and theory follows which summarizes the contribution of the research to the field of higher education.

Chapter 2: Elements that Define a Quality Law School Experience

a) There was a recognized need to clarify the purpose of law school. The aims, objectives and out-comes need to be specified and evaluated; and

b) Law school was an important experience for graduates and the education received had a long-term impact on their lives. This included professional designation upon graduation, continuing friendships and an ongoing change in thinking processes.

Chapter 3: Teaching and Learning Dynamics - Formal

a) The "hidden" curriculum had a significant impact upon the student at least as significant as the "formal" curriculum. According to participants the law faculty only recognized the formal elements of a legal education as being significant;

b) Teaching and learning dynamics in law school are similar to other higher education faculties and there was a need to:

1) identify the elements of effective teaching; and
2) consider positive learning strategies in order to improve the quality of legal education.

c) There was a recognized dichotomy between the need to teach theory and practice although most participants recommended accommodating both in legal education. Questions were raised as to why this issue has not yet been addressed by law faculties as the majority of other pre-professional programs have already adopted a practicum component - integrating theory and practice at the university level.

Chapter 4: Informal Learning Experiences

a) Learning should incorporate professional practice in law school which would foster life-long learning and "reflection in action" as part of the educational experience;

b) Advice to law students on how to better "handle" law school which included an emphasis on the need for balance and ways to seek a well-rounded law school experience; and

c) Recognition that law school can have a negative psychological impact upon students and recommendations on how best to minimize this aspect of legal education;

Chapter 5: Current Challenges and Future Direction (in Legal Education)

a) Participants identified key challenges in legal education which law schools need to address in the next decade. Issues included changes, advances in technology, advent of the information age and fewer opportunities for traditional career advancement.

Chapter 1: Statement of the Problem (Research Plan)

The research was based on a qualitative paradigm with the intent of gathering together evidence from those most directly impacted by the quality of the legal education experience at law school. Participants were selected through a snow-balling technique and purposive sampling. Forty individuals provided data for this study. Data were first collected through two focus groups involving 20 individuals. The first focus group was unstructured and was essentially a discussion group. The second focus group was semi-structured and a series of guided questions were used. Next, 20 one-to-one interviews were conducted, subsequent to the focus groups, using a similar interview guide. Notes were taken by the researcher at the time of the first focus

group. The second focus group session and all of the one-to-one interviews were taped with the participants approval and verbatim transcripts were made. Data were analyzed by the researcher through listening to the tapes and through reading and high-lighting key themes in the notes and transcripts. Data provided by each participant in the one-to-one interviews was also charted and cross-comparisons between participants were made.

Participant Response to Time Commitment

Many participants were surprised to be asked about their law school experiences yet despite busy schedules, every individual contacted agreed to participate if they were able to set up an appointment with the interviewer. Most of the lawyers were initially concerned about the length of time that an interview would take. When the response was that it could be as short as 1/2 hour for the one-to-one interviews, this was considered by most participants to be sufficient time to discuss their law school experiences.

As the person being interviewed determined the length of their responses to the questions, it was interesting to note that very few interviews lasted the minimum time requested of 30 minutes. Participants, while they may have been initially reluctant to allocate more than the half hour, often continued to talk well past the time allocation. Many appeared to find the experience of revisiting their law school experience as almost cathartic. Interviews ranged in length from thirty minutes to two hours in duration.

"Intensity" of Participant Involvement

Both the focus groups and the interviews tended to start very low key, however, participants generally became more animated and the intensity often increased dramatically. Participants recalled incidents that had obviously been very influential at the time and had left an indelible mark on their memory. Although their careers subsequent to law school had allowed little time for reflection upon this period of

their life it was apparent that the experiences of law school had in no way been diminished by the passage of time.

The surprising intensity of the participants supported the premise of Galbraith (1991) when he stressed the importance of the close connection of the learner to the learning experience:

> Learning is frequently spoken of in highly emotional terms by adults describing their experiences. This hardly seems surprising, yet the emotional dimensions to learning receive scant attention indeed in formal research on adult education ...
>
> When learners speak about learning episodes which they remember with some emotion and which they recall vividly, the element of connectedness is frequently evident. By connectedness I mean that the event or episode has some deeply felt meaning for them.
>
> ... This concept of connectedness is hardly new in adult education. It is the focus of the oft-quoted injunction to "start where the students are" and its importance is attested to by adult educators as ideologically diverse as Paulo Friere, Malcolm Knowles, and Cyril Houle. (p.41-42)

It was considered important to use the "voices" of participants in the study. Themes explored always included direct quotations from either the focus groups or the individual one-to-one interviews. These quotes best illustrated the commonalities disclosed by the study and the strong emotions expressed by participants during the course of discussing law school experiences. There was clearly a need for additional in-depth research in this area as this study attempted to cover a very broad spectrum of topics. Certainly legal, pre-professional and higher education are all areas which require further study. Research in these areas would be particularly well-rounded and insightful if it considered both the perspectives of past graduates, in addition to canvassing the opinions of students currently enrolled in a program of studies.

Chapter 2: The Purpose of Law School

Need to clarify aims & objectives of legal education

The majority of participants stated that they attended law school expecting it would

prepare them for the practice of law. The reviews were mixed on how well the law faculty succeeded in this aim. Certainly there was a lack of clarity as to whether this was even an objective which was shared by the law faculty. While most participants had indicated that they planned to practice law when they entered law school this did not settle the debate on the aims and objectives of law school. In fact, even when it was acknowledged that preparation for the practice of law was a primary aim of the law program there was still significant disagreement on how this could be best accomplished. In particular, the appropriate mix of theoretical (academic) education relative to the need for a practical skills, attitude and knowledge component was a debate which was not resolved by this study. Compromise between academic theory and practical skills training was a key-note of most participants who stressed that the highest quality of legal education experience at law school must of necessity combine both theory and practice.

There needs to be further exploration of law school education in Canada for while there are strengths, there are also identified areas which warrant improvement. Positive change hinged upon the law schools clarifying educational goals, preferably as part of an over-all analysis of the aims or "mission" of the law school. These objectives will need to be mindful of the needs of the students, the Law Society and the ultimate consumers of legal services - future clients. In the words of Lang (1990),

> A law school should not be merely an additional university philosophy department operating in a law building dominated by educators who are misinformed as to what lawyers do, further unaware of public needs for legal services or, in the alternative, have some awareness of both but take a "public be damned" attitude. (p.79)

Further study of this issue and coordinated debate which draws input from the three primary "interest" groups in defining the aims and objectives of legal education in Canada would provide guidance to both the law faculty and students.

Learning to think like a lawyer

The primary role of law school identified by participants was the teaching of a certain

way of thinking. While it was recognized that law school must educate students in core legal subjects and prepare them for practice, these latter aims were not as consistently commented upon by participants as "learning to think like a lawyer." This was perceived to be one of the main objectives of a legal education. The phrase encompassed analysis and reasoning which were perceived of as the key skills acquired in law school and essential in the day-to-day practice of law. Over-all law school had to ensure that the student graduated with the ability to "think like a lawyer" if the legal educational experience was to be considered successful.

Participants had a range of ideas on how this was accomplished although the vast majority identified the study of cases and the examination methods employed by the law school as being the twin sources of this skill or ability. The teaching styles of law professors, which included the use of the Socratic method, were also mentioned although clearly thought to be much less influential in developing this skill.

Case law method of instruction

The case-law method was seen to be over-used in law school and there was a perception that alternate forms of dispute resolution were minimized. Participants indicated that a more realistic reflection of the practice of law would include the knowledge and skills necessary to resolve issues both inside and outside of the court forum. Overall participants felt that law school placed too much emphasis upon litigation and the resolution of legal matters by the courts.

Narrow focus of law school

Law school was thought to be narrow in focus and that generally there not the same level of enjoyment in learning as participants had experienced in their undergraduate years particularly if the participant had received a degree from the Arts faculty.

"Big-firm" emphasis

There was an under-lying emphasis in law school on a big-firm mentality which had a

negative impact upon student collegiality and also brought undue pressure upon students to perform well academically. There was also a common perception that only the most "successful" students would get articles in a larger firm.

Positive outcomes

There were many positive outcomes of a legal education including professional accreditation and less obvious but also very influential outcomes of friendship and service to society.

Generally the elements which defined a "quality" legal education experience hinged upon first determining the aims and objectives of law school. As these have yet to be adequately circumscribed there was a vacuum identified by participants whereby it was difficult to adequately address the issue of "quality" unless the participant was willing and able to first determine what the aims and objectives of law school were from their own experience. Only then was it possible to set out the elements that would meet those prescribed ends. Clearly there was an identified need for Canadian law schools to clarify the aims and objectives through broad based initiatives involving key interest groups. Further study of this issue should draw upon the experience of law schools in other jurisdictions, particularly in Australia, England and the United States. These countries have all set aside time and resources to address the issue of identifying the aims and objectives of law school and have conducted research in this area. This has yet to be done in Canada, yet participants distinctly recognized the need for this to happen if a quality legal education experience is to be realized.

Chapter 3 - Teaching and Learning Dynamics - Formal Learning

Law schools have traditionally hired faculty for their subject expertise. They may or may not be necessarily adept educators. The improvement of teaching at law school will therefore not be an easy task nor one which will be readily undertaken. Gordon (1994) observed that the lack of teaching ability in law school was, "... not completely the law professor's fault ... they have no training whatsoever in teaching.

Law school deans claim that attending law school itself is enough to qualify a person to teach law school." Gordon (1994) continued on a humorous note when he commented,

> Fortunately, we don't hire our elementary school teachers that way. We require extensive training in education before we let anyone even stand in front of a kindergarten class. This is true at every level of the educational system except where teaching is the most complicated - the university. There, we let everyone wing it. (p.27)

The fact that law professors were not well prepared nor necessarily well suited for their teaching role was a factor noted by participants.

The attributes of a good instructor were found to be very similar to traits identified in higher and adult education research literature. "Beatrice," one of the participants stated that,

> There's something about good teaching no matter what the age of people or the subject being taught, there are qualities of good teaching. They love their subject, they're enthusiastic, they give lots of examples ... (and) use a variety of teaching techniques. They don't always lecture.

For a truly quality educational experience, instructors had to be excellent communicators and care about the students learning. Participants identified individuals as being superior instructors based upon the objective evidence that they possess the necessary teaching skills and ability. This depended more on their natural or learned teaching ability than upon what their full-time occupation was. Most participants found that there was no direct correlation between whether or not the instructor taught on a full-time basis or practiced law and their ability to teach. In fact, full time instructors were not necessarily selected by participants as being the more effective teachers.

Again, most participants found that there was a need for balancing theory and practice in classroom presentations and in some respects practicing lawyers seemed to have a

slight advantage in providing this mix. Participants commented that the full-time academic instructor needed to "ground" their theoretical subject matter in a practical context so that students could better relate to the material. For instructors who were practitioners of law, it was necessary to include a theoretical component in presenting the more day to day practicalities of the law. Participants stressed that the best instructors were able to draw on both academic theory and experiential practice and incorporate elements of both in the classroom.

Unfortunately the examples of excellent instructors were relatively rare and certainly much needs to be done according to participants if the ideal stated by LeBrun & Johnstone (1994) were to be matched by faculty at law schools.

> University teaching is a profession and a scholarly activity which draws on a high level of competence in the discipline and/or relevant professional experience together with highly developed communication and interpersonal skills. (p.134)

In order to achieve this, LeBrun and Johnstone (1994) contended that university professors, "... need to acquire and develop (their) knowledge and understanding of a wide range of teaching and assessment methods and of the principles which underlie student learning." (p.134)

Assessment of Teaching and Learning

Ultimately, the evaluation of what was taught and how it was taught and the adaptation of teaching methodology to a changing world are not ends in and of themselves. Research and evaluation of teaching must always be aimed at enhancing student learning. Therefore, according to LeBrun & Johnstone (1994) in order to meet the challenges of law school education in the future and improve the quality of legal education it must be required that each instructor work within the law faculty

> ... to develop environments in which all of us teachers are aware of the research into the nature of good teaching, actively seek information on the effect of our teaching on our students, and are engaged in experimentation and animated discussion with our students and our colleagues about ways to improve teaching." (p.375-376)

Effective Teaching Strategies

Learning experiences must be tailored so that students are guided into activities that enable them to learn by deep engagement with the subject matter. Methods selected must promote student learning in a way which advances the specific educational objectives which are set out. There are numerous areas for further study and research in this respect. Clarification of the role of the professor in the teaching-learning transaction was one example highlighted by participants. On a continuum of teacher intervention from student-centred where the instructor was primarily facilitative to more instructor-centred and didactic, the participants identified the following three teaching strategies as being the more frequently used methods in legal education:

"Paper" Courses (Facilitative): Methods of instruction can be placed on a continuum of passive to active learning. At the passive end are lectures where students have very little or no active involvement. At the opposite end of the continuum of active learning would be independent study where students take the greatest responsibility for their own learning and where the instructor simply becomes a facilitator of the process. Many of the participants in the study commented on paper courses as being particularly good examples of a memorable learning experience. While these courses were perceived to allow the student to cover a specific topic in depth, the corresponding caution of some participants was that these courses do not provide the necessary breadth in scope required in core courses. Participants who preferred "paper courses," which are essentially independent study mixed with sessional instruction and or guest speakers, would have liked to have had the opportunity to register in more courses of this nature.

Socratic Method (Interactive): According to Centra (1993),

> Socrates dialectical exchange with his students, now known as the Socratic method continues to be used in college classrooms, particularly at law schools. Based on the premise that students learn to think by being actively engaged in questioning and problem solving, the Socratic method was probably the first cognitive approach to teaching. (p.21)

The Socratic approach received mixed reviews from participants and many, particularly recent graduates, expressed little knowledge of this method. This suggested that the use of the Socratic method has been decreasing in the last decade. Those participants who had experienced it, tended to criticize the approach and found that it had generated anxiety and stress for students. Many commented that professors could abuse the interaction between the student and the instructor to such an extent that it simply traumatized the student rather than fostering learning. While there may be potential for this method to be a positive and challenging approach to learning, the general consensus was that it was a method of instruction that was either not used or not used well.

Lecture Method (Didactic): McKeachie (1986) concluded that lecture method was as effective as other teaching methods when measures of knowledge were examined but was inferior when measures of knowledge transfer to new situations, attitude change, problem solving, or critical thinking were studied. According to Centra (1993),

> In spite of the limitations of the lecture, it is the primary or only method used by more than 80 percent of college teachers (Thielens, 1987; Blackburn, Pellino, Boberg, and O'Connell, 1980). (p.23)

Participants confirmed that lecturing was the primary method of instruction in law school. There was general agreement that it could be done well, but participants also recognized that there was a strong tendency to over-use this method. Participants estimated that the lecture method was used 90% of the time in the classroom. Despite the prevalence of lectures, many participants commented that quality was frequently poor and there was a need for the majority of instructors to improve their lecture style.

Research into the role of the instructor needs to include further study of the elements and outcomes of effective teaching strategies and methods. For example, if the lecture method was found to be used so extensively then there must be ways to improve the lecture as a teaching tool at law school. If interactive learning through class

discussion and the Socratic method were found to be beneficial as long as instructors were sensitive to student needs, then the means to encourage better facilitation of class discussion and the fostering of a supportive learning environment in law school are important areas for further research. There should be no reason for students to experience feelings of trauma or discredit as a result of the in-class exchange of ideas. The need identified to continue to examine the Socratic and case method in law school must consider both expected and unanticipated outcomes for students. Professors need to know how to enhance the benefits of this approach while minimizing the negative outcomes. The role of the professor as facilitator in paper-courses and other self-directed learning experiences also needs to be the subject of further research.

Finally ways must be identified to foster professional development in respect to the teaching role of law professors and to encourage the use of a broader range of teaching methods. This should include the study of group learning, action learning, the problem method, simulations and role plays, mock trials, mooting and other activities where students can learn both legal theory and lawyering skills in the classroom. Clinical legal education can also be considered an extension of the action learning method whether or not the "clinic" involves real-life situations. Students in clinical programs are exposed to learning methods which will be required by the graduate in their continuing professional education and foster reflection-in-action necessary for learning in the work-place.

Research into the teaching methods used in law school and encouraging less reliance upon traditional classroom strategies, such as lecturing and the casebook (Socratic) method, are a necessary step in improving the over-all quality of legal education. Student learning needs to encompass a broader development of student skills, knowledge and values. To this end students should be actively encouraged to learn inside and outside of the classroom in ways which promote cooperative learning experiences as well as independent, life-long learning.

Effective Learning Strategies

"Learning is not a spectator sport"

Ettington:1984 in LeBrun & Johnstone (1994) p. 256

Participants were asked about their "learning experience" in law school as this was considered to encompass a broader concept than simply asking them about what was learned. Tyler (1949) stated that,

> The term "learning experience" is not the same as the content with which a course deals nor the activities performed by the teacher. The term "learning experience" refers to the interaction between the learner and external conditions in the environment to which he can react. Learning takes place through the active behaviour of the student; it is what he does that he learns, not what the teacher does. (p.63)

It would be quite possible for two students to be in the same class and yet for each to have two very different learning experiences. Yet there were commonalities which arose out of this study although the learning experience was considered from many different and individual perspectives. By studying the learning experiences of students the law professor should be able to improve their methods of instruction and better structure the curriculum to meet divergent student needs.

The principal focus of learning in higher education generally and in the law faculty should be on the student, and changes in the students conceptions of subject matter, rather than on the acquisition of factual information. If learners do not understand what they are learning then they will either not remember it or not be able to use it in the future to solve every day problems. To this end, learning experiences should be designed across a continuum so that students can exercise different levels of direction and control over their studies. There should be a broad range of experiences so that the locus of control shifts from the teacher to the student, giving the learner greater

control over their own learning. The use of a variety of didactic, interactive and facilitative methods of instruction would foster deeper learning and a higher quality of educational outcomes.

One of the more serious criticisms of the law school as an educational experience was the impact of the marking system and methods of evaluation on the learner. The most profound consequence was the erosion of the students effective learning strategies. In fact, law school seemed to breed a deep insecurity in many students in respect to their innate abilities. Participants laid the blame for this on 100% final exams and the use of the bell-curve or other competitive marking schemes where students are judged in respect to their peers rather than in respect to their abilities. "Beatrice" was particularly candid in her criticism of law school from the perspective of learning,

> I was a victim of that process which makes you completely insecure about your academic skills. Even though I went to law school thinking that I was just as good as the next person ... it was a struggle to maintain that perspective and to believe that you weren't anything but a complete moron ...
>
> What that did to my learning strategy was ... I became almost paralyzed ... I've talked to other students who have said the same thing ... to say nervous wouldn't even begin to capture the feeling. I was so completely overwhelmed and stressed out by this insecurity about doing well academically ... I was literally too anxious to study.
>
> ... this anxiety that law school causes is very counter-productive because I think it doesn't free you up to try different things and to be more relaxed ... your question was about learning strategy, and it was important for me to talk to you, to tell you that law school generally undermines good learning strategies for people. That's my main message. It certainly did for me.

The literature supports the participants' experiences that marking can interfere with the quality of learning. According to Katz & Henry (1993) "The grading system is a familiar obstacle to student learning and development (Milton et. al., 1986). Becker and his associates have described the disruption of learning because of the students' preoccupation with grades (Becker et al., 1968, p.60)" (p.49)

Katz & Henry (1993) examined an often hidden phenomenon, which was also identified by participants in this study, where the student may not be effectively learning the material, and may be over-whelmed yet still manage to exhibit,

> ... a satisfactory, external performance likely to elicit good grades ... (despite) the fear and the anxiety students experience when confronted by a task that is too difficult for them to master. In such circumstances, when they intuitively know that they are up against an impossible learning demand, they may develop ingenious ways of coping and may even be able to earn grades higher than students who have learned and understood more about a given discipline." (emphasis added) (p.51)

Participants recognized the need for the law faculty to seriously consider alternate evaluation methods that would provide a more well-rounded appraisal of the students ability. This has become a particularly acute issue in recent years as the long-term impact of marks now has the potential to limit the ability of the graduate to find meaningful employment particularly as a lawyer. Although the "gate-keeper" role was always part of the admissions process, it was never intended that the purpose of the marking system was to determine which graduates could practice law in the future.

Other Factors

Informal or "Latent" Curriculum: According to participants in this study, a quality learning experience had to include more than the "formal" curriculum offered at law school. Participants commented that many of the "informal" learning experiences, including moots; client counselling and communication skills; and the Student Legal Aid experience, had been particularly influential. Rather than allow these positive outcomes to be simply acquired by chance, these experiences should be identified and incorporated into the formal curriculum of law school.

Participants recalled the benefits of combining their learning experience with the opportunity of providing assistance to clients. Those who had been involved in volunteer work as part of a Student Legal Aid clinic expressed that the act of doing, in the practice of law, helped the student to learn the theory. The incorporation of

more clinical programs and the fostering of "reflection in action" in the learning experience of students would provide these experiences to more students in a structured setting. Again this would be a positive development that would be less dependent upon the "hit or miss" possibility of gaining experience through volunteer work.

A variety of practical lawyering skills were identified by participants which were not necessarily part of the clinical legal experience. These were also viewed as a necessary component of a quality legal education. Participants recognized, however, the difficulty of grasping practical skills and knowledge when these are only presented in a theoretical context. It would be helpful, therefore, for professors to incorporate a practical component to enable students to learn drafting skills, basic legal procedure and the interpretation of statutes. This may require simulation exercises which could provide both theory and practice in ways that are meaningful to the student. This would be preferable to the present system where essential lawyering skills are either neglected or the attempts made to teach these skills take place in a vacuum, unconnected to the real world of practice.

Theory Versus Practice Dichotomy: Literature in other areas of pre-professional education has demonstrated the benefits of incorporating practical clinical experiences into the teaching of theory. While this has been well-established in the past decade in other educational programs, the debate continues in legal education. Participants in this study provided insight into why clinical legal education and the clinical model have had limited acceptance in law schools. Primarily the concern appears to have been that clinical programs are indicative of a trade school approach to legal education. Despite a developing body of literature reconciling clinical programs with sound educational goals of the university, the experience in Western Canada has only indicated a very tentative acceptance. While consideration of clinical programs per se was not directly the focus of this study participants recommended numerous ways of accomplishing curriculum reform which would incorporate practical lawyering

experiences with the more traditional teaching of theory and standard case law curriculum.

Self-Reflection upon the Teaching-Learning Transaction: The study of teaching and learning in law school is essential if a quality legal education experience is to be realized. According to Ramsden (ed:1988)

> Teaching is an activity that assumes an understanding of learning. To teach in a way that encourages changes in conceptions, instructors must recognize how students already think about phenomena ... teachers should, in fact, become scholars of their own students' learning, and an important implication of this argument is that teaching and research in education are two sides of the same coin. (p.13)

The teaching - learning transaction should continue to be the subject of ongoing study and reflection. Katz & Henry (1993) agreed with Ramsden, that the professor must take an active role in evaluating student learning when attempting to improve upon the quality of teaching.

> Teachers can function analogously to other professionals whose reflections on their practice become a source both of new theoretical knowledge and of advance in their methods. (p.16)

Yet Katz & Henry (1993) stated that "... for many faculty it is a new idea that they might inquire into the teaching - learning process as systematically as they inquire into the problems of their disciplines." (p. 36) This study supported the need identified by Ramsden (1988) for further research and dissemination of the outcomes of higher education studies on teaching and learning. This must include ongoing research by law professors themselves, as they are the practitioners of higher education according to Katz & Henry (1993).

Chapter 4 - Informal Learning in a "Quality" Education Experience

Participants indicated that many diverse experiences stimulated learning in law school. Some of these experiences were intended and part of the "formal" curriculum. Other experiences were part of the informal curriculum of the law school. These generated

an underlying influence which had tremendous impact upon students. There were a variety of lessons "taught" to students by the learning environment whether or not these were part of the intended outcomes of the law degree program. Many of these influences were consistent with the stated or implied legal educational philosophy foundation of the law program. According to Jarvis (1995),

> Underlying every program of education there is a philosophy, whether it is explicit, or implicit, considered or rarely thought about, consistent or inconsistent ... (p. 208)

This "informal" curriculum was a powerful socializing force which had both positive and negative influences upon individual law students.

Further research would be necessary to study the impact of the "informal" curriculum on law students, however, participants in this study recalled both beneficial and detrimental experiences. Some of the most positive outcomes noted by participants were the direct result of voluntary involvement in practical lawyering experiences which students gained through Student Legal Aid work and participation in mooting. Interaction with peers was also considered beneficial both in terms of cooperative learning experiences in law school and the acquisition of long-term relationships which continued after graduation.

The more negative outcomes tended to be the result of the psychological environment of law school which fostered competition and over-emphasized high marks. Acquiring an articling position with a large down-town law firm was considered a prize within the law school environment and this created stresses in student learning. In particular, participants commented on the tendency to over-work and the resulting lack of balance in their personal lives. Research in this area has been limited and no recent articles have considered the impact of the learning environment or the "informal" curriculum upon the law student.

A key factor identified in the informal learning environment was the student body and the type of student admitted into the law school program. The criteria used in the admissions process determined the student population and a significant number of participants noted that the admissions policy should be reconsidered to meet the changing needs of society. In fact, according to one participant,

> The type of students you admit will partly determine what kind of law school you will end up with ... if you start admitting different types of students now, you're going to get a different kind of law school in ten years.

The primary recommendation of participants who commented upon the student body as an important factor in their educational experience was for greater diversity. There was a perceived need for law school to be more reflective of the greater society. Many participants felt that law school was elitist in nature and that there was an over-representation of the traditional and conservative power groups in Canadian society. Though admitting more "non-traditional" students through special quota's or simply changing the over-all criteria of admissions the student body can be changed significantly to accommodate greater diversity. This is important because by altering the student population the,

> ... law school culture changes, the classroom culture changes and the classroom discussions change." according to "Beatrice."

Advice to Law Students:

Know your direction and what it means to be a lawyer: Students were encouraged to seek out external sources of information about the legal profession. This could provide the student with the necessary dedication and determination to do well at law school and it helped the individual to assess whether they were making the decision to go to law school for the right personal reasons. The participants were in general agreement that in choosing a career as a lawyer, the individual,

> "Must enjoy it or it's a terrible way to make a living!"

Just as the law faculty has to establish clear aims and objectives, so does the law student need to identify the purpose of law school from a personal perspective. The student will be better motivated (Wlodkowski:1985) if they know why they are at law school and are clear in terms of what they expect to achieve. The importance of setting their own direction, the desire to tie learning to their personal experience and the need for a balance of theory and practice were all recognized as important by participants. These comments supported the general learning theory of andragogy as developed by Knowles (1978) and cited by Jarvis (1995). Knowles claimed that there are four main assumptions that differentiate andragogy from pedagogy. These are:

> 1) a change in self-concept, since adults need to be more self-directive;
>
> 2) experience, since mature individuals accumulate an expanding reservoir of experience which becomes an exceedingly rich resource in learning;
>
> 3) readiness to learn, since adults want to learn in the problem areas with which they are confronted and which they regard as relevant; and,
>
> 4) an orientation towards learning, since adults have a problem-centred orientation they are less likely to be subject-centred.

This "advice" to future students was also indicative of the literature of Schön (1987) who stressed the importance of establishing "congruency" between the pre-professional education received and the actual knowledge and skills required. Participants noted that an educational program which facilitated the successful transition from the law faculty to the workplace could be considered to have satisfied at least one important indicia of a quality legal education program.

Socialization pressures and the psychological impact of law school: The student must come to terms with the powerful psychological influences at law school. Participant comments in this respect reflected the findings of previous studies which

uncovered the intense pressure on the individual student in a law school program. In part this was perceived to be the result of the overwhelming workload, the changes to the way in which the student thinks and views the world and also to the "mythology" of law school which appeared to be actively fostered by some members of the faculty. These factors and the psychological impact they have on students require further study and the findings need to be taken into consideration in planning a more positive learning environment.

Maintain balance when attending law school: Future students were encouraged to get involved and seek out professors and fellow students in order to establish relationships and networks of support which can be extremely valuable throughout law school and following graduation. While many participants advised future students to try not to take law school too seriously, it was recognized that this would be difficult advice to follow in law school, "... it's easy to say, I should have been more relaxed, but doing it is another thing." Unfortunately, it was also recognized by participants that if the student is unable to achieve balance and becomes over-whelmed by the experience, then the ability to learn will be directly, and most often negatively, affected. Some participants admitted they were able to continue to learn, and did learn a tremendous amount, but that the cost of a legal education was enormous in terms of stress and long term impact on their mental and physical health and personal relationships with others outside of the law school environment;

Volunteer involvement: The three primary reasons identified by participants to be involved in Student Legal Aid were:

1) to learn the law in context;
2) to acquire necessary skills which are not taught at law school; and
3) to help others who are disenfranchised from the legal system.

As one participant commented "... it is just a very practical, rewarding, socially important thing to do ..."

Don't expect to work as a lawyer: Future students were advised to consider alternate employment following graduation and many participants simply stated, "Don't go!". Other participants recognized that there were benefits to a law school education but they also commented that graduates need to keep an open mind about what they will be doing with a law degree or they should not go into law school. It was no longer considered a guarantee of a well paying professional position as a lawyer and in some cases did not even assure the graduate of employment. If the individual decided that they wished to practice law then participants forewarned them of the need to take responsibility for their own education in order to meet the challenges of work as a lawyer in the future.

Chapter 5 - Current Challenges and Future Direction

This chapter considered the participants views on legal education issues which should be addressed in the future. Participants identified key challenges for law schools particularly the need to be more attuned with changes in society. The law faculty must respond to these issues if the acquisition of a law degree is to continue to meet the needs of the profession, society as a whole and future students.

The two key issues for participants were technological change and the number of law graduates. Law schools were not perceived of as doing a stellar job in addressing either of these challenges and the concern was expressed that this will simply lead to the increasing seriousness of these problems in the future.

In addition, the overall cost and quality of legal education was seen to be jeoprodized by recent cuts in funding. This was considered particularly unfortunate as it comes at a time when students face an increasingly competitive field of law upon graduation. In order to assist the students transition in a world of change and competition there was an identified need to determine which core courses were relevant. Participants stressed that a balance must be struck between theory and practice. This should be achieved through ongoing dialogue between the law faculty and the legal profession.

Finally life long learning while not directly identified by participants could play a critical role in addressing the changing needs of the profession. Law schools should play a part in promoting later professional learning and helping to set the pattern of continuing professional education in the pre-professional years. The law faculty could, in fact, consider adopting an enhanced function where the student receives assistance, not only while enrolled in law school, but also following graduation, in their transition from law school studies to the practical realities of the work-place.

Technological & Change

Law schools must accommodate new technologies and meet the challenges of the information age. Providing the opportunity for students to specialize may be one adaptation required by the increasing amount of information students are expected to cover. The rapid expansion of the number and complexity of laws may necessitate the end to the old scheme of educating generalists in the law. Students and faculty will need to adapt to changes in the methods of teaching and learning in order to meet the needs of the new paradigm which is "change itself". Law schools need to take a more active role in fostering self-directed learning as a well educated lawyer is no longer a static concept. Rather the graduates of law school will need the skills to develop their own ongoing educational program. Law schools need to take the initiative in setting up contact with, and using the resources of, the legal profession in order to meet these challenges.

Too Many Graduates

Kulig (1995) provided the following statistics on the phenomenal growth of numbers in the legal profession in recent years:

> Certainly, there are a lot of lawyers. According to the Federation of Law Societies of Canada, there were 61,317 lawyers in the country in 1994-1995, up almost 20,000 from a decade earlier. (p.15)

Quota's are only one of the proposed solutions that need to be considered in resolving

the issue of too many graduates. Participants did not necessarily favour this approach, but there were few other recommendations. A primary concern was the impact this would have upon the student body and the fear that an already unrepresentative selection process would become even less reflective of the diversity in society. Participants thought that if law schools were to play an active role in fostering alternate career options for graduates then it might be possible to continue with the current levels of enrollment. There has to be some recognition, however, that the over-whelming majority of students plan to practice law so this may not be a very realistic option.

Participants were in agreement that the current marking systems and methods of evaluation need to be addressed. In particular there must be an immediate study of the current situation where marks are having the unintended consequence of determining which graduates will have the opportunity to practice law. The consequences are becoming increasingly serious for more students each year. In the past, graduates were not precluded from the opportunity of demonstrating their ability in the actual practice of law. In the current job market, individuals may be effectively precluded from ever becoming lawyers. This was not the original intent of the marking system and there should be an over-all reassessment, given the realities of the present employment situation.

Core Courses and Relevance

Most participants were concerned that law students must graduate with a certain threshold level of knowledge and the ability to make the transition to private practice. The discussion regarding core courses again reflected the necessity for setting clear aims and objectives. In order to achieve this, there continues to be a need for law schools and the Law Societies in the respective provinces to set aside funds to study the situation in Canada. Little research has been done in Canada on the skills, knowledge and attitudes that graduates of law school should possess. Without this guidance it will be difficult to effect meaningful and lasting changes. Further research

and development in this one primary area would provide the fundamental building block in improving the quality of legal education in Canada.

Balance between theory and practice

According to Mudd (1986), "... much of the history of legal education centres on the tension between those who view law school as part of the university's scholarly community and those who see them as training grounds for new lawyers." (p.191-192) Mudd (1986) contended that the over-all assessment of legal education was not favourable particularly in the accusation that law professors do not adequately prepare their graduates for law practice.

Mudd stated that "... the law school curriculum is neither properly theoretical nor adequately practical ..." (p. 189) and this at least in part creates unproductive stress and anxiety in students. Participants agreed with Mudd in this respect. Their own comments illustrate the lack of congruency between the expectations of law students and the reality of the current law curriculum. This was identified as one of the fundamental issues of contention and it accounted in large measure for the overall lack of satisfaction expressed in regard to the legal education experience.

Mudd (1986) also supported the participants observations that there was an unchanging character to law school, "It is striking how effectively law schools have resisted change over the years." (p. 190)He found that law schools offer a very limited view of legal education,

> ... and one obstacle to creative thinking about educating lawyers: (is that) law professors have mistaken one aspect of lawyering, the cognitive or rational dimension, to be the whole of lawyer performance and they have structured legal education accordingly
>
> To overcome this conceptual barrier requires looking beyond the curriculum to the world of lawyering in all its dimensions as the proper starting point for evaluating a law school's academic program. (p. 191)

If the law faculty was serious in wanting to improve the quality of learning in law school, than it would be instrumental to move toward a more student-focused approach to teaching law. By considering the comments of graduates it was readily apparent that establishing a balance between academic theory and practice was also considered a critical element of a quality legal education.

IMPLICATIONS FOR FURTHER RESEARCH

Qualitative studies often raise more questions than they answer. This study was not an exception to this general rule and in many ways the most important implications of this study are in terms of the issues raised and the research questions generated.

The questions which emerged from this study relate to the need to learn more about the experience of law students and to sort out the variables involved in their interaction with the law school learning environment. It would be informative to explore any one of the questions asked of this small sample of participants with a larger sample of participants or to investigate similar issues through follow-up studies. Participants could be asked to evaluate elements of their legal education experience upon graduation, and again later once they have entered their chosen career, to discover whether responses are consistent over time. Is there a lasting impact of law school upon later career success or satisfaction generally in career choice or do later work experiences "colour" the perception of law school experiences?

Another possible area for further investigation would be to consider the impact of law school on the actual practice of law or upon the graduates involvement in continuing professional education and life-long learning. Were perceptions of learning permanently altered by the legal education experience? This question was raised by participant comments that their years in undergrad were generally more pleasurable and that law school was found to be "narrowing" and not as enjoyable. In fact, only

two participants indicated that they intend to return to university, one intended to pursue an Education degree and the second was as yet unsure of future direction. Participants were not asked whether they continue to participate in other forms of continuing education, therefore further research would be required to determine whether comments may be linked or connected to how participants view life-long learning generally as opposed to subsequent university education.

Further study could also consider similar research questions but relate responses to specific characteristics of the learners:

Are there gender, age, ethnic or racial, economic or social, factors or differences among the students which impact upon their response to legal education?

Teaching and learning are an intertwined phenomenon which cannot easily be separated for study. The role of the instructor, the student and the administration in improving the quality of the education experience require further exploration in higher education, particularly in pre-professional programs of study such as law. While there may be no one best way to teach, there are common principles that can assist the instructor so that no matter what method is chosen it facilitates student progress. Students, in turn, could be assisted to identify preferable learning strategies and take a more active role in their own education. This will becoming increasingly critical due to the pace of change and the demands made upon institutes of higher learning in the future to be accountable to the public.

There should be further exploration of law school education for while there are many strengths, there are also identified areas which warrant improvement. Positive change hinges upon the law schools identifying educational goals, preferably as part of an overall analysis of the aims or mission of law school. These objectives will need to address the needs of the students, the Law Society and the ultimate consumers of legal services - future clients. In the words of Lang (1990)

> A law school should not be merely an additional university philosophy department operating in a law building dominated by educators who are misinformed as to what lawyers do, further unaware of public needs for legal services or, in the alternative, have some awareness of both but take a "public be damned" attitude. (p.79)

The final area identified for further study was the issue of learner self-evaluation and ongoing reflection which requires a great deal of thought about what one is doing and what practices might be improved. Schön (1983) has discussed the importance of reflective practice for professionals and it clearly warrants attention as prospective lawyers will be required to teach themselves the answers to problems that were not even conceived of when they attended law school.

SUMMARY

A quality legal education must aim to realize high ideals and improve society, yet at the same time graduate students who understand the current system well enough to participate competently in society as it presently exists. Graduates need to be able to function as effective professionals and work continually to improve the system. A touchstone of a quality law school could be evidenced in the careful consideration of Tyler (1949), who stated that in setting educational objectives the question must be asked, "Should the educated man adjust to society, should he accept the social order as it is, or should he attempt to improve the society in which he lives ..." (p.35).

The outcome of this research has important ramifications. Law as a profession is indispensable to the functioning of our society and there are many demands made of the law faculty in educating future lawyers. Gordon (1994) stated that at the end of the educational program:

> Good lawyers must have the skills required for professional competence. But this is not enough. They must know how to carry the burdens of other people on their shoulders. They must know of pain, and how to help heal it ...

> ... lawyers are persons to whom people open up their innermost secrets when they have suffered or are threatened with serious injury. People go to them to be healed, to be made whole, and to be protected from harm. These are large and important tasks, and they require all that lawyers have to offer. they require both good minds and good hearts - not only mental acuity and professional, skill, but also compassion, righteousness, mercy, and strength to suffer and carry pain. That is what it takes to be a truly good lawyer. and the world desperately needs truly good lawyers. (p.130)

The legal profession includes some of the best educated and most powerful people in our society yet a quality legal education cannot be measured by worldly outcomes of wealth or power. Rather efforts toward excellence in legal education and improvements in the study and practice of law are best evidenced by graduates who have developed their knowledge and skills fully in order to increase their ability to serve others in society.

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Appendix - "A"

TELEPHONE REQUEST

I) HELLO, My name is Brenda Davis.

(You may remember me from law school.

OR

(I am a friend of ..... who gave me your phone #

I have just flown in from Vancouver, (or I am in .....) and I am trying to complete a research study by the end of August.

I am currently a graduate student in the Faculty of Education and I am working on completion of a thesis on law school education experiences. I would like to invite you to participate in a research study I am doing.

I will be gathering together @8 lawyers to talk about their law school experiences. The session will last between 1 1/2 and 2 hours - on Thursday, July 25 between 7:00pm and 9:00pm in the West End. (Address: .....)

Do you think that you will be able to join us?

"YES" (then continue with II)

"NO" I am (*also*) conducting a number of 45 minute interviews in early August to discuss the same topic on a one-to-one basis - Do you think that you would be available to participate during the week of August 7 (*x*) - 14 (*y*). It can be at any time convenient to you (morning or afternoon).

"YES" Book interview ..... (then continue to II)

"NO" Do you have anyone that you could recommend that may wish to participate:

If YES, then take name and phone #

If NO, then thank person for their time.

II) I will be mailing out a confirmation letter which will give you further information about the study.

Do you have any questions or would you like any more information about the study at this time?

"NO" (then give phone numbers below - III)

"YES" (then continue with background information)

BACKGROUND: The purpose of the study is to determine what a "quality" learning experience at law school means to a former law school graduate. I want to find out how you, as a former student (at a Western Canadian Law faculty), think about your law school experiences - how you would define quality legal education and what influenced the quality of your educational or learning experiences.

To do this, I plan to first conduct a "group session" (where 6 to 8 people - representative of a range of graduating years) meet to reflect upon and discuss their learning experiences at law school. I will then follow-up their comments by conducting a number of one-to-one interviews with a different group of law graduates.

You have been selected because I hope to include students who come from a variety of backgrounds. All information that is gathered will remain anonymous and confidential. Also, your participation in this study is completely voluntary and you are, of course, free to drop out at any time.

Do you have any (further) questions (or concerns) about the study?

III) My name is Brenda Davis and I can be reached at (phone # .....)
- my faculty advisor is Dr. David Collett and he can be reached at (.....)

Follow-up letter & phone call prior to group session.

NOTE: *Section in italics was used only for setting up Focus Group #2*

Appendix - "B" (Focus Group Confirmation Letter)

Brenda D. Davis

Dear July 20, 1996

Thank you for agreeing to participate in a group discussion on law school experiences. The information gathered will help me to complete my research and thesis, for a Masters degree from the Department of Education (Policy & Planning) at the University of Alberta.

The primary question that will be addressed in the research is:

> What do lawyers think, when reflecting upon their own experiences as law students, about the "quality" of their legal education in law school?

Please note, that "quality" is a term which will be defined by the group discussions, of which you will be a part, and later interviews with other law school graduates. While I am asking you to consider your personal experiences of law school, the entire research project includes individuals who graduated from a number of universities in Western Canada over the past 10 years. Therefore the final analysis of information provided will be "generic", encompassing legal education generally rather than evaluating or commenting upon a specific law faculty.

As I mentioned to you on the telephone, the group that I am gathering together in Edmonton will be encouraged to discuss their own personal experiences from law school and I am quite interested in hearing what you have to say about this topic. Participants in this group include:

"Mary"	"Brad"
"Kent"	"Ella"
"Jake"	"Greg"
"Dawn"	"Sara"
	"Joan"

Following is the date, time, and location of the group discussion session in Edmonton. The session will last between 1 1/2 - 2 hours.

DATE & TIME: **Thursday, July 25 between 7:00pm and 9:00pm**
LOCATION: **Address:**
Phone:

There is accessible parking on the street and I will be providing beverages, fruit and cheese. Thank you again, for agreeing to join us.

Brenda D. Davis

If you have any questions or would like further information about the study please feel free to call me, (Brenda Davis) at ..... or my faculty advisor (Dr. David Collett) at .....

PLEASE FIND ATTACHED:

1) Draft "Informed Consent" Agreement

2) Other Participants:

> In Part II, of the study I will be conducting a number of 45 minute interviews in early August to discuss the same topic on a one-to-one basis. This will involve a completely different group of law graduates.
>
> - Do you know anyone that you think may be interested that you would be available to participate during the week of August 7 - 14. The interview can be at any time during the day, at any location:
>
> Name:
> Phone Number:
>
> (Please Note: Individual must have graduated from a Western Canadian Law School during the period 1985-1995)

3) Further information about the study.

BACKGROUND:

The purpose of the study is to determine what a "quality" learning experience at law school means to a former law school graduate. I want to find out how you, as a former student (at a Western Canadian Law faculty), think about your law school experiences - how you would define quality legal education and what influenced the quality of your educational or learning experiences.

To do this, I am first conducting two "group session", in Vancouver and Edmonton, where 8 to 10 people - representative of a range of graduating years, will meet to reflect upon and discuss their learning experiences at law school. I will then follow-up their comments by conducting a number of one-to-one interviews with a different group of law graduates.

You have been selected because I hope to include students who come from a variety of backgrounds. All information that is gathered will remain anonymous and confidential. Also, your participation in this study is completely voluntary and you are, of course, free to leave the study at any time.

Appendix - "C"

CONSENT FORM

I have been informed by Brenda Davis that she is in the process of completing her Masters thesis at the University of Alberta, Department of Education (Policy Studies) and that the research she is conducting involves talking to former graduates of law school about various aspects of their experiences at law school.

By agreeing to take part in the study, I understand that my comments will be taped so that an accurate record can be made of the interview and that the transcript of these tapes will be coded so that all information used in the thesis or relayed in any way, in any publication will be anonymous. I also understand that any information I give is completely voluntarily - I can choose to refuse to comment on any particular question and at any time I am free to withdraw from the study.

By signing below, I am giving permission to Brenda Davis to tape the interview and to use the information gathered with the understanding that I will not be identified.

NAME (Please Print): .....

SIGNATURE: _____

DATE: _____

LOCATION: _____

Appendix - "D"

"PRE"-INTERVIEW QUESTIONNAIRE

NAME:

BIRTH DATE:

PRE-LAW EDUCATION: (DEGREE & YEAR)

ADDITIONAL FACTORS: In what way was your background unique - (and/or) - did you have special circumstances that affected your law school experience?

WHY DID YOU DECIDE TO GO TO LAW SCHOOL?

LAW SCHOOL ATTENDED:

MARITAL STATUS (during law school):
..... - Married or Common-law ..... - Single (at home) ..... - Single (on own)

CHILDREN (during law school) - "NO"..... "YES" (if yes, how many) .....

YEAR OF GRADUATION: .....

WHAT LENGTH OF TIME HAVE YOU WORKED FOR:

..... Small Firm (5 or less lawyers)
..... Mid-Size Firm (6 to 15 lawyers)
..... Large Firm (16 or more lawyers)
..... Government
..... Other (please give details)

.....

WHAT HAS BEEN THE PRIMARY FOCUS OF YOUR WORK TO DATE?

WHAT IMPACT HAS LAW SCHOOL HAD ON YOUR CAREER?

Would you like a transcript of your comments for review? YES / NO

Follow-up:

Name of person(*) who may be willing to participate in a one-hour interview:

NAME: .....

TELEPHONE: .....

(*) Person must be a law graduate of a Western Canadian University between the years 1985 - 1995.

Appendix - "E"

Moderator's Guide[1]

I. Introduction

A. Welcome
B. Statement of the purpose of the interview
C. Guidelines to follow during the interview

II. Warm-Up

A. Set the tone
B. Set the participants at ease

III. Establish Easy and Non-threatening Questions

A. The initial questions should be general and less threatening

IV. Establish More Difficult Questions

A. The more difficult or personal questions should be determined

V. Wrap-Up

A. Identify and organize the major themes from the participants responses
B. Ensure that any conversational points not completed are mentioned

VI. Member Check

A. Determine how each member perceives selected issues

VII. Closing Statements

A. Request anonymity of information
B. Answer any remaining questions
C. Express thanks

---

[1] Vaughn, S., Schumm, J.S. and Sinagub, J. (1996) Focus Group Interviews in Education and Psychology, SAGE:Thousand Oaks - Table 4.1 Overview of the Sections in the Moderators Guide p.43

Appendix - "F"

FOCUS GROUP PARTICIPANTS - QUESTIONS (MODERATORS GUIDE)

ROUND TABLE:

Why did you decide to attend Law School?

QUESTIONS:

What (do you think) is the purpose of Law School?

What was the most important thing you came away from Law School with?

That you still use today? ..... formal experiences ..... ? informal experiences ..... ?

What does the phrase "to think like a lawyer" mean to you?

Did Law School teach you "to think like a lawyer"?

How does Law School do this?

What is your over-all assessment of your law school experience in terms of the teaching and learning dynamics?

Give examples of effective teaching ....

Give examples of effective learning ....

What other factors affected your law school experience ...?

What was your experience with the "Socratic Method" at Law School?

What did you think about marks and the evaluation system generally (at Law School)?

How could your legal education experience have been improved?
(please give specific examples if possible)

What do you see as the greatest challenge in legal education that law school faces

- today?

- in the future?

ROUND TABLE:

What piece of advice would you give to law students entering law school today?

Any final comments from the group before we finish up? (SILENCE)

THANKYOU!

Appendix - "G"

INTERVIEW GUIDE

Why did you decide to attend law school?

What do you think is the purpose of law school?

Probe: How does it (the purpose) compare to your undergraduate degree?

Probe: Was the purpose/objective of the two degrees different?

What do you think is a necessary part of an excellent legal education?

Probe: If you were to set up your own law school what would you identify as the critical elements of a law school?

Probe: What is an important ingredient in a "high" quality legal education

What was the most important thing you came away from Law School with?

Probe: That you still use today?

What does the phrase, 'to think like a lawyer' mean to you?

Probe: Did law school teach you to do this (think like a lawyer)?

Probe: How does law school teach you to think like a lawyer?

What is your over-all assessment of your law school experience as an 'educational' experience?

Probe: Give an example of effective teaching (was there something a professor(s) did that worked for you)?

Probe: Give examples of effective learning strategies (what did you do that worked?)

Probe: What other factors influenced the teaching/learning dynamic in law school?

Probe: Are there any other factors that affected your law school experience?

Probe: Did you notice any difference between instructors who were full time academic faculty and practitioners who taught?

(If yes) Probe: What were the differences?

Probe: Did you have a preference between academic faculty and instructors who were practitioners?

What was your experience with the 'Socratic method' at law school?

Probe: What other (teaching) methods were used?

What comments do you have on the marking system and methods of evaluation used at law school?

Probe: What methods of evaluation were used?

Probe: On the whole did you find that the marks you received in a particular course accurately (reflected or) evaluated your learning?

(In other words, if you learned more in a course were your marks higher and if you learned less were your marks lower, or was there no correlation?)

How could your legal education experience have been improved?

Please give specific examples if possible

What do you see as the greatest challenge in legal education that law school faces

Probe: .... today?

Probe: ... in the future?

What last piece of advice would you give now to a law student (who is like yourself) entering law school today?

Probe: How would you tell them to go about law school?

Probe: How can a student get the most out of the law school years?

Any final comments on how legal education can be improved now based upon your past experience both educational and professional?

Probe: If you were talking to the faculty at your law school today what would you say ....

Probe: If you were asked to teach a course (at the law faculty) yourself what would you make sure to do ....

Any comments before we finish up today?

* *NOTE:* *Questions and Probes in Italics were used only in the last interviews conducted.*

NQ

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Dedication

For my mother who knew it could be

and

for my brother who knew it would be.

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Abstract

Research into the phenomenon of burnout has been of an anecdotal nature. The literature abounds with definitional, analytical and psychometric limitations. Although burnout has been defined by numerous researchers in varying terms, research still lacks a universal definition and theory. Therefore, it is essential to develop this universal definition by investigating the existence, and the determinants of the concept. One approach hypothesized to establishing a theoretical definition of burnout is to use a sophisticated and rigorous analyses such as structural equation modeling with a sample of a professionals exhibiting symptoms of burnout. This present study focuses on the nursing profession and endeavours to propose at least an initial theoretical definition of the burnout construct for this profession.

Research has determined that nursing is a profession prone to burnout. The current study elaborated on a postulated framework of burnout as it impacted on a nursing sample of 340 general staff nurses and 204 critical care nurses. In testing this model, the more salient determinants drawn from the research literature, were validated. The model incorporated such variables as Locus of Control,

Professional Identity, and Femininity (personal variables); Role Conflict, Role Ambiguity, Workload, and Autonomy (organizational variables); and Self-esteem and Job Satisfaction (mediating variables).

It was determined that nurses in this sample obtained from three major Ontario hospitals were indeed reporting levels of burnout. Further, the general staff nurses and critical care nurses reported differences in how they experienced that burnout. This information is particularly useful in developing programs to increase the quality of worklife for nurses.

This study provides a foundation on which to expand the knowledge of burnout as a construct, its definition and its determinants. The study concludes with limitations and directions for future research.

Table of Contents

Dedication ii

Acknowledgments iii

Abstract iv

Table of Contents vi

List of Tables x

List of Figures xii

List of Appendices xiii

Introduction 1

The Theoretical Framework of Burnout 8
Maslach & Jackson 9
Pines and Colleagues 12
Cherniss 17
Jones 21
Meier 23
Golembiewski & Munzenrider 24
Leiter 26
Summary 27

Limitations of Previous Research 28
Analytical 29
Nature of the research 29
Concept interrrelations 30
Diversity of perspectives 30
Level of analysis 32
Research attitude 33
Summary 33

Definitional 33
Variety of definitions 34
Meaningfulness of definitions 35
The Medical Model 35
Definitional assumptions 36
Summary 37

Psychometric 37
Nature of the study 37
Nature of the measurement 38
Summary 386

Conclusion 39

Construct Validation of Burnout 40

Hypothesized Model of Burnout Structure 43
Personal variables 48
Organizational variables 57

Purpose of Study 64
Hypothesis I 64
Hypothesis II 65

Method 67

Sample and Procedures 67

Instrumentation 71

Data Analysis 77
Testing the postulated model 78
Goodness-of-fit indices 79

Testing the factorial validity of measures 82
Formulating the measurement model 83
Formulation of the calibration and validation samples 86
Formulation of the structural model 86
Invariance across calibration and validation samples 88
Formulation of the model for the general staff nurses 89
Formulation of the model for the critical care nurses 89

Results 91

Preliminary analysis 91

Model of Burnout for calibration sample of nurses .. 117

Model of Burnout for general staff nurses 125

Model of Burnout for critical care nurses 129

Discussion 135

Survey of demographic data 135

Model of Burnout: Overall sample of nurses 136

Model of Burnout: general staff nurses and critical care nurses 142

Summary 149

Conclusions 151

Limitations 152

Future Research 158

The dynamics of professions 158
The link between sex-roles 159
The characteristics of male nurses 160
The existence of nurse group differences 160
The critical nature of nursing 161
The curvilinear nature of variables 162
Differentiation between professional and personal 162
Differentiation between burnout and other constructs 163

Conclusions 164

Recommendations 165

References 177

Endnotes 216

Appendices 228

Appendix A - Participation letters 228

Appendix B - Permission letters 234

Appendix C - Questionnaire 236

List of Tables

Table

1 Results of Demographic Survey 70

2 Summary of Means, Standard Deviations of Three Dimensions of Burnout 93

3 Summary of Indices of Fit of Measurement Instruments for Personal Variables 95

4 Summary of Indices of Fit of Measurement Instruments for Organizational Variables 97

5 Summary of Correlations among Factors 101

6 Summary of Means, Standard Deviations, Skewness and Kurtosis of Indicator Variables for the Calibration Sample 103

7 Summary of Means, Standard Deviations, Skewness and Kurtosis of Indicator Variables for the Validation Sample 106

8 Summary of Means, Standard Deviations, Skewness and Kurtosis of Indicator Variables for the General Staff Sample 109

9 Summary of Means, Standard Deviations, Skewness and Kurtosis of Indicator Variables for the Critical Care Sample 112

10 Summary of Means of Skewness and Kurtosis of Indicator Variables of Samples 116

11 Summary of Goodness-of-fit Indices of the Model for Calibration Sample 119

12 Summary of Goodness-of-fit Indices Relating to Tests of Invariance 124

13 Summary of Goodness-of-fit Indices of Model for General Staff Sample 126

14 Summary of Goodness-of-fit Indices of Model for Critical Care Sample 131

List of Figures

Figure

1 Hypothesized model of Burnout 45

2 Hypothesized model of Burnout with indicators 85

3 Final model of Burnout for nurses 121

4 Final model of Burnout for general staff nurses 128

5 Final model of Burnout for critical care nurses 133

List of Appendices

A Participation letters 228

B Permission letters 234

C Questionnaire 236

INTRODUCTION

The concept of burnout was first conceptualized and defined by Freudenberger in 1974 as a process of wearing out. Since that time, the term has evolved through numerous definitions to become the multifaceted, multidimensional construct of Burnout as defined by Maslach and Jackson (1981). According to Maslach & Jackson, burnout, particularly prevalent in the helping professions, has three related but independent components: emotional exhaustion, or progressively debilitating fatigue; depersonalization, or a negative and uncaring attitude; and finally, reduced personal accomplishment which involves one's own sense of self, competence, and achievement.

The definitional evolution of the concept has been rapid due to the enormous financial, emotional, and psychological costs of burnout. In individuals, the cost reflects itself as physical and psychological correlates. In organizations, burnout manifests itself in problems such as productivity and absenteeism (Golembiewski & Munzenrider, 1988). To compound the problem of costs, there is a lack of

information on what proportions of various professions succumb to burnout or to what extent these individuals in various organizations experience the phenomenon (Golembiewski & Munzenrider, 1988). Despite the costs in human and organizational terms, there are few studies dealing directly with the incidence of burnout. Prior to 1980, there were fewer than 50 references related to burnout appearing in any review article (Paine, 1981). This number, magnified by numerous articles, books, and edited volumes at least tripled in the following two years. A summary of the literature dealing with burnout (Perlman and Hartman, 1982) unfortunately still found that of the 48 articles discussed, only five were of a quantitative nature.

Much of the research on burnout has been of a substantive and anecdotal nature (Einsiedel and Tully, 1981; MacNeill, 1981; Meier, 1983, 1984). Research, labelled descriptive and exploratory, had been criticised on the grounds that (a) attention had been given to the practical rather than the empirical research, (b) there was little evidence of programmes of research study (research comprised individual study), (c) conceptual and operational definitions varied extensively, (d) hypothesis formulation and testing were uncommon, (e) there were few extensions

and/or replications of previous studies, and (f) contributions to theory development were far exceeded by the number of studies dedicated to prevention (Einsiedel and Tully, 1981). What is required are studies exploring the relations between burnout and other psychological constructs to which it was theoretically linked, as well as relations among the dimensions of the burnout construct itself.

Exceptions to the criticisms are such researchers as Maslach (1976) and colleagues, Jackson (1978) and Pines (1977, 1978); Pines, Aronson and Kafry (1978); Cherniss (1980); Jones (1981); Meier (1983, 1984); Golembiewski & Munzenrider (1988); and Leiter (1991, 1993). Maslach (1976) and colleagues, Jackson (1978) and Pines (1977, 1978), and Pines, Aronson and Kafry (1978) empirically studied burnout by focusing on the symptomatology and the negative consequences. Cherniss (1980) primarily views the cultural and organizational frames of reference to discover sources of burnout. Jones (1981) organizes his research around the cognitive, affective, behaviourial, and psychophysiological experience. Two researchers, Golembiewski & Munzenrider (1988) and Leiter (1991) developed models from the perspective of phases in burnout, the former with an eight phase model and the latter with two phases. Meier (1983,

1984) who investigated and validated burnout as a unique phenomenon, focuses on the construction of an interactional model of burnout based on Bandura's theory of reinforcement.

These researchers share a common thread in that each has a theory of burnout and each has a method of empirically testing the model. The theories have similar components (the physical, the psychological, and the emotional) and are directly related to stress. The authors differentiate between burnout and other concepts, and in doing so define burnout. Ultimately, burnout (a) is equated with the human service professional, (b) is produced by a combination of individual, organizational, and mediating factors, and (c) has a core component of commitment. Finally, the researchers agree that research related to the construct validation of Burnout is essential if progress is ever to be made in the understanding of the etiology and consequences of burnout.

Construct validity focuses on two issues: (a) the extent to which the assessment instrument measures the underlying hypothetical construct for which it was designed, and (b) the theoretical framework within which the construct is found (Cronbach and Meehl, 1955). Cronbach and Meehl, (1955) argue that construct validity research is

particularly essential for theoretical or propositional substantiation when there is no ***accepted, adequate*** body of knowledge related to a hypothetical construct.

Consistent with Cronbach and Meehl's (1955) views, methodological reviewers of the burnout literature have called for construct validation as a means to establish a potential nomological network of Burnout that can be linked to specific professions. Construct validation on a nomological network involves the investigation of both between-network relations (relations between Burnout and other constructs with which it has been empirically linked) and within-network relations (relations among the postulated facets of Burnout).

Based on the research of Maslach and colleagues that has determined Burnout to be a multidimensional construct of three distinct components, construct validation of the within-network relations of Burnout necessarily focuses on the extent to which the dimensions are related to each other. Construct validation of the between-network relations explores the determinants of a multidimensional Burnout structure.

Given the specificity of burnout relative to different work environments, it is critical that any construct

validation of its nomological network or structure of between and within relations, be investigated within the framework of a particular profession. Nursing is such a profession in that (a) it is the largest health-care professional body in Canada (Growe, 1991); (b) it has been linked to the incidence of burnout (Jones, 1981; Maslach, 1979, 1982, 1986); (c) the very nature of nursing is based on empathy, compassion and humanization of medicine [the antonyms of these concepts are detached concern and dehumanization (Maslach, 1993)]; and (d) nurses as professionals are involved with people on an extremely personal level in an environment that is not always conducive to positive consequences (Buunk & Schaufeli, 1993; Hatcher & Spence Laschinger, 1996).

Empirical research on burnout in the nursing profession has been scant (Morrow, Mullen & McElroy, 1990). Yet shortages of working nurses, a trend that is cyclic, necessitates the investigation of indicators of the quality of Canadian work life. For example, in 1987, 50% to 70% of 667 nurses in Newfoundland reported symptoms of burnout (Growe, 1991). Further, a survey in 1988, of 1,240 Metro Toronto Hospital nurses revealed an overwhelming dissatisfaction with their careers (Growe, 1991). In

addition, at this hospital, 50% of the nurses would not recommend nursing, 50% considered leaving their jobs, and 47% were likely to leave their jobs within a year.

Growe (1991) noted that turnover rates for Vancouver hospital nurses increased from 14% in 1984 to 25% in 1989. In 1988, despite the fact that the number of nurses doubled between 1965 and 1986, only 57% of female graduate nurses in Canada worked full-time by choice. Thus, there is a shortage of nurses that are ***willing to work***. Growe (1991) maintains that this dichotomous situation is due to hospital working conditions. Given that these working conditions have since further deteriorated due to restructuring and cutbacks, increasing job insecurity and organizational stress, the potential and milieu for burnout is even greater than reported by Growe (1991).

Reports indicate that nurses are dissatisfied. However, little research has been accomplished to determine the antecedents of this dissatisfaction. While the research focuses primarily on (a) intervention and prevention issues (Cherniss 1980), and (b) the incidence of stress and burnout in health-care professionals (Maslach, 1986 and Jones, 1981), researchers have failed to explore the determinants of the construct of Burnout.

The primary purpose of this thesis was to propose and test a theoretically and empirically derived structure of Burnout as it bears on the nursing profession. This structure is grounded in the substantive theory of burnout based on a review of the research literature. The thesis begins with a review of the literature and the limitations of previous research, followed by a discussion of construct validity in general, and as it relates to burnout in the nursing profession in particular.

Based on the literature review, the variables which were considered to be most salient to the nomological network of Burnout within the context of the nursing profession, were identified and justified. Finally, a theoretically and empirically-substantiated model of Burnout, considered to adequately represent the nomological network relative to the nursing profession, was analyzed. Discussion of this model, as it relates to a nursing sample, concludes the thesis.

The Theoretical Framework Of The Burnout Construct

Based on the knowledge that there is a theory of burnout rooted in empirical research[1], a literature review

of this research is essential. In the literature, the numerous researchers each view burnout from a different perspective and develop differing instruments to measure the construct. In order to better understand the construct of Burnout, the researchers and their contributions are now reviewed.

Maslach and Jackson

Maslach and Jackson (1981) were the first to construct a measuring instrument designed to assess burnout. Previous researchers, including the Berkley Planning Associates Metz, Gann, and Westerhouse (cited in Perlman and Hartman, 1982), provided a correlation between Burnout and such other concepts as Job Termination, Job Satisfaction, Role Conflict, and various personality traits and forms of communications, and defined burnout in those terms. However, the Berkley Planning Group did not develop an instrument to measure burnout nor did they provide a way in which to clearly define the construct. The seminal work of Maslach and her colleagues however, yielded both a definition of burnout and a means to test that definition, the Maslach Burnout Inventory (MBI).

In 1976, Maslach described burnout as a feeling of distance from the client or a sense of cynicism regarding the client. In 1977, along with Pines, she added descriptors and the factors of physical and emotional exhaustion, and dehumanization. The concept of lowered occupational productivity was appended in 1979. Finally, in 1981 Maslach and Jackson described burnout as a syndrome displaying such characteristics as emotional exhaustion, depersonalization, and dissatisfaction with personal accomplishments, dimensions obtained from a factor analysis of the data collected in the construction of their inventory.

Maslach developed her theory of burnout and the test inventory, based on a need for synthesis and integration of the existing information, and on a need for psychometric assessment tools to evaluate the construct (Einsiedel and Tully, 1981; Maslach and Jackson, 1981). The three facets, Emotional Exhaustion, Depersonalization and decreased Personal Accomplishment, were defined as distinct yet empirically correlated, sharing similarly hypothesized causes (Jackson, Schwab and Schuler, 1986).

Emotional exhaustion is considered by Maslach and Jackson (1981) to be the end product of a pattern of too

many emotional commitments. This product of depleted and unreplenishable emotional resources results in decreased motivation and an increased lack of involvement with people (Maslach, 1982). On the assumption that burnout is most prevalent in individuals who systematically interacted with people, this emotional and psychological exhaustion is particularly debilitating. This emotional exhaustion comprises a state of high arousal and is related to such concepts as Cynicism, Rigidity, and increasing Detachment (Maslach and Jackson, 1981; Maslach, 1982; Jackson et al. 1986).

In service-oriented professionals, a professional detachment is considered to be necessary as a buffer for concerned, effective caring. Unfortunately, this professional detachment could deteriorate to become ***depersonalization***, the second component of burnout. As such, clients of the professional tend to become dehumanized and labelled by the professional. The caregiver who is burned out, begins to minimize intense emotions and this leads to ineffective crises functioning, feelings of callousness and impersonal behaviours (Maslach, 1982; Jackson et al., 1986).

The third dimension of Burnout, ***reduced personal***

accomplishment, is a progression from depersonalization. In Depersonalization, the individual has increased negative attitudes to oneself, has an increased sense of inadequacy and helplessness, and ultimately begins to derogate others (Maslach, 1982). As the depersonalization increases, the person has an decreasing sense of having accomplished worthwhile tasks in their workday. These three components, emotional exhaustion, depersonalization and decreased personal accomplishment describe the burned-out professional according to Maslach and Jackson (1976).

Maslach and her colleagues are among the first researchers to investigate the construct of Burnout in an empirical manner. The Maslach Burnout Inventory (MBI), is the seminal instrument for the validation of the multidimensional nature of burnout.

Pines and colleagues

Pines, Aronson and Kafry (1978) define burnout and a second concept tedium, as states of mental, physical, and emotional exhaustion. The symptoms of both burnout and tedium include fatigue, emotional draining, helplessness, hopelessness, negative self-concept, and a negative attitude to life and people. Pines et al. (1978) differentiate

between the two concepts of Burnout and Tedium by clarifying the origins of each. They argue that tedium is the result of any daily chronic stress, whereas burnout is the result of constant or repeated stress related to a deep involvement with people over prolonged periods of time. The researchers conclude that tedium is usually an antecedent of burnout.

In addition, Pines et al. (1978) define burnout by comparing it to other concepts. For example, they argue that job alienation is a different phenomenon from burnout because job alienation does not originate in, nor depend on, the initial excitement and idealism of the helping professional, as does burnout; clinical depression is a separate concept in that the causes of depression are rooted in the person. Comparatively, burnout is a psycho-social phenomenon, the sources of which are environmentally determined (Pines et al., 1978).

The three antecedents of burnout, according to Pines et al. (1978), are directly related to the very nature of the human service professions and to the professional themselves, in three ways. First, the work of the professional is emotionally straining. This strain depends on the demands of the job and the resources available. Helping professionals, repeatedly subjected to clients'

problems of varied complexities, are expected to be both adept and concerned. Over time, this altruistic situation becomes intolerable.

Second, the human service professionals has common personality traits. Most professionals are empathic and sensitive to the needs and suffering of others, are oriented to people rather than to objects, and are considered humanitarians. These very characteristics make these professionals susceptible to overidentification with the clients' pain and more susceptible to stress (Pines et al., 1978).

And the third antecedent is a client-orientation. The role of the professional is defined by the needs of those serviced. The relationship between client and professional is therapeutic, not reciprocal. Rewards are inherent in the job itself, and satisfaction is derived from the service. Further, the professional socialization of these human-service professionals emphasize and encourage this absolute ethic of altruism. Pines et al. (1978) argue that these three elements combine incrementally in the helping professional, making them particularly vulnerable to burnout.

According to Pines et al. (1978), human service professionals are prone to burnout for a variety of reasons including: (a) the combination of personality traits, professional training, organizational structures, and political and economic realities; (b) the fact that women who make up the majority of helping professions, are more likely to subscribe to the dedication ethic, and are stereotypically nurturing and idealistic; (c) the increasingly fewer extrinsic rewards such as monetary compensation and recognition; and (d) the fact that few professionals have the necessary skills to identify and/or meet their own needs.

The research of Pines et al. (1978) indicates that almost half of the studied subjects of various professions, experience burnout at the time of study, and a further third had similar feelings in the past. This research conclusion illustrates the prevalence of the phenomenon.

Unfortunately, the targeted human service professionals themselves are slow to recognize their symptoms as burnout and thus are even slower to research the phenomenon of burnout (Pines & Kafry, 1981). The reasons for this slow response are categorized into five areas: (a) the socio-political climate (along with the public funding) is less

than ideal for costly research; (b) there is an oversupply of human service professionals; (c) some of the human service professions are sex-role stereotyped as women's jobs and research into these women's job burnout is not a priority; in addition, women are socialized not to force issues; (d) human services have been traditionally ranked lower than other professions; and (e) management not administration is rooted in human services. For these reasons, Pines et al. (1981) feel that although necessary, research into burnout has not been accomplished and is overdue.

Among the contributions to the field of burnout and tedium, Pines and his colleagues (a) developed inventories to measure the extent to which individuals experience tedium (1981) and burnout (1988; the Burnout Measure); (b) the researchers elaborated further on the concept of burnout by differentiating the concept of Burnout from the concept of Tedium and (c) their research detailed a picture of a helping professional prone to burnout.

Cherniss

Cherniss (1980), working from the socio-environmental perspective, focuses on the professional just beginning

their career. He contends that public criticism of the human service professions leads to an augmented demand for accountability. Thus, along with the expansion of professional roles has come more responsibility, commitment, and the need for professional effectiveness.

According to Cherniss (1980), human service professionals such as psychologists, social workers, doctors, therapists, transferred their professional practice to agencies and institutions. This migration from independent to institutionally-controlled practice led to an increase in stress, both on the organization, and on the attitude and performance of the individual within the organization. Traditionally, professionals were autonomous and self-regulating. The resulting modifications in the nature of work evolved to become the regulators of the new values and constraints. Thus by altering the work venue, such new problems as role conflict and decreased personal autonomy were added to the pre-existing inherent stresses and strains of professions in general.

Cherniss (1980) defines burnout in terms of these work stresses. He asserts that burnout is a process in which attitudes and behaviours are negatively altered in response to job stress. Ultimately, the response to job stress is

due to a loss of idealism and commitment, and is manifested by a variety of symptoms. The negative symptoms include detachment, loss of concern, pessimism, fatalism, decreased motivation, apathy, increased self-centredness, inflexibility, and a score of physical ailments.

Cherniss (1980) differentiates burnout from other concepts in a number of ways. First, he contends that temporary fatigue is not burnout, although it may be a symptom of it. Second, he argues that while socialization or acculturation are processes in which attitudes and behaviours respond to socially-exerted pressures, changes due to burnout are directly related to overload and job stress. The two concepts are similar in that both involved attitudinal changes in response to roles. However, burnout is an individual stress adaptation. Finally, he maintains that staff turnover is a sign of burnout, and not the process itself.

Believing that the first years are crucial as the professional make the transition from the student role to the accountable worker, Cherniss (1980) focuses on the human service professional new to the job. According to Cherniss (1980), this transition for the professional requires the most behaviourial and attitudinal changes for the

professional. Cynicism, lowered self-esteem and decreased job satisfaction developed in the initial years, are likely to persist and are in response to situational restraints (Cherniss, 1980).

The research of Cherniss is of a longitudinal and comparative nature. It consists of in-depth interviews with human service professionals in public institutions. The research is influenced by a socio-ecological perspective of three factors: first, human behaviour is a dynamic interaction of individual and environment; second, the environment imposes demands on the individual; and third, even as the environment influences the individual, the individual continues to force the environment to conform to her/his needs and wishes. Cherniss focuses on the adaptive modifications of the new professional, and on the strain produced by the exposure to new environments.

As a result of his research, Cherniss proposes five major sources of stress: (a) a sense of incompetence or insecurity about one's performance (b) a disillusionment due to client attitudes which are not always motivated by gratitude (c) decreased personal autonomy and self-sacrifice due to institutional bureaucracy with its politics, paperwork, and red tape (d) a boredom resulting from the

lack of stimulation for high achievers and (e) decreased peer support which is not always present but always necessary.

Cherniss observed changes in work goals, in personal responsibility, in idealism, in emotional detachment, in psychological involvement in work, and in self-interest. He determined that by not dealing with stress, by not making the necessary changes, the individual would become more vulnerable to burnout.

Cherniss (1980) identifies four factors as antecedents of burnout: first, the institution which provides such experiences as orientation, heavy workloads, lack of clarity of goals, and leadership; second, the individual with her/his career orientation and with his/her private lives; third, the resistance within the profession itself to role change; in most cases, the causes of this resistance are unclear; and fourth, society influenced by (1) a decline of the community support systems, and (2) a weakening of professional credibility.

Societal influence is further clouded by a professional mystique, or set of myths believed to be true by a culture and by the profession itself. This mystique encompasses (a) a sense of competency in that the professional should feel,

and be, competent; (b) a sense of autonomy, which is a part of professional socialization; (c) a knowledge that the profession provides stimulation and a sense of fulfilment; (d) a sense of collegiality; and (e) a client attitude that is one of gratitude.

Cherniss (1980) views the concept of burnout from a cultural and organizational perspective. The information he attained is invaluable in the understanding of the phenomenon of burnout, its sources, and the implications for future research.

Jones

The definition of burnout proposed by Jones (1981) includes the concepts of physical and emotional exhaustion, negative job attitudes, poor professional self-concept, and a decrease in empathic concern. Burnout is a work-stress reaction with behavioural, psychological, and psychophysiological facets.

Jones (1981) emphasizes that there is no empirical research yet identifying the causes, the consequences, or the cures of burnout. He developed the Staff Burnout Scale for Health Professionals (SBS-HP; Jones, 1981) and compared his new scale to the MBI. He reported that both yielded a

single score but that the SBS-HP comprises four subscales rather than three: work dissatisfaction, psychological and interpersonal tension, physical illness, and unprofessional patient relationships.

Jones (1981) argues that the correlates of burnout are categorized by three criteria: external stresses, stress reactions, and cognitive variables. External stressors include high patient-staff ratios with inherent overload, emotional drain, and high professional responsibility. Working in high trauma areas, shift work, and perceived family support are also determined to be external stressors.

Stress reactions include high turnover, increased absenteeism and tardiness, and increased addictions to alcohol and drugs. Further, the quality of the care, job dissatisfaction, property theft, and personal illness are considered by Jones as manifestations of stress reactions.

The cognitive variables are considered as mediators of burnout. Jones (1981) focuses on the personality component of the cognitive variables by using the concept of irrational beliefs, and the part the irrational beliefs play in perceptions and burnout.

Jones (1981) emphasizes the necessity for further research into the phenomenon of burnout. He argues for the

need of an operational definition, and a differentiation of the construct of Burnout from other constructs. The definition and differentiation could be accomplished only through the development of measuring inventories. Jones (1981) concludes that future research is essential to minimize burnout and its consequent rising costs.

Meier

In 1983, Meier presented a model of Burnout based on a definition in which the professional has low expectations of positive reinforcement and high expectations of punishment, has little control of these reinforcers, and has decreased performance competence. A further key element of the model is a contextual processing in which environmental situations are influenced by the individual, by society, and by organizations. This interactionist approach maintains that the causes of burnout are a combination of all of these three influences and not limited to any one. In addition, the model provides an empirical framework within which to develop research, and to compare Burnout to other constructs.

Golembiewski & Munzenrider

Golembiewski and Munzenrider (1988) researched the construct of Burnout in order: (a) to link the observed phenomena to the established research in order to challenge the theories, (b) to determine that burnout was phenomenally, practically and theoretically significant and related to health, well-being and productivity, and (c) to establish the importance of understanding a social phenomenon.

Based on the three components of burnout (Maslach & Jackson, 1976), that is Emotional Exhaustion, Depersonalization and decreased Personal Accomplishment, Golembiewski and Munzenrider (1988) define burnout in terms of eight possible high versus low combinations of the three factors. High scores on each of these factors indicated high levels of burnout; low scores on each of the factors indicated low levels of burnout; varying combinations indicated varying levels of burnout.

Golembiewski and Munzenrider (1988) viewed the Maslach Burnout Inventory (MBI) as a measure of idealized chronic dimensional progression. Underlying the theory is the following rationale: depersonalization begins as a detached concern or objectivity and led to rigidity. Beyond some

point, this depersonalization undermines the professional's feeling of personal accomplishment. The resulting decreased personal accomplishment has two effects: a sense of negativism about others produced by treating them objectively; and a negative self-evaluation about one's performance. Emotional exhaustion, the most potent contributor to burnout, is viewed as a recursive end product of continually trying harder to improve the depersonalization and emotional exhaustion.

The phases in Golembiewski and Munzenrider's model (1988) progress from reported low levels of Depersonalization, Personal Accomplishment and Emotional Exhaustion to reported high levels on each of the dimensions or Burnout. They argue that there are advantages to the phase model of Burnout including: the ability to measure burnout in large numbers, to classify the end of a burnout process, to identify individual differences in the mid-range scores, and to identify particular interventions.

The research by Golembiewski and Munzenrider (1988) provides key information to the understanding of burnout. Major contributions included: the linking of self-esteem, job involvement and autonomy to levels of burnout; the empirical determination that women are more prone to

developing burnout in that they (a) serve in helping professions and are more likely to invest their emotions in their work and (b) differ significantly from men in their levels of depersonalization and decreased personal accomplishment (a difference not accounted for by age or ethnic variables); and lastly, the foundation for the development of further models in the field of Burnout.

Leiter

In 1988, Leiter and Maslach investigated the impact of selected variables on the construct of Burnout. They determined that emotional exhaustion leads to greater depersonalization, which in turn leads to diminished personal accomplishment. Subsequently, Leiter (1988) reported that workers experience emotional exhaustion due to such work stressors as inadequate resources and excessive demands. The workers compensate for this exhaustion by losing their personal commitment, devaluing their accomplishments and depersonalizing their clients.

In later studies, Leiter (1991) conceptualized the construct of Burnout as a cognitive-emotional reaction to chronic stress. He argued that emotional exhaustion holds a central position as the precursor to the other two

dimensions as postulated by Maslach and colleagues. He evidenced this relationship by asserting that workers not reporting an emotional exhaustion but exhibiting behaviours that impersonalize their clients, are experiencing a job-related difficulty other than burnout (1991).

Subsequently Leiter (1993) revised the model of Burnout such that Emotional Exhaustion led to Depersonalization. However, Emotional Exhaustion and Personal Accomplishment developed in a parallel fashion.

In addition, Leiter differentiated Burnout from such other constructs as Occupational Stress (Cox, Kuk & Leiter, 1993) and Depression (Leiter & Durup, 1994). He contended that differentiating a measure of burnout from those measures of similar concepts or syndromes is necessary to develop the construct and evaluate its validity.

The research by Leiter has increased the understanding of the construct of Burnout. In differentiating between concepts and by evaluating and developing models, Leiter has identified key information in the field of Burnout.

Summary

Much of the research that followed Freudenberger's introduction of the term burnout has been of an anecdotal

nature. Of the few studies that are empirically-based, most are riddled with methodological limitations. According to Golembiewski and Munzenrider (1988) burnout research has (a) been episodic and ambiguous; (b) portrayed burnout as an acute phenomenon that ignored the chronicity factor; (c) failed to recognize the organizational component; and (d) focused on outcomes rather than antecedents. Research beginning with, and building on the seminal work of Maslach and colleagues, has continued to refine and redefine the multidimensional nature of burnout. Nonetheless, the limitations and problems associated with this area of research persist. We turn now to a summary of these limitations.

Limitations Of Previous Research Related To Burnout

From a review of the literature, it is evident that there are numerous limitations in the area of burnout research (Einsiedel and Tully, 1981). These limitations can be categorized into analytical, definitional, and psychometric perspectives.

Analytical Limitations

The limitations encountered in the empirical literature on the construct of Burnout from an analytical perspective focus on five issues: the nature of the research, concept interrelations, diversity of perspectives, levels of analysis and the research attitude.

Nature of the research. As previously noted, the research on burnout has been mainly anecdotal in nature. MacNeill (1981) stated that there is a lack of accuracy in design and research methodology. For example, although burnout was first identified as a discernible phenomenon in 1974, it was not until Maslach (1981) organized her qualitative data into an inventory that it was quantitatively assessed.

According to Meier (1984), there is a great deal of information on burnout, but still very little empirical validation of propositions, suppositions, and assumptions. The research community pays scant attention to the concept of Burnout despite the consequences of burnout for an overwhelming number of professionals. What is needed is more empirical research (Meier, 1984).

Concept interrelations. Research has failed to acknowledge the nature and extent of the relations between Burnout and other constructs. For example, MacNeill (1981) declared that the descriptions of burnout are similar to the empirical data on occupational stress. He maintains that the theory and possible methodology of measurement already exist in the occupational stress literature and that burnout is actually a form of this stress.

On the other hand MacNeill (1981) asserted that the field of occupational stress is rich in empirical data that could contribute to the pool of knowledge on burnout. Burnout could be validated as a unique, rather than a redundant construct through the clear delineation of relations between Occupational Stress and Burnout.

Other experts differentiate between Burnout and such constructs as Job Alienation (Pines et al., 1981), Fatigue (Cherniss, 1980; Pines et al., 1981) Occupational Stress (Cox et al., 1993) and Depression (Firth, McIntee, McKeown & Britton, 1986 and 1987; Glass, McKnight, & Vladimarsdottir, 1993; Leiter & Durup, 1993; Meier, 1984; Pines et al., 1981)[2].

Diversity of perspectives. The literature flourishes with numerous perspectives within which the phenomenon of

burnout is studied. Kamis (1981), Maslach (1981), and Carroll and White (1982) each developed their own theory of burnout.

Kamis (1981) utilize an epidemiological methodology to define and study burnout. By defining epidemiology as the study of the distribution of phenomena in specific populations and of the variables in the development and continuance of these phenomena, Kamis (1981) concludes that this perspective could determine causal, predictive, and risk-factor indicators of the phenomenon of burnout.

Carroll and White (1982) analyze Burnout by applying an ecological model based on two key factors - the person and the environment. According to the model, the person is surrounded by a set of environmental systems including: the microsystem or the smallest unit of society (i.e. the office); the mesosystem or the institution with several smaller work units; the exosystem or community and family that impact on the individual; and finally, the macrosystem or the culture or world. Each system is unique, dynamic, and interacts with the other systems. This model also describes the relations and the impact of person-environment on Burnout.

Maslach (1981) uses socio-psychological analyses in her study of Burnout. She believes that the decline of community and family increases the reliance on institutions for help. This increased demand for support results in larger institutions with more specialized staff, and unfortunately, more inherent organizational stress placed on the professional. Burnout is the consequence of this progression of events of increased stress and the individual's response to it.

Each of these theorists explains burnout from their differing perspectives. However, the multitude of perspectives regarding the structure of Burnout confounds the issue of clarity and parsimony in the determination of a universal or standard definition of burnout.

Level of analysis. Heifetz and Bersani (1983) asserted that a major difficulty in burnout research was the multitude of differing levels of analyses including: (1) operational definitions, or negative outcomes, or predictive values; (2) models of individual versus organizational concepts (Einsiedel & Tully, 1981); and (3) combinations of various levels within one study [e.g., the **individual** concerned with stress and burnout, and the **organization** with absenteeism, turnover, and job performance (Shinn, 1982)].

Research is conducted by sociologists on one level and by psychologists on another level, but both groups are concerned with job satisfaction and job strain. Concepts are related to Burnout but are analyzed on varying, and not necessarily comparable levels.

Research attitude. Most studies on burnout are necessarily negative in nature because of the negative sequelae and impact on the individual and the environment. The studies focusing on the positive side of stress are studies from a preventative and not from a determinant perspective.

Summary. Problems encountered in the investigation of the construct of Burnout, from an analytical perspective, can be categorized as the nature of the research, concept interrelations, diversity of perspectives, levels of analysis and the research attitude. This set of difficulties is only one of the cited limitations in Burnout research.

Definitional Limitations

The next category of limitations is one of definition. Definitions are neither true nor false, only more or less useful (Berger, 1969). The choice of a definition is

actually a matter of taste. According to Berger (1969), there are three alternatives in choosing a definition: (a) a functional definition which permits a more unambiguous line of analysis, (b) a definition used in substantive research to determine what is relevant or not, and (c) a constant in all fields of analysis. If there is a discrepancy, it is necessary to consider utility.

Substantive research can only proceed within a frame of reference that defines relevance in terms of research (Berger, 1969). In order to develop a theory of burnout that can be applied in varying occupations to determine antecedents and consequent possible interventions, an integration of the existing knowledge and a verified, standard definition is needed. Einsiedel and Tully (1981) found that the empirical research on Burnout lacked a standard definition, thereby rendering validation and generalizability to be problematic. From the perspective of definition, there are four categories of issues: variety, meaningfulness, foundation (the Medical Model) and assumptions.

Variety of definitions. Burnout has been defined in terms of a process with stages (Farber, 1983; Veninga, 1981), as an end product (Cherniss, 1980a, 1980b; Edelwich &

Brodsky, 1980; Maslach, 1981; Pines & Kafry, 1981) and as a syndrome with a multitude of symptoms (Freudenberger, 1975). Based on their definitions, each of these researchers developed their own theories, models, and measurement tools. What remains to be accomplished is a standardization of definition required as a basis for collective research.

Meaningfulness of definition. Freudenberger (1983) asserted that researchers tend to be inflexible in their thinking when there is no clear body of knowledge. With this in mind, Freudenberger (1983) identified two definitional problems. First, the term burnout had tended to become less meaningful by overextension and overusage. The term had become a cliché, a panacea for the ills of a profession or of a society. Freudenberger concluded that to increase the effectiveness of research into the concept of Burnout, such disciplines as sociology, political science, and business administration needed to provide input. The second definitional issue for Freudenberger (1983) involved the Medical Model.

Foundation (the Medical Model). Freudenberger (1983) asserted that burnout had been defined within the medical model which has its roots in pathology. Inherent in the medical model is the use of disease, and its signs and

symptoms. By basing a theoretical model on a system of maladaptive behaviours, researchers limits the possibilities and applications of the model. This pathological perspective of burnout biases any data obtained and limited data applicability.

According to Freudenberger (1983), a model of Burnout should be viewed in terms of social systems, values, and processes. He reasons that a number of changes within society including the feminist movement, the decline of family and community, and a large disparity in religious beliefs, has culminated in an increase in an individual's vulnerability to burnout. Freudenberger (1983)concluded that this vulnerability must be studied from the perspective of the social milieu in which it grew.

Definitional assumptions. Inherent in each of the definitions of burnout proposed by various researchers are assumptions based on individual and differing theories. For example, Kamis (1981) in defining her model, lists the assumptions underlying the model as related to content and concepts (i.e., identification of predisposing, precipitating and perpetuating determinants), and measurement and methodology (presented model is one of causality). These assumptions are particular to her model

alone.

Summary. Although assumptions must be thoroughly explained in order to avoid problems with replication, generalizability, and validity, this is not always accomplished. Ultimately, there is only one universal, underlying assumption in the theory of burnout - that it must be preceded by commitment (Farber, 1983; Heifetz and Bersani, 1983).

Psychometric Limitations

At least two psychometric limitations associated with burnout research have been proposed. The first is the nature of the study and the second is the variety of assessment tools.

The Nature of the study. Einsiedel and Tully (1981) believed that longitudinal studies are more appropriate in the study of Burnout. Burnout is not an immediate reaction to causal factors. Rather, it is a chain of incidents, spread over a length of time which vary according to the individual and the circumstances. Burnout, according to their understanding, is a chronic, insidious, and pervasive phenomenon. Because of the temporal factor in the development of burnout, longitudinal studies therefore

provide more relevant information on the systematic process. Unfortunately, a cross-sectional format has been utilized by the majority of researchers.

The Nature of the measurement. Until 1976 there were few assessment tools to evaluate Burnout. The number of such tools has increased but there was still an ongoing need for psychometric validity of the inventories, and of the construct of Burnout itself. Three of the tools, the Maslach Burnout Inventory, the Staff Burnout Scale, and the Burnout Measure (formerly the Tedium Measure), are still the most comprehensive and better validated of the growing list.

However, the tools have inherent problems. First, each is a self-report questionnaire which assumes that the respondent is accurately evaluating their own present situation and condition, and is not unduly influenced by unrelated factors. And second, even though the inventories measure a common concept, there are definitional differences and consequently, differences on the measured factors.

Summary. A solution to the psychometric problems in burnout research is necessary. Research replicability, generalizability and validity, cannot be accomplished without a clear idea of the construct in question. A universal definition and solid psychometric properties of

the construct of Burnout are essential.

Conclusion

Although there continue to be many limitations associated with Burnout research, one of the most serious is the lack of a clear and universally-accepted definition of the construct itself. Many definitions exist, but each is specific to a particular theoretical perspective. What is needed now is a universally-accepted definition of burnout or a construct validation study that investigates the nomological network of Burnout. More specifically, this area of research demands a knowledge of which variables impact on the multidimensional construct of Burnout (i.e., between-network relations) and the extent to which the three facets of Burnout impact on each other (within-network relations). The most meaningful approach to such construct validation, is to study the process within the framework of a particular profession. As noted earlier, the present thesis studies the process within the framework of the nursing profession.

Construct Validation of Burnout

According to Cronbach and Meehl (1955), construct validation refers to the scientific validation of tests and measures as indices of postulated attributes (Bentler, 1978). Construct validation is the interplay of the complementary processes of theory construction and test development (Byrne, 1989). Thus construct validity entails two methods of inquiry: validation of a construct, and validation of a measuring instrument. In construct validation, confirmation is needed in support of hypothesized construct relations among (a) the facets of the construct (within-network relations), and (b) other constructs that are known to be theoretically linked to the construct under study (between-network relations), in order to establish a theoretical network or nomological network of the hypothesized construct (Byrne, 1989).

Construct validation of a measuring instrument seeks evidence that the instrument indeed measures the traits it purports to measure. For example, subscales of an instrument demonstrate construct validity if they exhibit a factor structure consistent with the underlying theory (Byrne, 1989).

Introduction

The connection between construct validation and causal modeling was first elucidated by Bentler (1978) who declared that construct validity of a theory refers to the empirical adequacy of a causal model, evaluated on relevant data by appropriate statistical methods. In other words, a theory can be validated through the use of causal modeling procedures. Because the methodology associated with this analytical approach demands that the researcher postulate both between- and within-network relations a priori, the specified model is grounded in theory. This view of construct validity extends the definition of Cronbach and Meehl (1955) by focusing on the validation of a theory by testing its nomological network of construct relations.

Limitations associated with burnout research necessitate studies of its construct validity. Implicit in the conduct of between-network research is the specification and testing of causal linkages among the related constructs. The intent of this thesis is to investigate burnout in the nursing profession by exploring the causal linkages among salient variables as they impact on the construct of Burnout.

Structural equation modeling procedures which furnish a statistically and theoretically-sound method for evaluating

causal effects from nonexperimental data (Bentler, 1978; Bentler & Woodward, 1979) were employed in the thesis. The technique of structural equation modeling cannot prove causality but does assist in the choice of relevant causal hypotheses by eliminating those not supported by empirical evidence (Bentler, 1978). Although, admittedly, a longitudinal study of the Burnout construct would yield more rigorous findings (Leiter, 1993; Schaufeli, Maslach & Marek, 1993), practical constraints of time and money necessarily limited the design to a cross-sectional study.

In the present study causal modeling procedures are used to investigate the construct validation of Burnout as it relates to the nursing profession. Based on a review of substantive research concerned with burnout among nurses, and psychometric research concerned with the validation of a three-factor structure of Burnout as defined by Maslach and colleagues (1976), a model of the nomological network is proposed and tested. The decision to use the theory of Maslach and Jackson (1976) and thus utilize the Maslach Burnout Inventory (1981) was based on the fact that (a) the theory of Maslach and Jackson is the foundation of many other theorists' conceptions of Burnout including Pines,

Meier, Golembiewski and Munzenrider, and Leiter, (b) the Maslach Burnout Inventory was the first inventory designed to measure Burnout, and (c) the MBI is the most widely used burnout measure and is thus well validated across numerous and varied samples. We turn now to the hypothesized model of Burnout structure as it bears on the nursing profession.

Hypothesized Model of the Structure of Burnout

Nursing is one of the careers identified as being at high risk for the phenomenon of burnout (Maslach & Jackson, 1986). Inherent in the work nurses perform, are many of the antecedents for burnout (Buunk & Schaufeli, 1993). Following a thorough review of the empirical research (Blau, 1993; Greenhaus & Parasuraman, 1986; Lee & Ashford, 1996; Morrow, Mullen & McElroy, 1990; Swanson, 1992; Watkins & Mezydlo, 1995), salient variables were selected for inclusion in the proposed model of Burnout; selection was based on the following criteria: (a) the frequency of variable utilization, (b) the association between variables be at a moderate level, (c) the identification of the variables reported by nurses as those having an important

impact on their quality of worklife, and (d) the research findings being based on previous studies of burnout among nurses. It is important to note that for pragmatic reasons, three particular variables were not considered in model specifications. These were **Coping Styles**, (Blau et al., 1993; Boyle, Grap, Younger & Thornby, 1991; Duquette, Kerouac, Sandhu & Beaudat, 1994; Greenhauss & Parasuraman, 1986; Leiter, 1991, 1992; Lewis & Robinson, 1992; Swanson, 1992;), **Support** (Attridge & Callahan, 1989; Constable & Russell, 1986; Buunk & Schaufeli, 1993; Eisenberger, Huntington, Hutchison & Sowa, 1986; Ganster, Fusilier & Mayes, 1986; Kaufmann & Beehr, 1986; Lee & Ashford, 1996; Robinson, Roth, Keim, Levenson, Flentje & Bashor, 1991; Stechmiller & Yarandi, 1993; Boyle, Popkess-Vawter and Taunton, 1996; Winnubst, 1993) and **Depression** (Frone, Marcia & Cooper, 1995).

Overall, the review of empirical literature revealed personal and organizational variables to be the primary contributing factors in the determination of burnout for nurses. The hypothesized model summarizes this proposed nomological network and is presented schematically in Figure 1.

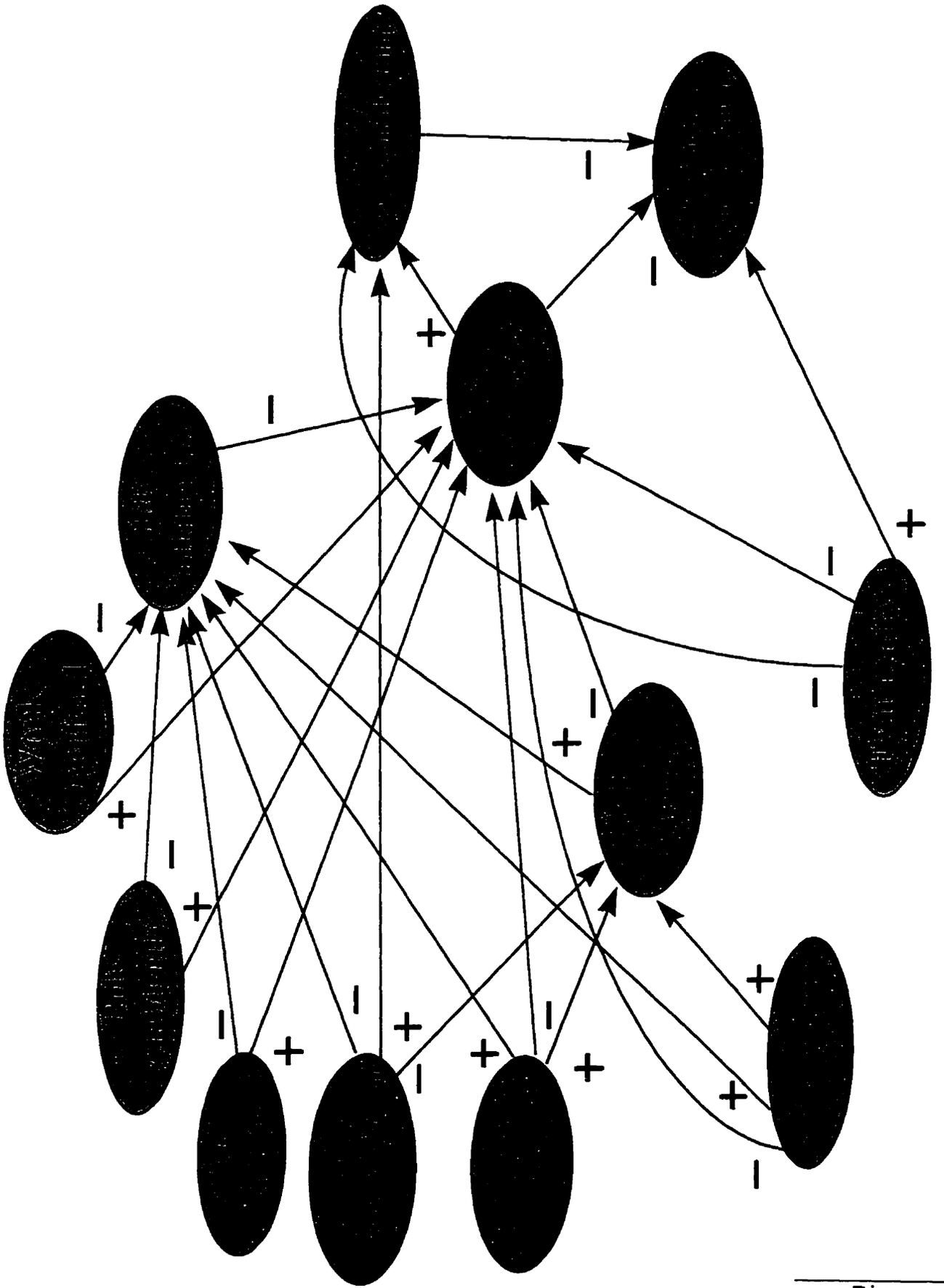


Figure 1

As depicted in Figure 1, salient personal variables selected are: External Locus of Control, Job Satisfaction, Professional Identity, Femininity, and Self-esteem. The arrows in Figure 1 depict an impact of one variable on another. The signs indicate the nature of that impact (e.g., a plus sign indicates that as Professional Identity increases, Job Satisfaction increases; and a negative sign indicates that as Job Satisfaction increases, Emotional Exhaustion decreases).

Locus of Control is a perception of one's control over life's events (Rotter, 1966). **Job Satisfaction** is an internal indicator of correspondence representing the individual's appraisal of the extent to which the work environment fulfils her requirements (Dawis and Lofquist, 1982). **Professional Identity** is the degree to which the nurse identifies psychologically with work, or is the importance of work in relation to the individual's total self-image (Lodahl and Kejner, 1965). **Femininity** defines the personality that typically exhibits the characteristics of female stereotypes (Spence & Helmreich, 1978). **Self-esteem** is the personal subjective evaluation of worthiness expressed in attitudes to the self and having such external

indices as behaviour (Coopersmith, 1967).

Within the hypothesized network, the postulated causal influences signified by the arrows are as follows: External Locus of Control impacts negatively on Job Satisfaction and Self-esteem, and positively on Depersonalization; Professional Identity impacts positively on Job Satisfaction and Self-esteem, and negatively on Emotional Exhaustion; Self-esteem impacts positively on Job Satisfaction and negatively on Emotional Exhaustion; Femininity impacts negatively on Emotional Exhaustion and Depersonalization, and positively on Personal Accomplishment; Job Satisfaction impacts negatively on Emotional Exhaustion.

The organizational variables considered salient are Workload, Role Conflict, Role Ambiguity, and Autonomy. **Workload** involves job complexity and demands (Farber, 1983). **Role Conflict** is the dichotomous situation of conflicting, competing demands (Kahn, 1973; Kahn et al., 1964). **Role Ambiguity** is the experience of unclear goals, status, and accountability (Farber, 1983). **Autonomy** is independent, self-directed thought and action in the job (Cherniss, 1980).

Within the hypothesized network the postulated causal

influences of the organizational variables signified by the arrows are as follows: Workload impacts positively on Emotional Exhaustion and negatively on Job Satisfaction (i.e., as the workload increases, Emotional Exhaustion increases and Job Satisfaction decreases); Role Ambiguity and Role Conflict impact negatively on Job Satisfaction and positively on Emotional Exhaustion; Autonomy impacts positively on Job Satisfaction and Self-esteem, and negatively on Emotional Exhaustion.

A review of the substantive literature wherein each of the variables has been linked to the nursing profession, is now presented.

Personal Variables

Locus of Control. Rotter (1966) defined locus of control as the person's perception of control over their world. People who have an internal orientation assume responsibility for their lives while those with an external orientation tend to feel they are lacking control over their lives and assume little responsibility for what happens to them.

Studies demonstrate nurses with an external orientation posit that outcomes are either the result of others'

actions, or the result of luck. In a nursing population, locus of control has been linked to such factors as autonomy and decision-making abilities (Alexander, Weisman & Chase, 1982).

Storms and Spector (1987) stated that nurses with external locus of control are more likely than internal people to respond to frustration with counter productive behaviour. Research indicates that nurses classed as "externals" have a greater alienation from their job and from themselves, and have increased levels of stress and burnout (Dailey, Ickinger & Coote, 1986; Keane, Ducette & Adler, 1985; Topf, 1989).

Job Satisfaction. Although the literature provides a variety of definitions of job satisfaction, the underlying concepts of the various definitions postulate that it is a positive emotional state ensuing from the appraisal of one's job, a perception that the job fulfils one's important job values (Locke, 1984). Job Satisfaction is a complex and well-researched construct as confirmed by the many studies on Job Satisfaction and numerous other variables (Blegen, 1993).

Loher, Noe, Moeller & Fitzgerald (1985) examined the relationship between job characteristics and satisfaction

and concluded that the more complex and enriched a job is (as is nursing), the more likely the person in that job will have a high need for personal growth. Dolan (1987) demonstrated that job dissatisfaction is a reliable indicator of burnout.

In a comparison of general staff nurses and Intensive Care Unit (ICU) nurses, both samples reported job satisfaction (Maloney, 1982). Interestingly Trait Anxiety scores of general staff and ICU nurses have been found by Wallace-Barnhill (1981) to be low in ICU nurses (cited in Hart, 1987), and higher in non-ICU nurses (Maloney, 1982).

Researchers have linked Job Satisfaction to other variables including: Control of the environment (i.e., Locus of Control) (Tetrick and LaRocco, 1987); Autonomy (Cavanagh, 1992; Jamal, 1990; Loher, Noe, Moeller and Fitzgerald, 1985; Stamps & Piedmont, 1986); and Role Conflict which negatively correlates with Job Satisfaction (Chacko & Wong, 1984; Klenke-Hamel & Mathieu, 1990; Mitchell, 1989; Tetrick & LaRocco, 1987).

According to Ashley (cited in Stamps & Piedmont, 1986), socially-determined sex-roles play a part in work satisfaction. In working with nurses, Landeweerd & Boumans (1988) demonstrated that high Job Satisfaction is related to

internal Work Motivation and meaningfulness. In a meta-analysis of Job Satisfaction as it related to the nursing profession based on 48 studies that involved a total of 15,048 nurses, Blegen (1993) determined that Job Satisfaction is most strongly related to Stress and Commitment, less strongly with Autonomy and Locus of Control, and least strongly with Professionalization. Kovner, Hendrickson, Knickerman and Finkler (1994) reported that renumeration, an extrinsic reward, ranks as the primary consideration in a definition of Satisfaction, followed by Autonomy and Professional Status.

Professional Identity. Professional Identity, a concept developed in the present study, was first conceptualized as Job Involvement in 1965 by Lodahl and Kejner who developed an inventory to measure the concept (JIS; 1965). According to their concept (Lodahl & Kejner, 1965), job involvement is the degree to which an individual identifies psychologically with work, is the internalization of the values regarding the goodness and the importance of work, and is the ease with which the professional can be further socialized by the organization. Job involvement is the end product of cultural, professional and organizational socialization processes to the extent that the importance of

work becomes reflected in one's overall perception of self.

Job involvement is the degree to which the person's performance affects her or his self-esteem. It is resistant to environmental change due to the nature of the job and is relatively stable over time. Job involvement is associated with traits of high achievement desire, mobility, drive, activity and aggression. Lodahl and Kejner (1965) noted that the main determinant of job involvement is a value orientation toward work that is learned through socialization. In this present thesis, the concept of Job Involvement was expanded to include the sense of values and ethics specific to the nursing profession and was renamed Professional Identity.

Leiter (1991) contends that values indoctrinated during professional socialization such as valuing and committing to patients, are at odds with the Burnout dimension of Depersonalization. In other words, Job Involvement or Professional Identity is inversely related to Depersonalization.

Other researchers link Job Involvement, or Professional Identity, to Burnout. For example, Runyon (1973) reported that Job Involvement is largely a function of the Locus of Control dimension. People with an External Locus of Control

have low Job Involvement (Evans, cited in Hall & Mansfield, 1971).

In their study, Lodahl and Kejner (1965) found that nurses with higher Job Involvement (Professional Identity) report higher levels of Job Satisfaction. In additional studies, Shoham-Yakubovich, Carmel, Zivanger and Zaltoman (1989) found that for nurses, Professional Self-image is positively related to Autonomy and Job Satisfaction; Jamal (1984) asserted that Professional and Organizational Commitment moderates stress and performance.

Femininity[3]. In 1972 Bardwick and Douvan summarized characteristics of sex-role stereotypes such that women, socialized in different ways to be warmth-expressive (Bardwick & Douvan, 1972; Gilligan, 1982), are described as dependent, passive, nonaggressive, noncompetitive, having an inner orientation, supportive, empathic, sensitive and nurturing; in contrast men are independent, aggressive, assertive, having an outward orientation, rational and self-confident.

A review of 48 studies which explored nurses' personalities concluded that nurses as a group share such characteristics as nurturance, submission, and dependence, and have little dominance, leadership, and autonomy

(Muhlenkamp & Parsons, 1972). Experts argue that the image of nurses is one of a traditional, stereotypic nature and confirm this image by citing nursing theorists who interpret nursing behaviours as those typical of an oppressed group (Attridge, 1996; Attridge & Callaghan, 1989; Bowman, 1993; Hatcher & Spence Laschinger, 1996; Martin, 1990; Stamps & Piedmont, 1986) of low social status (Cherniss, 1993).

VanYperen, Buunk and Schaufeli (1992), have shown that nurses described as low in communal orientation are prone to burnout. Communal Orientation refers to the stereotypically-feminine trait of a desire for reciprocity of benefits in relationships with patients and a motivation to help in response to the needs of, and out of a concern for others. In other words, nurses who are altruistic and who are responsive to needs of others (i.e., are feminine), do not develop depersonalization (VanYperen et al., 1992)

The noted studies, however, are ground-breaking. Little research other than those studies cited has been conducted on nurses, and even less, if any, burnout research has been conducted using the personality variable of Femininity.

Self-esteem. Rosenberg (1965) focused his research on the dynamics of self-image during the developmental years of

adolescence. For Rosenberg, self-esteem is an evaluative attitude, a global property of personality and the summation of evaluations of self in diverse domains. Persons with low self-esteem have more neurotic tendencies, have greater difficulty with social interactions, and have lower aspirations and expectations for success based on negative evaluations and the availability of supportive reference groups than did persons with high self-esteem (Rosenberg, 1965).

In addition, research indicates that underlying processes in self-esteem include a sense of competence (Rosenberg, 1965); a competency motivation (White, 1959); an affiliation and a task success; power and worth; and a mastery of the environment (Woodworth, 1958). These processes link Self-esteem to other concepts as they impact on Burnout.

Research indicates that there are links between Self-esteem and variables in the present study, for example, reactions to **stressful environments**. Self-esteem is a component of self-regulation, the extent to which the self-system is maintained under strain (Ziller, 1969, cited in Wells & Marwell, 1976). In other words, self-esteem is the capacity to react to environmental stress. Low Self-esteem

correlates with shyness, guardedness, rigid conformity to values and increased authoritarianism and self-derogation (Rosenberg, 1965). In addition, it is a believed that the relation between Self-esteem and Adjustment, and between Self-esteem and **Tolerance for Ambiguity**, is curvilinear (Stewart, 1968).

According to Coopersmith (1967), there is an positive association between **Autonomy** and Self-esteem. Persons with high self-esteem are more likely to be assertive and independent than persons with low self-esteem.

There are few studies that have focused on Self-esteem as it relates to nurses. In 1975, Manuel and Kimoski explored Self-esteem and its moderating capacity in female nurses and determined that the most important factor in Self-esteem for nurses is Job Complexity. Further, evidence was found for Self-esteem as a moderator in the relationship between Performance and Satisfaction. Mossholder, Bedeian and Armenakis (1982) discovered that Group Interactions have a greater impact on Job Performance and Job Strain in nurses with low, rather than high Self-esteem. In the same study, subjects with low Self-esteem were found to be more dependent on peers for Task Support than subjects with high Self-esteem. In their study Christensen, Lee and Bugg

(1979), concluded that there is a negative relationship between External Locus of Control and Self-appraisal. Burke (1982), in his study of 136 nurses, determined that nurses with more Self-esteem and Internal Locus of Control are more active and satisfied with their jobs than nurses with low Self-esteem.

Other studies have described nurses in terms of an oppressed group having low Self-esteem (Roberts, 1983), and have indicated that female nurses feel inferior and must work to maintain the status quo in hospital organizations (Bullough & Bullough, 1975; Campbell-Heider & Pollock, 1987; Tellis-Nayak & Tellis-Nayak, 1984).

Consistent with the review of the literature, the present study of nurses hypothesizes the personal variables of External Locus of Control, Job Satisfaction, Professional Identity, Femininity and Self-esteem to impact on Burnout. We turn now to a discussion of the organizational variables in the hypothesized model of burnout (see Figure 1).

Organizational Variables

The extensive literature review to determine the salient organizational variables utilized the same criteria for inclusion as did the determination of the personal

variables: that is (a) the frequency of variable utilization, (b) the association between variables be at a moderate level, (c) the identification of the variables reported by nurses as those having an important impact on their quality of worklife, and (d) the research findings being based on previous studies of burnout among nurses. In reference to organizational variables, the criterion of the identification of the variable by nurses as those having the greatest impact on the quality of their worklife (Baumgart & Larsen, 1992; Kramer & Schamlenberg, 1988; Kiely et al., 1992; Meltz & Marzetti, 1988; Ontario Nurses' Association, 1988; Ontario Ministry of Health, 1988, 1990; Parkin, 1995; Skelton-Green, 1996; Stamps & Piedmonte, 1986), was considered to be the most important. It should be noted that other organizational variables that impact on Burnout were not considered by nurses to be as important for the nursing profession but still relevant for other professions (e.g., physical properties in the environment; availability of extrinsic rewards such as pay and security; internal rewards such as collegiality; promotion; professional development; evaluation processes; monotony; supervisor support; and shift work). Those organizational variables included in the present thesis are Workload, Role Conflict,

Role Ambiguity and Autonomy. We turn now to a discussion of these variables.

Workload. Work has both a qualitative and a quantitative component (Farber, 1983: French & Caplan, 1973). Qualitative overload refers to job complexity or those tasks which are perceived as too difficult to complete satisfactorily. The quantitative overload component refers to having too many demands and too little time in which to meet them adequately. Research indicates that Work Overload contributes to Job Stress (French & Caplan, 1973).

Studies have linked Burnout in nurses and Workload (i.e., Overload). Pagel and Wittman (1986) reported that patient-care load and overtime for nurses predicts burnout. Further predictors of Burnout in the nursing profession include Overload and Personality Hardiness (McCranie, Lambert & Lambert, 1987); and Role Ambiguity and Overload (Heim, 1991). Kiely, Ursell & Blyton (1992) demonstrated that nurses' workloads are a major source of job stress.

Role Conflict. Role Conflict is the occurrence of two or more contradictory demands (Kahn, 1973; Kahn et al., 1964). It is the conflict between the employees' demands and expectations and the employer's demands and expectations (Ivancevich and Matteson, 1980).

Studies have reported that Role Conflict is positively related to Emotional Strain and negatively related to Satisfaction (Jackson, 1983; Kahn et al., 1964; Organ & Greene, 1974). In addition, there is an interaction effect on individual Performance between Conflict, and Education and Leadership (Vredenburgh & Trinkhaus, 1983).

Bedeian, Mossholder & Armenakis (1983) have shown that nurses who demonstrate a propensity to leave, report Supervisor and Peer Role Conflict. Further, this perceived Role Conflict is negatively correlated with Job Satisfaction (Jackson, 1983; Posner & Randolph, 1979, 1980). Dailey and Ickinger (1986) reported that Role Conflict is related to Autonomy. Robinson et al. (1991), determined that Work Pressures are related to Burnout for nurses.

Role Ambiguity. Role Ambiguity is the discrepancy between the amount of information a person has and the amount she or he needs to perform the role adequately (Kahn, 1973). Role ambiguity is associated with a lack of clarity in an employees' rights, obligations and accountability (Farber, 1983).

Ivancevich and Matteson (1986) contended that role ambiguity is a lack of clarity about one's role, objectives and responsibilities, and that everyone experienced some

degree of ambiguity in change. Studies into Role Ambiguity (French & Caplan, 1970; Margolis, Kroes and Quinn, 1974 cited in Ivancevich & Matteson, 1980), have reported that Role Ambiguity is related to lowered Self-esteem and decreased Job Satisfaction.

Studies linking Burnout in nurses and Role Ambiguity include: leads to decreased Job Satisfaction and increased perceived Stress (Revicki and May, 1989); is a predictor of short-term Absenteeism (Firth & Britton, 1989); predicts Career Commitment (which shares some of the characteristics of Professional Identity) (Blau, 1985); is positively related to Emotional Strain and negatively related to Satisfaction (Jackson, 1983; Posner & Randolph, 1979, 1980); and is negatively related to Autonomy (Dailey and Ickinger, 1986; Posner & Randolph, 1979).

Nurses in other studies have identified that some of the major sources of their occupational stress include institutions with unclear and/or conflicting goals, and inadequate resources (Motowidlo, Packard & Manning, 1986; Steers, 1981; Wry, 1985).

Autonomy. Autonomy refers to the need to be self-governing, to be responsible for one's own actions. Friedson (1973) maintained that autonomy in an occupation is

an important factor in job satisfaction. In much the same vein, Cherniss (1980) asserted that novices vary in their perception of the degree of autonomy that they are given, and that at some point, all professionals in institutions face a lack of autonomy not incurred by professionals in private or independent practice. This lack of autonomy is a source of dissatisfaction and frustration.

Autonomy, as defined by Hackman and Oldham (1976), is the degree to which there is freedom, independence and employee discretion in the job. Attridge and Callaghan (1989) argued that this autonomy is a critical variable in determining job stress.

In 1977 Wagner, Loesch & Anderson demonstrated that for nurses, respect, collegiality, tasks and autonomy or responsibility are important factors in job satisfaction. Kanungo (1980) found that nurses who are highly stressed, show greater autonomy-need satisfaction than low stress subjects. Weisman (1982) declared that nurses' perceived Autonomy is the greatest predictor of Job Satisfaction. Constable and Russell (1986) concluded that one of the major determinants of Burnout in nurses is low Job Enhancement, which included the factor of Autonomy.

Additional studies demonstrated that nurses identify the lack of autonomy and power as major sources of their occupational stress (Motowidlo, Packard & Manning, 1986; Steers, 1981; Wry, 1985). Pincus (1986) reviewed studies of Job Satisfaction for nurses and found that Autonomy is an important factor in their Nursing Practice and a source of stress. In 1989, Shalom-Yakubovich et al. reported that during a physicians' strike, nurses expanded their roles and responsibilities and in doing so, their professional autonomy and satisfaction increased.

In 1990, a Nursing Clinics of North America focusing on the dynamics of the nursing shortage, emphasized that autonomy and workload are the two most important factors in nursing dissatisfaction (Cowling, 1990; Ferguson, 1990; Regan, 1990). McCloskey (1990) reported that nurses experiencing low autonomy and reporting fewer relationships with co-workers, express low job satisfaction. Dwyer, Schwartz and Fox (1992) further determined that nurses with a greater preference for autonomy express more job satisfaction than those nurses who did not have a preference for autonomy. Kovner et al. (1994) demonstrated that nurses rank autonomy and professional status as important factors in satisfaction.

With the personal variables (External Locus of Control, Job Satisfaction, Professional Identity, Femininity, and Self-esteem) and the organizational variables (Workload, Role Conflict, Role Ambiguity, and Autonomy) in mind, we turn now to a discussion of the purpose of this present study.

The Purpose of the Study

The present thesis represents a construct validation study designed to **investigate the structure** of Burnout as it relates to the nursing profession. Specifically, the purpose of the study was to validate a proposed model of the nomological network of Burnout. In particular, the model described the impact of particular personal and organizational variables on Burnout (between-network relations) and the impact of the three facets of Burnout on each other (within-network relations). The study was designed to test two following hypotheses. These are as follows:

Hypothesis I: Based on the empirical literature reviewed earlier, the impact of personal and organizational

variables on Burnout, as portrayed in Figure 1, is a valid representation of the nomological network of Burnout as it relates to the nursing profession as a whole. More specifically, it is hypothesized that: (a) Professional Identity, Autonomy, Role Conflict, Role Ambiguity and Workload will impact directly on Burnout[4] and on Job Satisfaction, (b) Professional Identity, Autonomy and Locus of Control will impact on Self-esteem and Burnout, (c) Self-esteem impacts directly on Job Satisfaction and Burnout, (d) Job Satisfaction impacts directly on Burnout, (e) Femininity impacts on Emotional Exhaustion, Depersonalization and Personal Accomplishment, and (f) External Locus of Control impacts on Depersonalization. And finally, consistent with Leiter's theory (1991), Emotional Exhaustion is shown to hold the central position in the structure of burnout; as such it is shown to impact on Depersonalization and Personal Accomplishment; Depersonalization is hypothesized to impact on Personal Accomplishment.

Hypothesis II: Based on empirical findings that have shown reported levels of Job Satisfaction to be higher for

critical care nurses than for general staff nurses, it is hypothesized that the model determined to best represent the data for general staff nurses, as a whole, will exhibit a poorer fit to the data representing the critical care nurses. In other words, variables in the nomological network of Burnout for the critical care nurses are hypothesized to have different impacts than do the variables in the nomological network of Burnout for the general staff nurses. For this thesis, critical care nurses are defined as those nurses whose patients are physiologically unstable, desperately ill with an acute, critical illness, and are frequently sustained by technologically-advanced machinery. Critical care nurses are able to respond quickly and intelligently to physiological and emotional changes in their patients (Clochesy, Breu, Cardin, Rudy, & Whittaker, 1993). Patients under this definition are traditionally found in Intensive Care, Cardiac Intensive Care, Post-Anesthetic Care Units, Operating Rooms and Emergency Departments.

METHOD

Sample and Procedures

Eligibility for participation in the study required that the general staff nurses be employed at tertiary care hospitals having at least a 450-bed capacity. The rationale underlying this criterion was to insure that the impact of the organizational variables in the models was optimum. In other words, the organizational structure and practices of hospitals having more than 450 beds are more likely to impact at a greater degree on burnout than hospital organizations with a lesser number of beds. Further, these larger hospitals are more likely to have various critical care areas with patients of higher acuity. Two Ottawa hospitals, the Ottawa Civic and the Ottawa General, were chosen due to their geographic convenience and size. The Toronto Hospital was chosen for its size.

The determination of sample size addressed the large sample-theory demands associated with the analysis of covariance structures which provide the analytic strategy of this study (Boomsma, 1982; Fornell, 1983; Marsh, Balla & McDonald, 1988). Due to the necessity of the large sample

size, all full-time registered nurses employed as general staff at the three Ontario hospitals were considered for inclusion in the study. Packages of questionnaires were distributed to the general staff nurses on the wards. The nurses were asked to spend approximately 50 minutes and return the completed packages to the researcher within a two-week time frame, via hospital intramail, in the provided envelope which was addressed to the researcher. A follow-up letter was distributed as a reminder, three weeks after the initial contact.

The packages contained a demographic sheet with six questions; a series of questionnaires with 114 questions; and a covering document outlining the intent of the study, the option to participate, the completion procedures and a statement of anonymity and confidentiality of the responses. Because of the number of inventories in the package and the variety of likert-like scales and choices of responses, each of the pages and each new inventory in the package began with a bolded version of the current scale being completed. The completed packages were numbered upon receipt by the researcher in order to facilitate data entry and validity. Participants in the study were thus assured of confidentiality and anonymity.

A total of fifteen hundred questionnaire packages were distributed to the wards of three major hospitals in Ontario (The Toronto Hospital, The Ottawa Civic and The Ottawa General). Five hundred and sixty-seven of the packages were returned for a response rate of 37.8%.

Of the nurses in the sample, 15% were 20 to 29 years old, 45% were 30 to 39 years old, 28% were 40 to 49 years old, and 12% were over 50 years old. Twenty-seven percent were single, 2% single with children, 22% married, 37% married with children, 3% divorced, 8% divorced with children, and 1% were widowed. Of the overall sample of nurses, 3% had less than four years continued nursing experience, 48% had between five and twelve years, 26% had between 13 and 20 years, and 23% had over 20 years continued experience. Eleven percent worked only days, 2% worked only evenings, 4% worked only nights and 83% worked a combination of shifts, including 12-hour shifts. The nurses worked in various areas including 53% on medical-surgical units, 37% in critical care areas, 4% in oncology, 2% in clinic units and 4% in day units. Finally, 37% of the sample was obtained from Toronto and 63% from Ottawa. Results of the demographic survey are presented in Table 1, in a percentage format.

Method

Table 1

Results in Percentages of the Demographic Survey for the Full Sample of Nurses (N = 544).

Sex		Age (Years)				Marital Status (with Children)			
F	M	21-29	30-39	40-49	<49	Single	Mar.*	Div.*	Widow
94	6	15	45	28	12	27 (2)	22(38)	3(8)	1.0

Nursing Experience (Years)				Area	
1-4	5-12	13-20	<20	Medicine/Surgery	Critical Care
3	48	26	23	63	37

Shift				Hospital**		
Days	Evening	Nights	Combination	OCH	OGH	TTH
11	2	4	84	46	17	37

Notes: *Mar. = Married; Div. = Divorced.

**OCH is Ottawa Civic Hospital; OGH is the Ottawa General Hospital; and TTH is The Toronto Hospital.

Instrumentation

Collection of data involved the completion of a demographic sheet and several measurement instruments. The demographic sheet asked the respondents to identify their sex, marital status, age, length of nursing experience, area of work in the hospital and what kind of shift work they performed.

The package of several measurement instruments collected data as follows: **Burnout** was measured using the Maslach Burnout Inventory (MBI; Maslach & Jackson, 1986), which measures the three components of Burnout - Emotional Exhaustion, Depersonalization, and decreased Personal Accomplishment. Frequency of burnout symptoms are measured on a 7-point Likert-type scale such that high scores on the first two dimensions and low scores on the third dimension indicate Burnout. Reported subscale reliability coefficients estimated by Cronbach's coefficient alpha include 0.90 for Emotional Exhaustion, 0.79 for Depersonalization, and 0.76 for decreased Personal Accomplishment (Iwanicki & Schwab, 1981); 0.88, 0.75, and 0.77 respectively (Jackson et al., 1986); 0.90, 0.71 and 0.79 respectively (Constable & Russell, 1986); 0.90, 0.79, and 0.71 respectively (Maslach and Jackson, 1986); 0.86,

0.63, and 0.72 respectively (Powers & Gose, 1986); 0.82, 0.72, and 0.83 respectively (Wolpen, Burke & Greenglass, 1991); and an overall coefficient alpha of 0.72 (Stechmiller & Yarandi, 1993); and with nurses, Cronbach's alphas range from 0.75 to 0.91, and alphas from 0.65 to 0.87 (Hatcher & Spence Laschinger, 1996). Test-retest scores range from 0.53 to 0.82 (Maslach and Jackson, 1981); 0.60 to 0.82 (Maslach and Jackson, 1986); and from 0.65 to 0.87 (Hatcher & Spence Laschinger). In this present study, the Cronbach's alpha was 0.70.

External Locus of Control was measured using the Internal-External Locus of Control Scale (LCS; Rotter, 1966). The LCS is uses a 5-point Likert-type scale format. The LCS has been widely validated across a variety of populations (Lefcourt, 1976). Test-retest reliability for subscales has been reported as 0.65 to 0.79 (Rotter, 1966); and 0.81 (Tadmore and Hofman, 1985). Split-half reliability coefficients (Spearman-Brown) have been reported as 0.84 (Frost & Wilson, 1983). Alphas have been reported as 0.71 (Sheridan & Vredenburgh, 1978) and 0.81 (Luthans, Baack & Taylor, 1987). Cronbach's coefficient alphas have been reported as 0.77 (Goodman & Waters, 1987); and for nurses as 0.84, 0.85 and 0.88 (Dailey, Ickinger & Coote, 1986).

Kruder-Richardson Formula 20 for reliability has been reported as 0.72 (Bigoness, Keef & Du Bose, 1988). In this present study, the Cronbach's alpha was 0.55 for the overall scale, and 0.51 and 0.66 for the Internal and External scales respectively.

Job Satisfaction was measured using the Minnesota Satisfaction Questionnaire (MSQ; Dawis & Lofquist, 1983). The short form consists of 20 items measuring concepts that have been reported by nurses as important features of their worklife [i.e., Autonomy, Skill Utilization, Collegiality, Value, and Policies and Procedures (Attridge, 1996)]. The items are anchored in a 5-point Likert-type scale. Hoyt reliability coefficients for the 20 scales range from 0.97 to 0.59 (Dawis & Lofquist, 1983). Test-retest correlation coefficients range from 0.91 to 0.66 on the scales (Dawis & Lofquist, 1983). Cronbach's coefficient alphas have been reported as 0.91 and 0.92 (Klenke-hamel & Mathieu, 1990; Duxbury, Armstrong, Drew & Henly, 1984); 0.85 (supervision), 0.79 (pay), 0.72 (co-workers) and 0.72 (work) and an overall alpha of 0.87 (Chacko & Wong. 1984). Further alpha coefficients for the intrinsic scale and extrinsic scale are 0.73 and 0.81 respectively (Ivancevich, Matteson & Preston, 1982); and 0.86 and 0.81 respectively, with an overall

satisfaction of 0.90 (Jackson, 1983). In this present study, the Cronbach's alpha was 0.895.

Professional Identity was measured using the Job Involvement Scale (JI; Lodahl & Kejner, 1965). The short form consists of six items with a 4-point Likert-type scale such that a low score equates with high Professional Identity. The measure has been shown to have reliability and validity over a number of studies (Lodahl & Kejner, 1965; Rabinowitz & Hall, 1977; Rabinowitz, Hall & Goodale, 1977). The split-half correlations have been reported as 0.57 (Lodahl & Kejner, 1965), and 0.72 to 0.89 (Rabinowitz & Hall, 1977); correlation to the long form 20-item test was 0.87 (Lodahl & Kejner, 1965). The Spearman-Brown reliability has been reported as 0.73 (Lodahl & Kejner, 1965). Cronbach's coefficient alphas have been reported as 0.79 to 0.81 (Lodahl & Kejner, 1965); as 0.83 (Rose, 1969, cited in Rabinowitz & Hall, 1977); as 0.81 (Lawler, Hackman & Kaufman, 1973, cited in Rabinowitz & Hall, 1977); as 0.73 (Runyon, 1973, cited in Rabinowitz & Hall, 1977); as 0.65 (Baba & Jamal, 1991); and as 0.48 (Lance, 1991). Alphas have been reported as 0.81 (Siegel & Ruh, 1973); 0.79 (Gould & Werbel, 1983); and 0.59 (Huselid & Day, 1991). In this present study, the Cronbach's alpha was 0.70.

Method

Femininity was measured using the Australian Sex-Role Scale (ASRS; Antill, Cunningham, Russell & Thompson, 1981). The long Scale comprises 50 items on a 7-point Likert-type scale. Three items from each of the five scales (masculinity positive and negative, femininity positive and negative, and social desirability) were chosen randomly from this version. Cronbach's coefficient alphas for the scales range from 0.78 to 0.81 for the Masculine scale and 0.69 to 0.80 for the Feminine scale (Antill, Cunningham, Russell & Thompson, 1981); 0.67 and 0.78, 0.73 and 0.63 to 0.69 for the Masculine and Feminine Scales respectively (Marsh, 1987). In this present study, the Cronbach's alpha was 0.51 for the overall scale, and 0.42 and 0.47 for the Femininity and Masculinity scales respectively.

Self-esteem was measured using the Rosenberg Self-esteem Scale (SES: Rosenberg, 1965) The SES comprises 10 items using a 4-point Likert-type scale. Test-retest reliability of 0.62 and validity coefficients ranging from 0.56 to 0.79 have been reported (Byrne, 1983). In this present study, the Cronbach's alpha was 0.85.

Workload was measured using a subscale of the Michigan Organizational Assessment Questionnaire (MOAQ: Seashore, Lawler, Mirvis & Cammann, 1982). The MOAQ has a 5-point

Likert-type scale with a reported Cronbach alpha of 0.65. In this present study, the Cronbach's alpha was 0.73.

Role Ambiguity and **Role Conflict** was measured using the Role Questionnaire (RQ: Rizzo, House, & Lirtzman, 1970). The RQ has a 7-point Likert-type scale with low scores on the Role Ambiguity subscale indicating high Role Ambiguity and high scores on the Role Conflict subscale indicating high Role Conflict. Spearman-Brown internal reliability coefficients of 0.74 to 0.90 for Role Ambiguity and 0.81 to 0.94 for Role Conflict have been reported in samples of hospital employees (Seybolt & Pavett, 1979; Bedeian, Armenakis and Curran, 1980; Posner & Randolph, 1980; House, Schuler, & Levanoni, 1983; Kemery, Mossholder & Bedeian, 1987). Alphas have been reported as 0.71 for Role Conflict and 0.70 for Role Ambiguity (Brief & Aldag, 1976); 0.84 and 0.74 (Posner & Randolph, 1980) respectively; 0.89 and 0.79 (Bedeian et al., 1980; 1981) respectively; 0.78 and 0.79 (Bedeian et. al. 1983) respectively; and 0.85 and 0.81 (Kemery et al., 1987) respectively. Cronbach's coefficient alphas have been reported as 0.84 (Parasuraman, Drake & Zammuto, 1981) and 0.61 (Tetrick & LaRocco, 1987) for Role Conflict; 0.81 for Role Conflict and 0.77 for Role Ambiguity (Seybolt & Pavett, 1979); 0.84 for Role Conflict and 0.74

for Role Ambiguity (Randolph & Posner, 1981); 0.82 and 0.86 (Jackson, 1983) respectively; 0.82 and 0.77 (Ganster, Fusilier & Mayes, 1986) respectively; 0.55 and 0.60 (Lance, 1991) respectively; and for a nursing populations as 0.78, 0.83 and 0.84 for Role Conflict and 0.80, 0.83 and 0.86 for Role Ambiguity, (Dailey & Ickinger, 1986) and 0.76 for Role Conflict and 0.60 for Role Ambiguity (Baba & Jamal, 1991). In this present study, the Cronbach's alpha was 0.60 for the overall scale, and 0.83 and 0.82 for the Role Ambiguity and Role Conflict scales respectively.

Autonomy was measured using the questionnaire developed by Beehr (1976). The questionnaire has a 4-point Likert-type scale. Spearman-Brown internal reliability coefficient of 0.74 (Beehr, 1976) has been reported. In this present study, the Cronbach's alpha was 0.81.

Data Analysis

All analyses were conducted based on the analysis of covariance structures within the framework of structural equation modeling using the EQS computer program (Bentler, 1992). Structural equation models represent regression equations with less restrictive assumptions that allow measurement error in both the explanatory and dependent

variables to be evaluated. Full structural equation models extend (a) the factor analytic model by permitting the specification of both direct and indirect effects among variables, and (b) the path analytic model through its use of multiple indicators of the underlying latent constructs (Bollen, 1989).

Structural equation modeling involves (a) the postulation of an a priori model, (b) the fitting of this model to sample data, (c) the evaluation of parameter estimates, and (d) modification of the model to establish a valid representation of the postulated structure for the population of interest (Bentler, 1990). In structural equation modeling, the researcher postulates a model of relations among particular variables a priori, and then tests the goodness-of-fit of the model to the sample data. Given findings of poor fit, the researcher may proceed in conducting post-hoc model-fitting procedures. As such, the model is respecified to include a previously omitted variable. It is critical to note, however, that such inclusion must be meaningful and theoretically grounded.

Testing of postulated the model. A postulated model is grounded in theory and empirical research. In most instances the initial model does not fit the data adequately. This

initial misfit, detected in part by disturbance effects, represents a misspecified model. This misspecification can be a result of an inappropriate inclusion or exclusion of a particular variable, or it can result from a fundamentally-flawed hypothesized model (Bollen, 1989).

Model respecification can involve (1) theoretical and substantive revisions and (2) empirically based revisions. Respecification is accomplished statistically using goodness-of-fit indices.

Goodness-of-fit indices. An important aspect of the data analyses entails the goodness-of-fit criteria to be used in evaluating the adequacy of model fit. The evaluation of model fit requires the use of several goodness-of-fit indices. In the present study, the goodness of fit indices used included the chi-square statistic (χ^2), the Comparative Fit Index (CFI; Bentler, 1990), the Expected Cross-validation Index (ECVI; Browne & Cudeck, 1989) and the Parsimony Index (PCFI; Mulaik, James, Van Alstine, Bennet, Lind & Stilwell, 1989).

Traditionally, model fit has been based on the Chi-square statistic (Byrne, 1994). However, one major problem with the χ^2 statistic is that it is sensitive to sample

size; the larger the sample, the greater the likelihood that the model will be rejected. Given that structural equation modeling is grounded in large-sample theory, this sensitivity of the χ^2 statistic is highly problematic. In addressing this limitation, statisticians have developed alternate indices that more appropriately reflect the goodness-of-fit of data to the postulated model (for a review, see Marsh, Balla & McDonald, 1988). These indices are typically termed "practical" or "ad hoc" criteria of fit since they reflect the degrees of covariation in the data. In the present thesis, the χ^2 statistic was accompanied by these additional indices of fit as described below.

The CFI is a revised version of the Bentler-Bonett (1980) normed fit index that adjusts for degrees of freedom (Byrne, 1993; 1994). The CFI is derived from the comparison of a restricted model with a null model. The index ranges from zero to 1.00 and a psychometrically-acceptable fit to the data is a value greater than 0.90 (Byrne, 1993; 1994)

The ECVI is proposed as a means to assessing, in a single sample, the likelihood that the model cross-validates across similar-sized samples from the same population (Browne & Cudeck, 1989). Specifically, it measures the

discrepancy between the fitted covariance matrix in the analyzed sample, and the expected covariance matrix that would be obtained in another sample of equivalent size (Byrne, 1993; 1994). Application of the ECVI assumes a comparison of models whereby an ECVI index is computed for each model and then all ECVI values placed in rank order; the model having the smallest ECVI value exhibits the greatest potential for replication size (Byrne, 1993; 1994).

The PCFI (Mulaik et al., 1989) is calibrated from the CFI. This coefficient weights model parsimony against its use of the data in achieving goodness-of-fit (Byrne, 1994). The PCFI ranges between 0.00 and 1.00.

In this present study, analyses involved the testing of postulated models such that given evidence of misfit, post-hoc analyses were conducted to identify ill-fitting parameters. The models were then respecified and re-estimated in order to establish a theoretically-sound model structure for each of the models (i.e., the models for the overall sample of nurses, for general staff nurses and for the critical care nurses). The analyses included (a) testing the factorial validity of the measuring instruments using confirmatory factor analysis; (b) the formation of the measurement model; (c) the formation of the calibration and

validation samples in order to test for invariance across the two samples; (d) the formation of the structural component of the model; (e) the test for invariance across the calibration and validation samples as a means of cross-validation; (f) the formation of a model for general staff nurses; and (g) the formation of a model for critical care nurses. We turn first to a description of these stages in the analyses.

Testing the factorial validity of the measures. It is important to emphasize that before the validity of the postulated structural paths in the full model of the nomological network can be adequately tested, it is imperative to first establish that the measuring instruments are appropriately measuring their underlying latent constructs. Therefore, based on the full sample of nurses, confirmatory factor analysis (CFA) was used to test the factorial validity of the observed variables as they relate to each instrument. Given evidence of model misspecification, post-hoc analyses were conducted in order to establish a theoretically and substantively better-fitting measurement model.

These analyses included model respecification of additional paths identified by the Lagrange Multiplier Test

(LM) as those contributing most to a better-fitting model, in particular, some misspecified parameters, factor cross-loadings and correlated errors. The LM test examines hypotheses that bear on the statistical viability of specified restrictions in a model (Byrne, 1994). The basic purpose of the LM test is to determine if the specification of certain parameters, initially constrained to zero, would lead to a model that better fits the data if the parameter were to be freely estimated (Byrne, 1994).

Formation of measurement model. The **measurement model** depicts the links between the latent variables and their observed measures, in other words the confirmatory factor analysis model (Byrne, 1994). For each latent construct in the postulated model of Burnout structure (see Figure 1), items from the related measuring instrument were grouped to form multiple measurement indicators. The items were combined to take advantage of the correlated errors within each of the measuring instruments.

This process was conducted such that the relations between observed variables and unobserved (i.e., latent) hypothetical constructs were defined by the measurement model (Byrne, 1994). In other words, each latent construct was measured by two or more indicator variables that

represented the observed variables. A schematic summary of all the latent constructs, together with their related indicators variables, is shown in Figure 2.

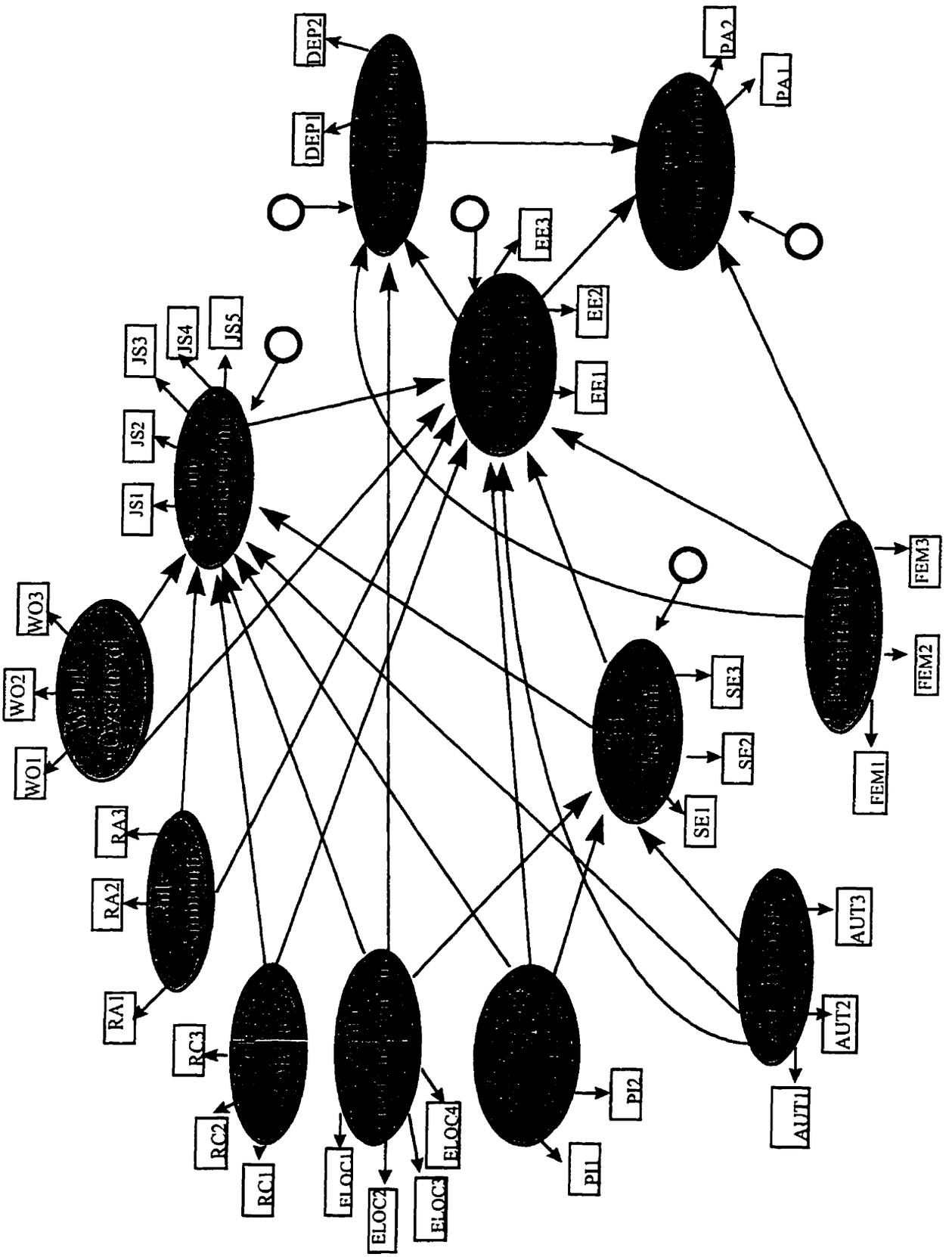

DEP2
DEP1
PA2
PA1
EE3
EE2
EE1
JS5
JS4
JS3
JS2
JS1
WO3
WO2
WO1
FEM3
FEM2
FEM1
SE3
SE2
SE1
RA3
RA2
RA1
AUT3
AUT2
AUT1
RC3
RC2
RC1
ELOC1
ELOC2
ELOC3
ELOC4
PI2
PI1

Figure 2

The indicator variables can be identified in Figure 2 by the rectangular boxes; as noted above, each represents a combination of observed item scores from a particular measuring instrument (please see Tables 6 through 9). The single-headed arrows leading from each factor to its respective box operate as regression paths that reflect the impact of the factor on its indicator set of item measurements. Finally, the single-headed arrow pointing to each indicator represents measurement error associated with the observed indicator variables. In the interest of clarity, the symbols that represent these errors [ε's] are not included in Figure 2.

Formation of the calibration and validation samples. The full sample of nurses was split into two samples for purposes of cross-validation[5]: (1) the nurses on day units, clinics and medical and surgical areas and (2) the nurses in such critical care areas as Intensive Care, Emergency, Post Anesthetic Care Unit, Coronary Intensive Care and Operating Rooms. Each of the two groups were then randomly split into two, and each half randomly assigned to either the calibration or the validation subsamples.

Formation of the structural model. Having determined a well-fitting measurement model, testing for the validity of

the postulated causal paths linking the constructs of interest (see Figures 1 and 2) followed next. The structural regression equations, termed "structural" paths, represent the regression of one latent construct upon another; in combination, they comprise the structural (as opposed to the measurement) portion of the structural equation model. In other words, this **structural model** defines the pattern of relations among the unobserved constructs. The arrows leading from one construct to another represent these structural paths. For example, Job Satisfaction impacts on Emotional Exhaustion. The hypothesized model (Figure 2) was tested to determine the extent to which it fit the calibration sample data.

Given findings of misspecification, the analyses including the LM test then proceeded in an exploratory, rather than a confirmatory mode, in order to detect areas of misfit in the model. Specifically, post-hoc procedures were conducted to establish the model fitting the data most appropriately, both statistically and theoretically. In a full model (i.e., with measurement and structural components), the LM statistic reports (a) misspecified paths (i.e., paths that are not specified but should be) and (b) misspecified covariances among disturbance terms (Byrne,

1994).

Once this model for the calibration sample was determined, nonsignificant parameters identified by the Wald test (W-Test) were eliminated. The Wald test determines whether sets of parameters specified as free in the model could be simultaneously set to zero without substantial loss in model fit. More specifically, this test takes the least significant parameter (i.e., the parameter with the smallest z statistic) and adds other parameters such that the overall multivariate test yields a set of free parameters that can be dropped from the model in future runs without significant loss in model fit (Bentler, 1989; Byrne, 1994).

Invariance across the calibration and validation samples. The final, best-fitting structure of Burnout determined from the calibration sample was then imposed on the validation sample to determine the adequacy of model fit to these data. Thus, each specified structural and measurement path was constrained as equal across calibration and validation subsamples and tested for their invariance across groups. Replicability was based on two criteria: (a) goodness-of-fit of the constrained model and (b) the probability level of the equality constraints (with $p<.05$ being untenable) as determined by the LM Test.

Method

Formation of the model for the general staff nurses. Given a validated model of Burnout for the overall sample of nurses, this nomological structure was then tested for the subsample of general staff nurses (i.e., nurses working in areas other than critical care) to determine the extent to which the model fits the data from this subgroup[6]. Given evidence of misfit in the model for general staff nurses, post-hoc analyses were conducted to identify ill-fitting parameters. The model was then respecified and re-estimated with a view to establishing a theoretically-sound model of Burnout structure for general staff nurses.

Formation of the model for the critical care nurses. Given a validated model of Burnout for the subsample of general staff nurses, this nomological structure was then tested for the subsample of critical care nurses to determine the extent to which the model fits the data from this smaller specialized group[7]. Given evidence of misfit in the model for critical care nurses, post-hoc analyses was conducted to identify ill-fitting parameters. The model was then respecified and re-estimated in order to establishing a theoretically-sound model of Burnout structure for critical care nurses.

Results of the aforementioned analyses will now be

presented. The data analyses will be presented in tabular form and will be described in the discussion section of the thesis.

Method

RESULTS

For the sake of clarity and for consistency with the stages of data analyses, results are now described in three phases: (1) the preliminary analyses, (2) the confirmatory factor analyses of the measuring instruments and (3) the testing of the models, consisting of the full model for the overall sample of nurses (including the cross-validation of this model), the full model for the general staff and the full model for the critical care nurses.

Preliminary analyses

The initial step in preliminary analyses involved data preparation. Initially the data was reviewed to determine cases with missing data. Sixteen cases with more than 5% missing data were eliminated (therefore $N = 551$). Regression analysis rather than mean imputation was utilized for the remaining cases with missing data (Bentler, 1992).

Because it is meaningful to know the extent to which the nurses in the sample reported levels of burnout compared to previous studies, the means and standard deviations of the three dimensions of Burnout, that is Emotional

Exhaustion, Depersonalization and Personal Accomplishment, were examined and compared to the Maslach healthcare sample (1986). These findings are summarized in Table 2.

Table 2

Summary of Means and Standard Deviations of the Three Dimensions of Burnout.

	Emotional Exhaustion		Depersonalization		Personal Accomplishment	
	M	SD	M	SD	M	SD
Maslach Healthcare Sample (Maslach & Jackson, 1986) (*N* = 1104)	22.19	9.53	7.12	5.22	36.53	7.34
Full Sample of Nurses (*N* = 544)	23.92	14.17	7.70	7.77	33.13	10.14
Subsample of General Staff (*N* = 340)	24.27	14.39	7.68	7.81	33.27	10.03
Subsample of Critical Care (*N* = 204)	23.02	13.66	7.76	7.73	33.07	10.19

Notes: **Emotional Exhaustion:** low is less than 19; average = 19-26; high is more than 26

Depersonalization: low is less than 6; average = 6-9; high is more than 9

Personal Accomplishment: low (higher Burnout) is less than 34; average = 34-39; high is more than 39

M = Mean; SD = standard deviation.

Confirmatory Factor Analyses

Confirmatory factor analyses were conducted for each measuring instruments to determine that, in fact, the instrument measured the construct in question and did so in accordance with its unidimensional/multidimensional structure. In the process of conducting these analyses, a total of seven cases having multivariate-outlier scores were identified; they therefore were removed from all subsequent analyses, thereby resulting in a final sample size of 544. Of these full-time registered nurses, 340 represented general staff and 204 represented critical care. Findings from the confirmatory factor analyses of the instruments measuring the personal variables are presented in Table 3 and those measuring the organizational variables in Table 4, respectively.

Table 3

Summary of Indices of Fit of the Measurement Instruments for Personal Variables

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Femininity							
Model 1	205.547	9		6	.402	.42	.6
Model 2	74.151	8	131.396	1	.799	.182	.533
Model 3	34.266	7	39.885	1	.917	.114	.467
Model 4	10.131	6	24.135	1	.987	.073	.4
Locus of Control							
Model 1	141.383	34		11	.832	.329	.778
Model 2	46.851	32	94.532	2	.977	.169	.711
Self-esteem							
Model 1	486.914	35			.773	.958	.778
Model 2	456.	35	30.914	0	.792	.906	.778
Model 3	103.138	32	352.862	3	.965	.272	.711

Table 3 cont'd

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Professional							
Identity							
Model 1	69.939	9			.907	.169	.6
Model 2	72.044	9	2.105	0	.909	.176	.6
Model 3	21.458	7	50.586	2	.979	.090	.467
Job Satisfaction							
Model 1	816.891	134			.803	1.619	.876
Model 2	360.477	130	456.414	4	.934	.801	.849
Burnout							
Model 1	972.26	206			.833	1.939	.892
Model 2	566.254	201	406.006	5	.921	1.220	.870
Model 3	533.066	199	33.188	2	.927	1.168	.867
Model 4	504.935	198	28.131	1	.933	1.119	.857

Notes: χ^2 is chi-square; *df* is the degrees of freedom; $\Delta\chi^2$ is the difference in chi-square; Δdf is the difference in degrees of freedom; CFI is the Comparative Fit Index; ECVI is the Expected Cross Validation Index; and the PCFI is the Parsimony Comparative Fit Index.

Results

Table 4

Summary of Indices of Fit of the Measurement Instruments for Organizational Variables

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Role Ambiguity and Conflict							
Model 1	376.129	76		15	.889	.789	.836
Model 2	377.68	76	1.551	0	.889	.794	.836
Model 3	325.827	73	51.853	3	.907	.709	.802
Model 4	206.918	70	118.909	3	.950	.505	.769
Workload							
Null					1.00		

Table 4 cont'd

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Autonomy							
Model 1	35.740	2		4	.957	.094	.333
Model 2	29.613	2	6.127	4	.965	.083	.333
Model 3	6.037	1	23.276	1	.994	.044	.167

Notes: χ^2 is chi-square; *df* is the degrees of freedom; $\Delta\chi^2$ is the difference in chi-square; Δdf is the difference in degrees of freedom; CFI is the Comparative Fit Index; ECVI is the Expected Cross Validation Index; and the PCFI is the Parsimony Comparative Fit Index.

The confirmatory factor analyses on the Workload measure indicated that the CFI was 1.00 with no degrees of freedom and it, therefore, constituted a just-identified model. In other words, the number of data variances and covariances equalled the number of parameters to be estimated. Given that a just-identified model has no degrees of freedom, the model cannot be rejected and therefore is of little scientific interest (Byrne, 1994). In structural equation modeling, only models that are over-identified can be adequately tested. Such a model is one in which the number of estimated parameters is less than the number of data points. This model provides for a number of degrees of freedom which allow for its possible rejection as a viable representation of the data.

The just-identified model for the Workload measure was considered in the full structural equation model. However, when the full model was submitted for computer analysis, convergence problems were encountered. One solution to the convergence problem involved an increase in the limit of iterations. In other words, the number of iterations was increased to over 60. However, the convergence problem remained.

A second possible solution to the convergence problem involved the just-identified model. In other words, the solution is to increase the number of degrees of freedom in the model for the Workload measure. In order to increase the number of degrees of freedom and thus change the model to an over-identified model, two of the indicators were constrained as equal. However, despite the different combinations of constrained and free parameters, the problem of convergence remained. Because of the convergence problems and the moderate correlations between this factor and such other factors as Role Ambiguity (.412), Role Conflict (.694) and Autonomy (-.47), it was decided to delete the factor from further analyses. For a complete picture of correlations among the proposed Burnout factors, see Table 5.

Table 5

Correlation between Factors

	FEM	ELOC	SE	RA	RC	PI	AUT	JS	EE	DEP	PA
FEM	1.000										
ELOC	-0.315	1.000									
SE	0.614	-0.669	1.000								
RA	-0.368	0.349	-0.483	1.000							
RC	-0.210	0.392	-0.369	0.537	1.000						
PI	0.175	-0.092	0.057	-0.208	-0.082	1.000					
AUT	0.270	-0.259	0.286	-0.604	-0.486	0.277	1.000				
JS	0.353	-0.300	0.437	-0.591	-0.579	0.413	0.841	1.000			
EE	-0.179	0.443	-0.403	0.470	0.509	-0.350	-0.514	-0.676	1.000		
DEP	-0.614	0.424	-0.484	0.417	0.438	-0.152	-0.316	-0.447	0.481	1.000	
PA	0.615	-0.341	0.414	-0.434	-0.196	0.412	0.569	0.516	-0.475	-0.480	1.000

Confirmatory factor analyses were performed on each of the measuring instruments to determine a fit to the data (see Tables 3 and 4). No further problems encountered with respect to confirmatory factor analyses of all other instruments. Once a well-fitting model for each of the instruments was established (range of CFI's = .933 to .994), the indicators were determined for the measurement model based on correlated errors and cross loadings within each factor. For example, because one set of correlated errors in the Self-esteem measure involved the errors with items 1 and 2 of the measure, one of the indicators for this construct (i.e., SE 1) was a combination of the two items. Summaries of the descriptive statistics related to each indicator variable, as it relates to the calibration, validation, general staff and critical care samples, are presented in Tables 6, 7, 8 and 9 respectively.

Table 6

Summary of Means, Standard Deviations, Skewness and Kurtosis of Indicator Variables for the Calibration Sample.

Item Combination	Indicator Variable	M	SD	SK	KU
FEM 1, 6	FEM1	5.745	0.952	-1.053	1.071
FEM 4, 10	FEM2	5.560	0.859	-0.460	-0.168
FEM 13, 14	FEM3	4.060	1.217	0.084	-0.407
LOC 3, 4, 13	ELOC1	2.579	0.804	0.211	-0.218
LOC 17, 20	ELOC2	2.513	0.958	0.296	-0.518
LOC 6, 19	ELOC3	3.358	0.866	-0.106	-0.293
LOC 10, 12, 15	ELOC4	2.648	0.737	0.200	-0.030
SE 1, 2, 9	SE1	3.504	0.489	-0.762	0.255
SE 3, 5, 6, 7	SE2	3.582	0.517	-1.472	2.209
SE 4, 8, 10	SE3	3.408	0.622	-0.805	0.002
RCA 1, 3	RA1	5.090	1.153	-0.518	0.025
RCA 2, 4	RA2	5.509	1.069	-0.531	-0.331
RCA 5, 6	RA3	5.485	1.245	-0.706	01.01
RCA 8, 13	RC1	3.288	1.557	0.444	-0.689

Table 6 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
RCA 7, 9, 14	RC2	3.446	1.381	0.230	-0.456
RCA 10, 11, 12	RC3	3.883	1.525	0.136	-0.749
WO 1	WO1	3.231	1.307	-0.304	-1.132
WO 2	WO2	2.599	1.305	0.323	-1.170
WO 3	WO3	3.165	1.311	-0.379	-1.152
PI 1, 2	PI1	3.050	0.663	-0.404	0.292
PI 3, 5	PI2	2.393	0.673	0.232	-0.122
PI 4, 6	PI3	3.121	0.647	-0.532	-0.004
AUT 1, 3	AUT1	2.545	0.774	-0.180	-0.467
AUT 2, 4	AUT2	2.811	0.779	-0.360	-0.537
JS 1, 3, 7, 9	JS1	3.951	0.525	-0.770	1.154
JS 2, 4, 11, 16	JS2	3.604	0.635	-0.672	1.158
JS 8, 10, 15, 20	JS3	3.626	0.630	-0.731	0.917
JS 5, 12, 14	JS4	2.793	0.854	-0.055	-0.572
JS 6, 13, 19	JS5	3.021	0.906	-0.245	-0.631
BI 1, 13, 14	EE1	3.086	1.349	0.154	-0.655
BI 3, 8, 20	EE2	2.418	1.450	0.476	-0.593

Table 6 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
BI 2, 6, 16	EE3	2.137	0.812	0.716	0.696
BI 5, 10, 15	DEP1	1.228	1.052	0.910	0.618
BI 11, 22	DEP2	1.901	1.349	0.578	-0.280
BI 4, 9, 17, 19	PA1	4.417	0.791	-0.153	-0.552
BI 7, 12, 18, 21	PA2	3.961	0.880	-0.353	0.131

Notes: M = Mean; SD = standard deviation; SK = skewness; KU = kurtosis.

FEM is from the Androgyny measure; LOC is from the Locus of Control measure; SE is from the Self-esteem measure; RCA is from the Role Conflict and Role Ambiguity measure; WO is from the Workload measure; PI is from the Professional Identity measure; JS is from the Job Satisfaction measure; and BI is from the Burnout measure.

Table 7

Summary of Means, Standard Deviations, Skewness and Kurtosis of The Indicator Variables of the Validation Sample.

Item Combination	Indicator Variable	M	SD	SK	KU
FEM 1, 6	FEM1	5.724	0.984	-1.022	1.281
FEM 4, 10	FEM2	5.483	0.972	-0.552	-0.053
FEM 13, 14	FEM3	4.340	1.346	-0.061	-0.461
LOC 3, 4, 13	ELOC1	2.606	0.740	0.060	-0.189
LOC 17, 20	ELOC2	2.555	0.938	0.371	-0.451
LOC 6, 19	ELOC3	3.353	0.896	-0.223	-0.338
LOC 10, 12, 15	ELOC4	2.692	0.721	0.255	0.010
SE 1, 2, 9	SE1	3.466	0.511	-0.593	-0.175
SE 3, 5, 6, 7	SE2	3.505	0.547	-1.154	0.687
SE 4, 8, 10	SE3	3.325	0.591	-0.463	-0.420
RCA 1, 3	RA1	5.268	1.086	-0.332	-0.496
RCA 2, 4	RA2	5.473	1.083	-0.484	-0.576
RCA 5, 6	RA3	5.512	1.197	-0.682	0.038
RCA 8, 13	RC1	3.327	1.512	0.436	-0.454

Table 7 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
RCA 7, 9, 14	RC2	3.621	1.413	0.313	-0.618
RCA 10, 11, 12	RC3	4.096	1.544	0.057	-0.717
WO 1	WO1	3.354	1.235	-0.400	-0.930
WO 2	WO2	2.610	1.191	0.356	-0.881
WO 3	WO3	2.924	1.336	0.075	-1.224
PI 1, 2	PI1	3.053	0.704	-0.462	-0.019
PI 3, 5	PI2	2.379	0.631	0.134	-0.105
PI 4, 6	PI3	3.169	0.602	-0.254	-0.556
AUT 1, 3	AUT1	2.410	0.805	-0.145	-0.882
AUT 2, 4	AUT2	2.708	0.798	-0.353	-0.418
JS 1, 3, 7, 9	JS1	3.873	0.561	-0.847	1.977
JS 2, 4, 11, 16	JS2	3.519	0.689	-0.525	0.572
JS 8, 10, 15, 20	JS3	3.579	0.680	-0.691	0.464
JS 5, 12, 14	JS4	2.740	0.900	-0.031	-0.612
JS 6, 13, 19	JS5	2.974	0.945	-0.214	-0.641
BI 1, 13, 14	EE1	3.123	1.230	0.196	-0.404
BI 3, 8, 20	EE2	2.474	1.392	0.543	-0.245

Table 7 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
BI 2, 6, 16	EE3	2.424	1.201	0.614	0.152
BI 5, 10, 15	DEP1	1.332	1.203	1.103	1.155
BI 11, 22	DEP2	1.968	1.488	0.622	-0.278
BI 4, 9, 17, 19	PA1	4.344	0.828	-0.408	-0.212
BI 7, 12, 18, 21	PA2	3.867	0.893	-0.242	-0.619

Notes: M = Mean; SD = standard deviation; SK = skewness; KU = kurtosis.

FEM is from the Androgyny measure; LOC is from the Locus of Control measure; SE is from the Self-esteem measure; RCA is from the Role Conflict and Role Ambiguity measure; WO is from the Workload measure; PI is from the Professional Identity measure; JS is from the Job Satisfaction measure; and BI is from the Burnout measure.

Table 8

Summary of Means, Standard Deviations, Skewness and Kurtosis of The Indicator Variables of the General Staff Sample.

Item Combination	Indicator Variable	M	SD	SK	KU
FEM 1, 6	FEM1	5.786	0.963	-1.067	1.231
FEM 4, 10	FEM2	5.549	0.941	-0.585	-0.005
FEM 13, 14	FEM3	4.182	1.267	0.059	-0.420
LOC 3, 4, 13	ELOC1	2.573	0.807	0.172	-0.200
LOC 17, 20	ELOC2	2.500	0.950	0.317	-0.616
LOC 6, 19	ELOC3	3.335	0.876	-0.194	-0.351
LOC 10, 12, 15	ELOC4	2.646	0.743	0.339	0.069
SE 1, 2, 9	SE1	3.472	0.520	-0.711	0.076
SE 3, 5, 6, 7	SE2	3.550	0.533	-1.323	1.423
SE 4, 8, 10	SE3	3.391	0.592	-0.638	-0.140
RCA 1, 3	RA1	5.165	1.143	-0.508	0.040
RCA 2, 4	RA2	5.430	1.107	-0.476	-0.560
RCA 5, 6	RA3	5.421	1.230	-0.616	-0.115
RCA 8, 13	RC1	3.399	1.519	0.297	-0.669

Table 8 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
RCA 7, 9, 14	RC2	3.568	1.326	0.268	-0.508
RCA 10, 11, 12	RC3	3.920	1.485	0.007	-0.670
WO 1	WO1	3.510	1.216	-0.577	-0.728
WO 2	WO2	2.753	1.247	0.174	-1.122
WO 3	WO3	3.194	1.321	-0.269	-1.194
PI 1, 2	PI1	3.079	0.687	-0.495	0.242
PI 3, 5	PI2	2.436	0.675	0.190	-0.230
PI 4, 6	PI3	3.135	0.642	-0.525	0.031
AUT 1, 3	AUT1	2.449	0.802	-0.113	-0.713
AUT 2, 4	AUT2	2.763	0.808	-0.322	-0.565
JS 1, 3, 7, 9	JS1	3.874	0.570	-0.871	1.767
JS 2, 4, 11, 16	JS2	3.563	0.705	-0.651	0.892
JS 8, 10, 15, 20	JS3	3.565	0.701	-0.754	0.609
JS 5, 12, 14	JS4	2.700	0.888	0.036	-0.519
JS 6, 13, 19	JS5	2.956	0.965	-0.152	-0.730
BI 1, 13, 14	EE1	3.197	1.339	0.147	-0.581

Table 8 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
BI 3, 8, 20	EE2	2.510	1.461	0.528	-0.417
BI 2, 6, 16	EE3	2.383	1.195	0.703	0.252
BI 5, 10, 15	DEP1	1.253	1.143	1.047	0.986
BI 11, 22	DEP2	1.959	1.457	0.589	-0.241
BI 4, 9, 17, 19	PA1	4.385	0.797	-0.318	-0.360
BI 7, 12, 18, 21	PA2	3.933	0.872	-0.335	-0.083

Notes: M = Mean; SD = standard deviation; SK = skewness; KU = kurtosis.

FEM is from the Androgyny measure; LOC is from the Locus of Control measure; SE is from the Self-esteem measure; RCA is from the Role Conflict and Role Ambiguity measure; WO is from the Workload measure; PI is from the Professional Identity measure; JS is from the Job Satisfaction measure; and BI is from the Burnout measure.

Table 9

Summary of Means, Standard Deviations, Skewness and Kurtosis of The Indicator Variables of the Critical Care Sample.

Item Combination	Indicator Variable	M	SD	SK	KU
FEM 1, 6	FEM1	5.650	0.970	-1.005	1.164
FEM 4, 10	FEM2	5.476	0.876	-0.445	-0.068
FEM 13, 13	FEM3	4.230	1.329	-0.011	-0.461
LOC 3, 4, 13	ELOC1	2.625	0.712	0.101	-0.294
LOC 17, 20	ELOC2	2.590	0.943	0.360	-0.263
LOC 6, 19	ELOC3	3.390	0.889	-0.129	-0.264
LOC 10, 12, 15	ELOC4	2.711	0.706	0.020	-0.101
SE 1, 2, 9	SE1	3.507	0.465	-0.552	-0.336
SE 3, 5, 6, 7	SE2	3.532	0.535	-1.271	1.230
SE 4, 8, 10	SE3	3.327	0.632	-0.606	-0.416
RCA 1, 3	RA1	5.203	1.090	-0.313	-0.579
RCA 2, 4	RA2	5.593	1.014	-0.525	-0.326
RCA 5, 6	RA3	5.627	1.197	-0.843	0.516
RCA 8, 13	RC1	3.154	1.550	0.685	-0.293

Table 9 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
RCA7, 9, 14	RC2	3.476	1.458	0.301	-0.555
RCA 10, 11, 12	RC3	4.105	1.617	0.181	-0.912
WO 1	WO1	2.930	1.283	-0.007	-1.174
WO 2	WO2	2.358	1.213	0..637	-0.647
WO 3	WO3	2.795	1.305	0..036	-1.251
PI 1, 2	PI1	3.005	0.677	-0.343	-0.025
PI 3, 5	PI2	2.302	0.605	0.094	0.031
PI 4, 6	PI3	3.162	0.596	-0.173	-0.819
AUT 1, 3	AUT1	2.525	0.774	-0.262	-0.598
AUT 2, 4	AUT2	2.754	0.761	-0.434	-0.284
JS 1, 3, 7, 9	JS1	3.978	0.488	-0.584	0.768
JS 2, 4, 11, 16	JS2	3.560	0.589	-0.444	0.170
JS 8, 10, 15, 20	JS3	3.670	0.567	-0.419	-0.120
JS 5, 12, 14	JS4	2.871	0.853	-0.159	-0.689
JS 6, 13, 19	JS5	3.064	0.854	-0.346	-0.471
BI 1, 13, 14	EE1	2.949	1.192	0.121	-0.582
BI 3, 8, 20	EE2	2.340	1.347	0.419	-0.598

Table 9 cont'd

Item Combination	Indicator Variable	M	SD	SK	KU
BI 2, 6, 16	EE3	2.218	0.847	0.596	1.158
BI 5, 10, 15	DEP1	1.325	1.111	1.061	1.265
BI 11, 22	DEP2	1.895	1.357	0.643	-0.299
BI 4, 9, 17, 19	PA1	4.374	0.853	-0.259	-0.303
BI 7, 12, 18, 21	PA2	3.882	0.913	-0.234	-0.524

Notes: M = Mean; SD = standard deviation; SK = skewness; KU = kurtosis.

FEM is from the Androgyny measure; LOC is from the Locus of Control measure; SE is from the Self-esteem measure; RCA is from the Role Conflict and Role Ambiguity measure; WO is from the Workload measure; PI is from the Professional Identity measure; JS is from the Job Satisfaction measure; and BI is from the Burnout measure.

The means of the skewness and kurtosis for the calibration, validation, general staff and critical care samples are presented in Table 10. The skewness and kurtosis levels were within acceptable range (Muethin & Kaplan, 1987).

Table 10

Summary of Means of Skewness and Kurtosis of the Indicator Variables of the Samples.

Sample	M of SK	M of KU
Calibration	-0.182	-0.086
Validation	-0.139	-0.184
General Staff Nurses	-0.184	-0.114
Critical Care Nurses	-0.114	-0.193

Notes: M = Mean; SD = standard deviation; SK = skewness; KU = kurtosis

We now turn to a review of the findings related to the full structural equation models. More specifically, we examine findings relative to the calibration and validation samples of nurses as a whole, and the separate samples of general staff nurses and critical care nurses.

The Model of Burnout for the Calibration Sample of Nurses

The hypothesized or initial model of Burnout for this calibration sample of nurses[8] yielded an inadequate fit to the data (CFI = .70). The LM-Test indicated that the addition of eight correlations between factors and seven paths, would lead to a significantly better fitting model. Based on an evaluation of the relations of these factors in the literature, and on which of the factors were substantively salient and important, the correlations between the constructs Role Conflict and Ambiguity, Autonomy and Role Ambiguity, Role Conflict and External Locus of Control, Role Ambiguity and External Locus of Control, Autonomy and Role Conflict, Role Ambiguity and External Locus of Control, and External Locus of Control and Femininity were added to the model. In addition, the structural paths leading from Femininity to Self-esteem, from Role Ambiguity to Self-esteem, from External Locus of

Control to Emotional Exhaustion, from Role Conflict to Depersonalization, from Role Conflict to Personal Accomplishment, from Professional Identity to Personal Accomplishment and from Autonomy to Personal Accomplishment were specified as parameters in Model 2. This respecified model resulted in a substantially better-fitting model (CFI = .910). Model 3 was respecified to include correlations between Autonomy and Professional Identity, Autonomy and Femininity and Professional Identity and Role Conflict and External Locus of Control (CFI = .914).

In order to assess the improvement in fit from one model to the next when the models are nested within one another (as in the present case), the difference in χ^2 values fit the competing models can be examined. This differential ($\Delta\chi^2$) is itself χ^2 distributed with degrees of freedom equal to the difference in degrees of freedom (Δdf), and can be tested for significance. A significant $\Delta\chi^2$ demonstrates a substantial improvement in fit. As indicated in Table 11, the addition of these correlations and paths yielded a significantly improved and adequately fitting model ($\Delta\chi^2_{(5)} = 213.692, p<.001$; CFI = .914).

Table 11

Summary of the Goodness-of-fit Indices of the Model for the Calibration Sample.

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Model 1	1001.947	464			.859	3.918	.879
Model 2	805.055	461	196.892	3	.910	3.672	.873
Model 3	788.255	459	16.8	2	.914	3.625	.869
Model 4	798.051	464	9.796	5	.912	3.661	.879

Notes: χ^2 is chi-square; *df* is the degrees of freedom; $\Delta\chi^2$ is the difference in chi-square; Δdf is the difference in degrees of freedom; CFI is the Comparative Fit Index; ECVI is the Expected Cross Validation Index; and the PCFI is the Parsimony Comparative Fit Index.

In Model 4, the application of the W-Test identified thirteen nonsignificant causal paths, that is Professional Identity to Self-esteem, Autonomy to Self-esteem, External Locus of Control to Job Satisfaction, Role Ambiguity to Job Satisfaction, Femininity to Emotional Exhaustion, Self-esteem to Emotional Exhaustion, Role Ambiguity to Emotional Exhaustion, Role Conflict to Emotional Exhaustion, Professional Identity to Emotional Exhaustion, Autonomy to Emotional Exhaustion, External Locus of Control to Depersonalization, Femininity to Personal Accomplishment, and Emotional Exhaustion to Personal Accomplishment. These paths were eliminated from the model resulting in a final CFI of .912. As identified by the W-Test, the removal of these correlations and paths resulted in a model in which the $\Delta\chi^2$ between Model 3 and Model 4 was not significant ($\Delta\chi^2_{(5)} = 9.796$). As compared with previously-tested models, the resulting model of the calibration sample of nurses ($Model_{cal}$) was more parsimonious and most likely to be able to be replicated (ECVI = 3.661; PCFI = .879). The ECVI was higher than in previous models as a result of minor degradation in fit (in the interests of parsimony). $Model_{cal}$ is presented diagrammatically in Figure 3.

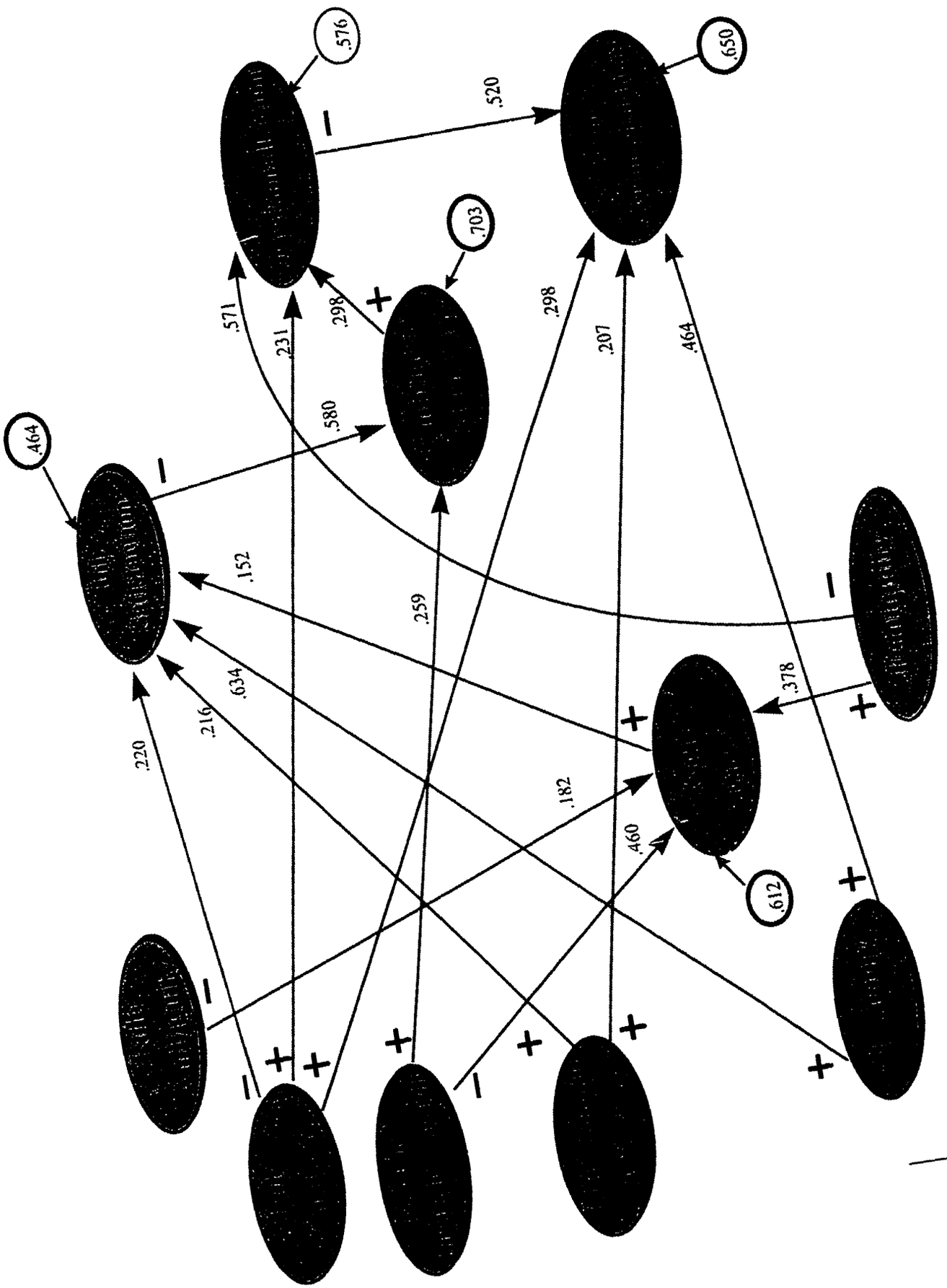

.576
.650
.520
.703
.571
.231
.298
.580
.298
.207
.464
.464
.152
.259
.634
.216
.220
.182
.460
.378
.612

Figure 3

All values reported in the figure represent standardized estimates. Those associated with each of the paths represent regression coefficients, whereas those in the small circles represent error in the prediction of related constructs from antecedent variables. All but one of the associated signs, (i.e., Role Conflict to Personal Accomplishment), were in the expected direction.

For purposes of cross validation, $Model_{cal}$ was tested for its replication across the validation sample. As such, all freely-estimated factor loadings and structural paths were constrained equal across the calibration and validation samples, and then tested statistically. This test of invariance represented an extremely rigorous test of cross-validation (see Bollen, 1989).

The LM-Test on this highly restrictive model (CFI = .894) identified three constraints in the measurement model to be untenable; these three factor loadings were (a) one indicator of the External Locus of Control factor, and (b) the second and third indicators of the Emotional Exhaustion factor. As Bollen (1994) has noted, the best fit of data is usually from the calibration sample and that it is possible that the fit of the validation sample may not be as good, thus leading to the necessity of freeing constraints.

Results

Bollen (1989) has asserted that if the focus in testing for the invariance across groups (e.g., calibration and validation samples), is directed more to the equality of structural rather than measurement parameters, then the testing of invariance of the structural parameters may precede the testing of invariance of the measurement parameters. Therefore, in this study, a further test of invariance was conducted such that only structural paths and factor correlations were constrained as equal. Results yielded a finding of total equivalency across the calibration and validation samples. The resulting model was considered to represent an adequate fit to the data (CFI = .91). Results are presented in Table 12.

Table 12

Summary of the Goodness-of-fit Indices Relating to Tests for Invariance Across Calibration and Validation Groups.

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Model 1	1806.518	978			.894	7.316	.926
Model 2	1672.324	955	134.194	23	.908	7.012	.904

Notes: Model 1 has the all measurement and structural parameters constrained as equal. Model 2 has all structural parameters constrained as equal.

χ^2 is chi-square; *df* is the degrees of freedom; $\Delta\chi^2$ is the difference in chi-square; Δdf is the difference in degrees of freedom; CFI is the Comparative Fit Index; ECVI is the Expected Cross Validation Index; and the PCFI is the Parsimony Comparative Fit Index.

The Model of Burnout for General Staff Nurses

The final model for the sample of nurses ($Model_{cal}$) was imposed the subsample of general staff nurses and yielded an inadequate goodness-of-fit to the data (CFI = .871). The LM-Test indicated that the addition of one correlation between factors and four paths, would lead to a significantly better fitting model. Consequently, based on an evaluation of the relations of these factors in the literature, and on which of the factors were substantively salient and important, Model 2 was respecified to include the correlation between Professional Identity and Femininity and to include four further causal paths leading from Role Conflict to Emotional Exhaustion, from Professional Identity to Emotional Exhaustion, External Locus of Control to Depersonalization, and from Role Ambiguity to Depersonalization. As indicated in Table 13, the addition of this correlation and these paths yielded a significantly improved and adequately fitting model ($\Delta\chi^2_{(3)} = 155.9, p<.001$; CFI = .918).

Table 13

Summary of the Goodness-of-fit Indices of the Model for the General Staff Samples.

	χ^2	*df*	$\Delta\chi^2$	Δdf	CFI	ECVI	PCFI
Model 1	1037.274	468			.888	3.608	.886
Model 2	881.374	465	155.9	3	.918	3.166	.881
Model 3	883.856	466	2.482	1	.918	3.149	.883

Notes: χ^2 is chi-square; *df* is the degrees of freedom; $\Delta\chi^2$ is the difference in chi-square; Δdf is the difference in degrees of freedom; CFI is the Comparative Fit Index; ECVI is the Expected Cross Validation Index; and the PCFI is the Parsimony Comparative Fit Index.

In Model 3, the application of the W-Test identified five nonsignificant factor correlations and two nonsignificant causal paths. The correlations were between Role Ambiguity and External Locus of Control, Autonomy and External Locus of Control, External Locus of Control and Femininity, Autonomy and Femininity, and between Professional Identity and Role Conflict. The paths included Role Conflict to Depersonalization and Role Conflict to Personal Accomplishment. These correlations and paths were eliminated (CFI = .918). As identified by the W-Test, the removal of these correlations and paths resulted in a model in which the $\Delta\chi^2$ between Model 2 and Model 3 was not significant ($\Delta\chi^2_{(4)} = 2.42$). Ccmpared with the previously-tested models, the resulting model, $Model_{gen}$ was more parsimonious and most likely to be able to be replicated (ECVI = 3.149; PCFI = .883). $Model_{gen}$ is presented diagrammatically in Figure 4.

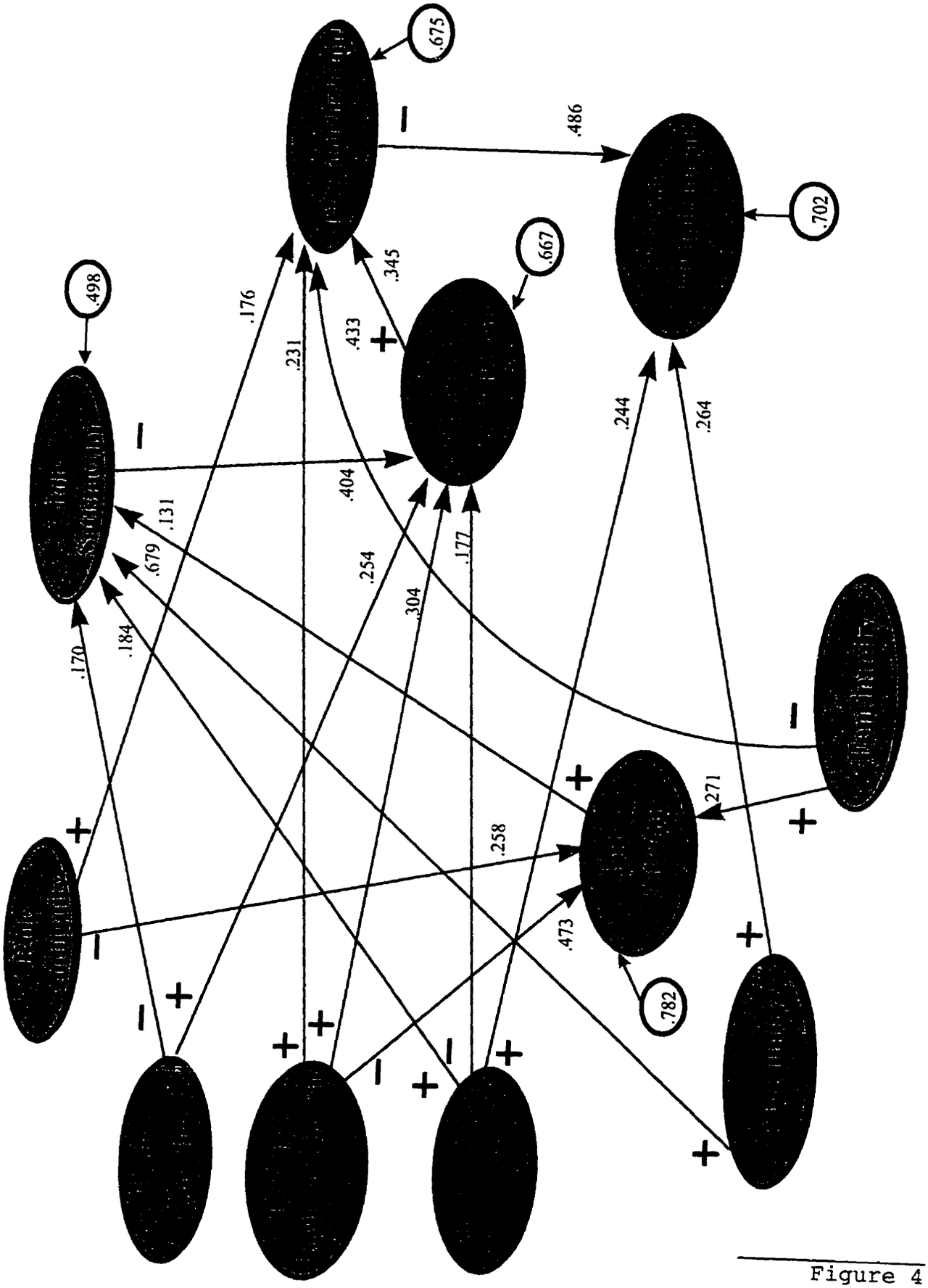

.675
.486
.702
.667
.498
.345
.176
.231
.433
.244
.264
.404
.131
.679
.254
.304
.177
.184
.170
.271
.258
.473
.782

Figure 4

Once again, estimates associated with each of the paths represent standardized coefficients: those associated with paths represent those in the small circles represent error in the prediction of related constructs from antecedent variables. All of the associated signs were in the expected direction.

The Model of Burnout for Critical Care Nurses

An initial model derived from the model of general staff nurses yielded an inadequate goodness-of-fit to the data (CFI = .862). The LM-Test indicated that the addition of two correlations between factors, would lead to a significantly better fitting model. Based on an evaluation of the relations of these factors in the literature, and on which of the factors were substantively salient and important, Model 2 was respecified to include two correlations between the factors Autonomy and External Locus of Control, and External Locus of Control and Femininity (CFI = .899). A further LM-Test indicated that the addition of six paths, would lead to a significantly better fitting model. In Model 3 six causal paths were added, that is leading from Job Satisfaction to Self-esteem, Femininity to Emotional Exhaustion, Autonomy to Emotional Exhaustion,

Depersonalization to Emotional Exhaustion, Personal Accomplishment to Depersonalization and Role Conflict to Personal Accomplishment. As indicated in Table 14, the addition of these correlations and paths yielded a significantly improved and adequately fitting model ($\Delta\chi^2_{(5)}$ = 27.424, p<.001; CFI = .902).