

The Association between Executive Functioning Skills and Spousal Attributions: An Investigation of Younger and Older Samples

by

Jenna Dawson

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Examining Committee Membership

The following served on the Examining Committee for this thesis. The decision of the Examining Committee is by majority vote.

External Examiner

Justin Cavallo, Ph.D.
Associate Professor
Department of Psychology
Faculty of Science
Wilfred Laurier University

Supervisor

Uzma Rehman, Ph.D.
Associate Professor
Department of Psychology
Faculty of Arts
University of Waterloo

Internal Member

Elizabeth Nilsen, Ph.D.
Professor
Department of Psychology
Faculty of Arts
University of Waterloo

Internal Member

Jonathan Oakman, Ph.D.
Associate Professor
Department of Psychology
Faculty of Arts
University of Waterloo

Internal-External Member

Steven E. Mock, Ph.D.
Associate Professor
Department of Recreation and Leisure Studies
Faculty of Health
University of Waterloo

Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Abstract

Marriage in older age has been shown to provide important benefits such as increased emotional support, increased affective positivity and decreased health concerns (Stinnett et al., 1972; Erikson et al., 1986; Parron, 1982). While relationship satisfaction has been shown to increase in later years (Carstensen et al., 1996), there is variability in relationship satisfaction levels in the marriages of older individuals (Carstensen et al., 1995). In the current study, I focused on how individuals construe the meaning of their partner's negative behaviour and investigated how such attributions, a key relationship process, change as a function of age. An attribution is the process by which individuals explain the causes of a behaviour or event. Individuals make attributions in order to create a more stable, predictable world (Heider, 1958; Kelley, 1972; Miller et al., 1978). To address my goal, I included a sample of younger individuals (ages 18-35 years, N=63) and a sample of older individuals (60 years and older, N=69). The second goal of the current study was to examine how declines in executive functioning skills, that occur as part of normative aging, influence the types of attributions that individuals make about their partner's behaviours. I compared predictions offered by two important and influential theories of aging, Socioemotional Selectivity theory and the Frontal Aging hypothesis. Socioemotional Selectivity theory posits that as mortality becomes more salient, one's motivation shifts to maximizing emotional well-being (Carstensen, 2006; Carstensen et al., 1999; Mather & Knight, 2006). As a result, older adults are able to employ cognitive strategies to improve emotion regulation because they are more focused on emotional goals. Paradoxically, the Frontal Aging hypothesis has established that executive functioning systems decline with age (Dempster, 1992). Research on executive functioning suggests declines should also be associated with less flexibility and more negative attributions (Gross & John,

1998). To test these theories, I ran multiple regression analyses to test the main effects of relationship satisfaction, executive functioning skills, and age on each of the attribution variables. In addition to the main effects models, I conducted a multiple moderation analyses for each outcome variable. Specifically, I included the two-way interaction between executive functioning and age, as well as the two-way interaction between executive functioning and relationship satisfaction. Overall, the study findings provided greater support for Socioemotional Selectivity theory, as older adults tended to provide less negative attributions for their partner's undesirable behaviours. Further, the study findings showed that older individuals with weaker executive functioning skills tend to make more positive attributions for their partner's behaviour when they have high levels of relationship satisfaction. Therefore, while I found that executive functioning does decline with age, in line with the Frontal Aging hypothesis, the consequences of those declines on relationship attributions are protected by other mechanisms that come 'online' when older individuals are satisfied within their relationships.

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General Introduction

Meagan walks into the kitchen to see dirty dishes strewn across the counter, the milk carton left opened, and a trail of jam across the counter. She realizes that the mess is from her partner's breakfast earlier in the morning. She sighs with exasperation and begins to clean up the mess.

There are a number of ways that Meagan could respond to this scenario and how she could make sense of her partner's behaviour. She might wonder if her partner had been in a rush to get to an appointment and left the things on the counter. Alternatively, if the behaviour is frequent, she may feel a familiar frustration that her partner is not considerate of her wishes. If there has been a recent stressor in her partner's life, she may dismiss the behaviour as uncharacteristic of him and reflective of the stress he is experiencing. Just as there are a number of explanations that Meagan can make for her partner's behaviour, there are a number of factors that influence the types of attributions she makes for her partner's behaviour, including her overall satisfaction in the relationship (Fincham & Bradbury, 1987), her general level of well-being (Forgas & George, 2001), her current mood (Forgas & Locke, 2005), as well as qualities about the incident (how frequently it has occurred in the past; how often they have talked about it in the past; and how such conversations have unfolded, Knight & Vallacher, 1981).

An attribution is the process by which individuals explain the causes of a behaviour or event. Individuals make attributions in order to create a more stable, predictable world (Heider, 1958; Kelley, 1972; Miller et al., 1978). Influential theories of romantic relationship functioning (Graham & Conoley, 2006) highlight the role of attributional activity in causing relationship distress and view attributions as a core process involved in treating such relationship distress (Bradbury & Fincham, 1990). Thus, the attributions that individuals make for their partner's behaviour is an extensively studied relationship process. For example, relationship researchers

have comprehensively examined the types of attributions that individuals make for their partner's behaviours, the factors that influence which attribution an individual will make, and how the attribution influences subsequent thoughts, feelings, and behaviour toward the partner (McNulty & Karney, 2001, Lavee et al., 1987). The overarching goal of my dissertation research was to contribute to the literature on relationship attributions by investigating the role of executive functioning skills on how individuals make sense of their partner's negative behaviours. Specifically, I examined: (1) how executive functioning skills influence the types of attributions that an individual makes for problematic/negative relationship events, and (2) compared the association between executive functioning and relationship attributions in younger versus older adults. I focused on executive functioning skills as these skills are involved in higher level cognitive tasks, (Lezak, 1995; Salthouse, 2005) essential to the completion of many important daily responsibilities (Barkley, 2012), and central to maintaining interpersonal relationships (von Hippel & Gonsalkorale, 2005). Executive functioning skills have also been found to decline over one's lifespan (Phillips & Henry, 2008). Therefore, investigating how age-related declines in executive functioning impact key relationship processes (i.e., the causes an individual makes for her/his partner's behaviours) is of theoretical and practical interest.

I investigated the role of executive functioning in relationship attributions in a non-clinical sample of typically aging individuals. I recruited two age groups: the younger group consisted of individuals between the ages of 18 and 35 and the older group of individuals aged 60 and over. Before I review the specific goals and hypotheses of the study, I would like to discuss why I focused on relationships of older couples, the importance of investigating relationship processes in normative (nonclinical) samples, how executive functioning skills change with age, and the influence of executive functioning skills on interpersonal relationships.

Further, I will describe two important theoretical perspectives (Frontal Aging Hypothesis and Socioemotional Selectivity Theory) that guide the current research and offer differing perspectives on how aging would be associated with interpersonal processes, such as attributions. Through this research, I hope to clarify which of these theories is more consistent with the observed associations between age, executive functioning, and interpersonal attributions.

As individuals grow older, their social circles grow smaller, and their marriage often becomes the most intimate and enduring of all close relationships (Katz, 2001). Marriage in older age has been shown to provide important benefits such as increased emotional support, increased affective positivity and decreased health concerns (Stinnett et al., 1972; Erikson et al., 1986; Parron, 1982). While marriage itself has been shown to serve as a protective factor, a longitudinal study by Hawkins and Booth (2005) found that the quality of one's marriage is an important element when considering the interaction between marital status and well-being. While relationship satisfaction has been shown to increase in later years (Carstensen, et al., 1996), there is variability in relationship satisfaction levels in the marriages of older individuals (Carstensen, et al., 1995). Given the aging population and the centrality of marriage in older individuals' well-being and life satisfaction (e.g., Erikson et al., 1986; Parron, 1982), understanding the factors that contribute to successful marital relationships in older age is progressively more important.

I now describe two different perspectives on how older adults may interpret their partner's behaviour differently than younger adults. These two perspectives are Socioemotional Selectivity Theory and the Frontal Aging Hypothesis. I will begin by discussing Socioemotional Selectivity Theory and outlining the key tenets of the theory and its empirical status.

Socioemotional Selectivity Theory

Research has found that as individuals age, there is a tendency for their social relationships to increase in positivity and decrease in negativity (Andrews & Withey, 1976; Campbell et al., 1976; Hansson et al., 1990; Smith & Goodnow, 1999). One explanation for this shift is the Socioemotional Selectivity theory. This theory proposes that as individuals age, the possibility of mortality becomes more salient and therefore one's motivation shifts to maximizing emotional well-being (Carstensen, 2006; Carstensen et al., 1999; Mather & Knight, 2006). Within the Socioemotional Selectivity theory, it is posited that maturity, familiarity, and contact frequency all impact one's increased positivity in social relationships. Each of these key mechanisms is discussed in greater detail below.

The first explanation that Socioemotional Selectivity Theory offers for the increased positivity and decreased negativity of older age is maturity. The theory conceptualizes maturity in terms of emotional control; for this reason, I focus on research that has investigated how emotional processing changes with age (Carstensen et al., 1995; Charles, Reynolds, & Gatz, 2001; Diehl et al., 1996). Diehl and colleagues (1996) examined emotional control among people from 10 to 70 years of age and found that older people used more impulse control and had a tendency to positively appraise conflict situations, whereas younger people were more likely to be outwardly aggressive and less likely to use impulse control. In line with this, older adults employ cognitive strategies to improve emotion regulation because they are more focused on emotional goals (Mather & Carstensen, 2005). Older adults, more so than younger adults, were able to use their emotional control and show attentional bias towards more positive information. For example, in a dot-probe task, older adults were slower to indicate which side the dots were on when they appeared behind negative faces than behind neutral faces, and faster when they

appeared behind positive faces than neutral faces. By contrast, younger adults did not show any attentional biases for the faces (Mather & Carstensen, 2005). In another study conducted by Mather and colleagues (2005), participants were given a chart with consumer information and asked what choice they would make between two products. As compared to younger adults, older adults spent a larger proportion of their time reviewing the positive features and a smaller proportion of their time reviewing the negative features.

It has also been found that age strengthens the ability to distance oneself from stressful situations and reassess them positively (Folkman et al., 1987; Schryer & Ross, 2012). Folkman et al. (1987) found that younger people used more active, interpersonal, problem-focused forms of coping (e.g., confrontive coping, seeking social support, planful problem solving), whereas older people used more passive, intrapersonal emotion-focused forms of coping (e.g., distancing, acceptance of responsibility, and positive reappraisal). Younger people appraised their situations as more changeable than older people and therefore used more problem-focused strategies. Older people however, appraised their situations as less changeable, and therefore used more emotion-focused strategies. Further, Schryer and Ross (2012) found that older adults tend to accentuate the positives when evaluating past events. Consistent with Socioemotional Selectivity Theory, older adults experience fewer negative emotions than younger adults do (Gross et al., 1997) and therefore Schryer and Ross (2012) posited that this heightened positive mood could contribute to more positive evaluations of past events. When dealing with an upsetting interpersonal situation, older adults report being less likely to engage in destructive behavioral responses such as shouting or name calling (Birditt & Fingerman, 2005). In another study, participants' moods were sampled over the course of a week. When participants experienced a negative mood, it was less likely to persist to the next sampling occasion among older adults than younger adults,

suggesting that older adults are able to dissipate negative affect more effectively than younger adults (Carstensen et al. 2000).

The second explanation suggests that familiarity with their partner increases positivity in their relationship. That is, older people are more likely to have known these close relations (e.g., spouse) longer than younger people, and therefore are more familiar with them, know them better, and have learned to anticipate and successfully cope with problems that have arisen in their relationship over the years (Carstensen et al.,1999). Drawing from the social cognitive perspective, it may be that older adults hold relational schemas that allow them to anticipate and manage conflict in their close, long-term relationships. Relational schemas are defined as beliefs and expectations of self and others, which guide subsequent behaviours (Baldwin, 1992). Within relationships, schemas lead individuals to interpret ambiguous information in a way consistent with their expectations, fill in gaps in information with expected values, and to preferentially recall information that is consistent with, or highly relevant to that specific schema (Baldwin, 1992). Further, individuals can become accustomed to specific negative aspects of their relationships and no longer be upset by them or perceive them as problematic. As such, with increased familiarity and predictability, older individuals have been able to establish well defined relational scripts that allow them to anticipate actions and reactions of significant others and use heuristics to interpret those events. This familiarity allows older individuals to develop more successful coping strategies when presented with problems that have more frequently arisen over the years (Carstensen et al.,1999).

The third explanation for increased positivity in older adults' relationships is that negative interactions are a function of the frequency of contacts; that is, greater number of contacts or individuals to interact with, the more conflicts and frustrations they tend to

experience. In general, evidence indicates that frequency of contact with social network members declines with age (Carstensen, 1992; Carstensen et al., 1995; Fredrickson & Carstensen, 1990). As people age, they disband relationships that are bothersome and have less contact with problematic social partners. Less frequent contact may allow individuals to use constructive strategies rather than destructive strategies because they have time to “cool off” between encounters (Akiyama et al., 2003). However, because older individuals have smaller social networks, Socioemotional Selectivity theory suggests that they are likely to be more invested in the social ties they do have and may have better quality relations than younger adults (Carstensen et al., 1999). Based on this frequency theory, you could posit that older adults may have less frequent contacts with problematic partners, and therefore less opportunity for negative interactions, and more investment in their existing marital and romantic relationship. Rusbult and colleagues (1998) found that people who report that they are highly invested in relationships are less likely to report using destructive strategies.

Given that social circles become smaller and marriage becomes such a significant relationship in older age, understanding how one manages tension within their marital relationship is important. While relationship satisfaction has been shown to increase in later years, there is variability in relationship satisfaction levels in the marriages of older individuals (Carstensen et al., 1995). The findings for higher relationship quality for older adults appear to be inconsistent with what we would expect based on changes in executive functioning that occur as part of the normative aging process. While it has been found that individuals may be able to implement executive functioning strategies and increased emotion regulation when dealing with social problems, there is also considerable research demonstrating that executive functioning decline is part of the normal aging process. These age-related declines impact one’s memory,

one's ability to inhibit prepotent responses, and one's ability to shift their attention. While there is much research looking at how executive functioning facilitates positive social functioning early in development (Waller et.al, 2017, McQuade et. al, 2013), a relatively unexplored issue is how individual differences in these normative age-related changes impact the self and others. More specifically, individual differences in executive functioning skills may influence how individuals construe and make sense of negative relationship events, that is, the attributions one makes for their partner's behaviour.

Executive Functioning

Cognition subsumes a wide variety of specific skills, including executive functioning skills. Executive function skills are the mental processes that enable us to plan, focus attention, remember instructions, and juggle multiple tasks successfully (Baddeley, 1981). It has been found that many cognitive skills decline with age; however, the magnitude and direction of these changes vary across cognitive domains such that some skills are more vulnerable to the effects of aging than others (Morse, 1998). For example, vocabulary and general knowledge continue to improve into one's sixties and remain fairly stable thereafter (Schaie, 1994), whereas declines in memory tend to become apparent in one's sixties (Giambra et al., 1995) and speed of information processing begins to decline as early as the third decade of life (Salthouse, 1996).

There are several theories that attempt to explain causal mechanisms that contribute to age related declines in cognition (Lyon et al., 1996). One theory is the Frontal Aging hypothesis (Dempster, 1992; West, 1996, 2000). This theory focuses specifically on age-related changes in the frontal lobes and concurrent changes in executive functioning. Executive functioning is widely regarded as a set of inter-related skills that promote purposeful behaviours (Lezak, 1994). While there are variations in the definition of executive functioning, as well as core components,

three skills are thought to be central to the executive construct (Miyake et al., 2000). These skills include inhibition, which is the ability to voluntarily control behaviour that conflicts with an automatic and prepotent response (MacLeod, 1991; McDowd et al., 1995), shifting, which is the ability to shift attention back and forth between multiple tasks, operations or mental sets (Rogers & Monsell, 1995), and working memory, which is the ability to maintain and manipulate information in mind for a short period of time (Baddeley, 1981; Conway et al., 2003). These skills are central to theories of executive functioning (Lyon & Krasnegor, 1996). These skills are supported by distinct, though overlapping neural networks, in which prefrontal brain regions play a particularly important role (Aron et al., 2004; Cohen et al., 1994) and are considered to be the building blocks of more complex executive tasks and other aspects of cognition (Miyake et al., 2000). That is, an important underlying aspect of working memory, shifting, and inhibition, is they all involve focusing the attention on relevant information, while inhibiting irrelevant ones (Cohen et al., 1990; MacLeod, 1991). For example, within inhibition tasks, individuals are required to inhibit an automatic, dominant response in addition to focusing their attention on a weaker, but relevant process (Smith & Jonides, 1999). Further, task switching also involves attention and inhibition processes, because it requires switching the focused attention from one task set to the other while inhibiting the irrelevant task set (Dove et al., 2000). Finally, updating also involves attention and inhibition aspects. Although updating is often thought to concern the storage of information in working memory, it has been argued that updating is mainly about using attention to maintain or suppress information (Barrett et al., 2004; Engle, 2002). Also, differences in working memory capacity predict whether individuals are able to buffer their focused attention from distracting events or information (Barrett et al., 2004; Hofmann et al.,

2008). Therefore, these components of executive functioning are unified by attention and inhibition processes.

The Frontal Aging hypothesis posits that as individuals grow older, they experience a weakening in their frontal lobes which form part of the neural system that supports executive skills. Research has established that the frontal lobe is one of the last regions within the brain to develop and is one of the first brain regions to show signs of deterioration in later life (Dempster, 1992). In particular, aging has been shown to correlate with decreases in the size, volume, and density of cells within the frontal lobe (Uemura & Hartman, 1978). This deterioration results in a decline in brain weight and cortical thickness in the frontal region (Haug et al., 1981). Changes in the frontal lobes are more susceptible to age-related changes than the posterior regions of the brain that are thought to be associated with other cognitive skills (Shaw et al., 1984). For example, the degree of reduction in the temporal, parietal, and occipital regions of the brain has been estimated to be approximately 1%, compared with volume reduction in the frontal cortex estimated to be 10%-17% (Haug et al., 1983; Haug & Eggers, 1991). As such, the Frontal Aging hypothesis posits that cognitive functions supported by the prefrontal cortex, namely executive functions, should decline at an earlier age than those cognitive skills supported by other brain regions.

In one illustrative study, for example, Libon et al. (1994) compared participants aged 75 years and older with a younger age group (i.e., those 74 and younger). Comparisons showed that the older participants exhibited greater deficits in problem solving, mental flexibility, and the ability to maintain and shift mental sets. Similar results have been reported elsewhere (Campbell, 1990; Christensen, 2001; Crawford, et al., 2000). Although the Frontal Aging hypothesis posits that executive functions exhibit signs of age-related decline at an earlier age than cognitive

abilities that are preferentially supported by other regions of the brain, research has demonstrated that older age is associated with significant inter- and intra-individual differences in the rate at which executive skills change. Although the average performance on most tasks declines with age, some studies have suggested that many older individuals change very little, whereas others may deteriorate more dramatically, leading to a greater diversity of performance-based scores (Christensen et al., 1994; Morse, 1998). For example, a study by Carlson and colleagues (2009) examined executive functioning skills in older adults over a nine-year period. At the time of the study enrollment participants were healthy older women (age 70-80 years) who had sufficient hearing, mobility, exercise tolerance, and were capable of completing basic self-care. Over the nine-year period, the researchers found that 49% developed one or more impairments across functional and cognitive domains (e.g., self-care, mobility, hearing loss, verbal knowledge). Of the 49% who developed impairments, 37% developed a significant decline in executive functioning, which was measured by the Trail-Making task. Thus, although majority of those who experienced impairments did so in the domain of executive functioning, the overall percentage of participants with such impairments (i.e., 37% of 49%) constituted a minority of the sample, highlighting the fact that there are large individual differences in executive functioning among older adults.

In contrast with the declines seen in executive functioning, emotion regulation does not seem to be affected by age. In fact, as mentioned above, research has found that emotion regulation skills actually improve with age, both on subjective and objective measures. Compared with younger adults, older adults report that they focus more on self-control of their emotions and rate their emotion regulation skills as better (Lawton et al. 1992, and Gross et al. 1997). When dealing with an upsetting interpersonal situation, older adults report being less

likely to engage in destructive behavioral responses such as shouting or name calling (Birditt & Fingermann, 2005). Older adults are also able to move on from negative experiences and affect more effectively than younger adults are (Carstensen et al., 2000).

Research with younger adults suggests that mechanisms used to regulate emotions are implemented by some of the same brain regions as mechanisms used to control executive functions (Ochsner & Gross, 2004). One possibility is that although there are significant declines in cognitive processes with age, there are also shifts in how people allocate these processes in their everyday lives (Carstensen et al. 2005). For example, in an fMRI study conducted by Logan et al. (2002), researchers found evidence for two separate age-associated changes in neural correlates of memory encoding. That is, when older adults were left to execute their own strategies for verbal encoding, there was a deficit in the frontal lobe activation as compared to younger adults. However, when older adults were provided support by giving them an effective encoding strategy, the reduced frontal lobe activation was ameliorated and effectively reversed. These findings support the under-recruitment hypothesis in aging, given that frontal resources are present, but are not recruited effectively when self-initiated. This suggests that at least some of the aging deficits reported in the literature could reflect behavioral shifts as much as neural deterioration. This shift in resource allocation can be tied back to the Socioemotional Selectivity theory. As people approach the end of life, goals associated with emotional meaning and well-being become more salient whereas goals associated with acquiring knowledge for future use become less so. Therefore, individuals shift in their priorities and goals and allocate their cognitive resources accordingly.

In the proposed study, I focused on comparing younger and older adult's executive functioning in relation to their marital relationship for a number of reasons. First, past research

has found that executive functions are responsible for controlling and managing many different cognitive domains and have the potential to affect performance on a wide variety of cognitive tasks (Salthouse et al., 2003). Second, the main components of executive functioning, namely inhibition, working memory and task switching, have played a prominent role in theories of cognitive aging (Salthouse, 2005). Third and most importantly, research has shown that executive functioning can have a significant impact on one's interpersonal relationship, as discussed further below.

Executive Functioning and Interpersonal Relationships

Executive functions not only help in regulating everyday activities like completing household tasks, planning daily activities, and being successful at work, but they also play an important role in successfully maintaining interpersonal relationships. As interest has grown in examining the role of executive functioning in interpersonal relationships, researchers have focused on how important relationship processes, such as emotional regulation, forgiveness, and making sacrifices for one's partner, are associated with executive functioning skills. Executive functioning has been found to be significant in regulating one's emotions, which is of vital importance within one's interpersonal relationships (von Hippel & Gonsalkorale, 2005). Greater executive functioning skills have been associated with successful expressive suppression (e.g., the attempt to hide, inhibit, or reduce ongoing emotional-expressive behaviour, Gross & Levenson, 1993), cognitive reappraisal (e.g., recognizing negative thought patterns and changing that pattern to one that is more effective, Gross & John, 1998), self-enhancement (e.g., the tendency to attribute positive qualities to one's self and take credit for one's success, Alicke & Sedikides, 2009), and coping with daily stressors (Schmeichel & Tang, 2015). Consistent with these findings, executive control has also been shown to prevent people from responding

aggressively when being provoked (Hofmann et al., 2008; Wilkowski et al., 2010). That is, Hofmann and colleagues (2008) found that individuals high in executive control, as indicated by a high level of working memory capacity, expressed less anger toward their partner in an anger-provoking situation. Specifically, these individuals retaliated less against their interaction partner when given the opportunity to provide feedback to him or her on the anger-provoking situation. In another study, inhibitory control appeared to contribute to the successful suppression of socially inappropriate emotional expressions (von Hippel & Gonsalkorale, 2005).

Previous research on forgiveness has tended to focus on the quality of interpersonal connection between the ‘forgiver’ and ‘transgressor’ and the results of this research show that people are more inclined to forgive individuals to whom they feel close and committed, securely attached, or with whom they experience a strong friendship bond (Park & Enright, 1997). However, more recent research has shifted to examine the individual characteristics of the ‘forgiver’ to assess how those characteristics, such as executive functioning skills, influence the process of reconciliation. Studies have shown that those who have higher levels of executive functioning are more inclined to forgive their partner (Pronk, et al., 2010). This relationship was mediated by rumination; that is, those with higher executive functioning skills were less likely to ruminate about the transgression and therefore, more likely to forgive. They also found that people high in executive functioning display more linear increases of forgiveness over a five-week period, suggesting that over time individuals become more and more forgiving. In contrast, people with a low level of executive functioning seem to have difficulty increasing their level of forgiveness consistently over that same timeframe.

Executive functioning has also been associated with romantic partners’ faithfulness (Pronk et al., 2011). More specifically, Pronk and colleagues (2011) found that individuals in

romantic relationships with a higher level of cognitive control experience less difficulty in staying faithful to their partners. Further, when confronted with an attractive other, those individuals showed less relationship-threatening behavior. That is, executive control helped people inhibit the tendency to respond in an impulsive, self-interested way (i.e., retaliating, getting involved with an attractive alternative), and instead facilitated a more relationship-protective responses. Additionally, individuals with greater executive functioning also made choices that decreased the frequency of opportunities where they would be around attractive others. While there has been an abundance of research on how strong executive functioning skills help to maintain positive relationships, research has also found that declines in executive functioning can have a negative impact on one's interpersonal relationships. Previous research on the effects of brain injury in the frontal lobe has revealed severe consequences for the social skills and interpersonal relationships of the patients. For example, damage to the frontal lobe is related to impaired empathic ability (Eslinger, 1998; Grattan et al., 1994; & Shamay-Tsoory et al., 2003), as well as a diminished sensitivity to the consequences of future actions (Bechara et al., 1994). Moreover, injury in the frontal lobe leads to problems in the regulation of social behavior (Cicerone & Tanenbaum, 1997; & Eslinger & Damasio, 1985). These deficits have severe negative consequences for the quality of one's interpersonal relationships, increasing the likelihood of relationship dissolutions. When investigating brain injury sustained by one partner and relationship dissolution, Panting and Merry (1972) found a 40% separation rate in their sample when one partner sustained a brain injury. Within their study, this separation rate was higher than among those with a spinal cord injury. Tate and colleagues (1989) found a 55% divorce rate 6 years after injury, and Thomsen (1984) found only two out of nine couples remained together 15 years after injury. Further, spouses of patients with severe brain damage

report lower marital satisfaction, less affection for the partner, and less marital cohesion (Gosling & Oddy, 1999; Peters et al., 1992). In short, such findings suggest that executive functioning plays an important role in both the maintenance and dissolution of close relationships.

Within the aging population, there have been relatively few studies to investigate how normative age-related changes in executive functioning impact one's romantic relationship. Diverging from this trend, in my Master's research, I investigated normative variation in executive functioning of couples, who were both over the age of 60, and found that lower levels of working memory, inhibition, and task switching in one partner predicted lower levels of quality of life in the other partner (Dawson, et. al, 2015). This finding may be driven in part by diminished quality of interpersonal interactions. Another possible explanation is that in older marital relationships, when one partner has diminished executive skills, the distribution of daily tasks may also change such that the other partner ends up with greater responsibilities. Additional support for this perspective emerges from studies showing that normal age-related changes in executive functioning skills are associated with worse performance on activities of daily living (Bell-McGinty et al., 2002; Jefferson et al., 2006). That is, even when executive functioning skills are still within the normative range, these normative declines may influence the quality of life of the partner more than the self, possibly by affecting division of labor in the relationship. A decline in one spouse's performance on activities of daily living may lead the partner to take on more of the burden of everyday tasks, leading to an inequitable division of labor. Past research investigating the link between marital satisfaction and division of labor has found that quality of marriage and well-being decreases when the division of labor is perceived to be unfair (Lavee & Katz, 2002; Lennon & Rosenfield, 1994), particularly for the partner who is doing a greater portion of the labor. Another study investigating how normative age-related

changes in executive functioning impacts one's interpersonal relationship found that normative decreases in executive functioning in older adults are associated with their engaging in more socially inappropriate behaviors than their younger counterparts, causing peers to report less closeness to these individuals (von Hippel & Dunlop, 2005).

As highlighted above, while executive functioning has been shown to decrease as one ages, interestingly, emotion regulation seems to improve with age. Compared with younger adults, older adults report that they focus more on self-control of their emotions and rate their emotion regulation skills as better (Gross et al. 1997). Older adults may have less intense emotional reactions to interpersonal tensions than younger people. Older adults appraise daily events as less stressful than do younger adults (Aldwin, 1991; Almeida & Horn, 2004) and they are less likely to report negative emotions in general (Carstensen et al., 2000; Gross et al., 1997). In a study by Birditt and Fingerman (2003), they found that when recalling salient interpersonal tensions, older people were less likely to report anger in response to these tensions than their younger counterparts.

The interplay between emotion regulation and executive functioning has been documented in research; that is, individual differences in executive functioning are associated with emotion regulation skills. In a study by von Hippel and Gonsalkorale, (2005) participants completed a Stroop task as a measure of inhibitory ability and were then presented with a controversial opinion. Participants who performed better (more quickly) on the Stroop task exhibited less negative responses. In another study by Tang and Schmeichel, (2014), they found that better performance on the stop-signal task predicted less anger and anxiety after recalling emotionally charged memories. Studies have also found that working memory is associated with emotion regulation skills. Schmeichel and colleagues (2008) had participants complete a working

memory span task, and then view a highly aversive film clip; participants with higher working memory capacity expressed less emotion on their faces. The study found the same pattern using an amusing film clip. These studies support the idea that inhibition and working memory capacity contributes to successful suppression of negative emotions. Given that executive functioning skills decline with age, and executive functioning supports emotion regulation skills, it is curious that emotion regulation skills have been found to increase with age (Mather & Carstensen, 2005). This pattern of results suggests that there are other factors, not just executive functioning, that are playing a role in emotion regulation skills.

Thus, the divergence seen between executive functioning and emotion regulation in older adults poses a dilemma for researchers. In earlier developmental stages (e.g., childhood) greater executive functioning skills are associated with improved emotion regulation skills, but in older adults these two previously interdependent systems follow different trajectories with executive functioning skills declining with age and emotion regulation skills improving with age¹. While the current study does not focus on emotion regulation skills per se, the manner in which individuals construe interpersonal experiences (i.e., their attributions) are associated with emotion regulation skills (Aldwin, 1991; Almeida & Horn, 2004). In this way, the current study has the potential to shed some light on how these two systems diverge in later life.

Attributions

Attributions have been studied extensively in order to investigate how individuals make sense of their experiences (Shaver, 1985). One category of attributions that have been examined are causal attributions, commonly assessed along three different dimensions (Kelley, 1972). The

¹ Note however that there are differences in how emotion regulation is measured and defined across development. That is in preschool studies it is often operationalized in behavioural terms, whereas in adulthood it is operationalized in by investigating internal management (e.g., cognitive appraisal, Hill et al. 2006, Zimmermann, & Iwanski, 2014).

first dimension is *stability*, which refers to how likely it is that the behaviour will change over time; individuals can classify behaviours on this dimension as stable or unstable. The second dimension is *locus of control*, which refers to one's belief that another's behaviour is guided by external factors, for example, their environment, or internal factors, such as the other's ability, effort, or personality. The final dimension is *pervasiveness*, referring to the extent to which the behaviour occurs and this dimension ranges from *global* (e.g., a belief that the behaviour or event determines outcomes in other situations, or relates to everything) to *specific* (e.g., the behaviour or event operates uniquely and only relates to one thing). While causal attributions are the types of attributions most commonly studied within the relationship literature, other types of relationship-relevant attributions have also been investigated. These include responsibility attributions, that is, the belief about the cause of an event, or outcome, or state (Baumeister & Vohs, 2007). The event in question may be positive (success) or negative, but responsibility is typically used more in association with aversive outcomes. Further, blame attributions refers to the process of attempting to construct causal explanations for behaviours displayed by themselves and others (Shaver, 1985).

Past research has examined how the causal attributions one partner makes of the other's behaviours influences relationship quality and stability (e.g., Karney & Bradbury, 1995). Distressed couples have often been found to make *stable*, *internal*, and *global* attributions for their partners' negative behaviours, thereby enhancing the impact of those behaviours, while also making *unstable*, *external* and *specific* attributions for their partners' positive behaviours, thereby diminishing their impact (Graham & Conoley, 2006). When faced with negative relationship events, couples that make relationship-diminishing attributions, like those described above, have a more difficult time sustaining the quality of their relationship. Conversely, the

relationship quality of couples that make more relationship-enhancing attributions about their relationship, has been found to be relatively unaffected by stressful events (Graham & Conoley, 2006).

The directionality of relationship satisfaction and attributions is an important research question with implications for further theory development. Initially, researchers posited a specific direction for the link between relationship-diminishing attributions and relationship satisfaction, specifically, that relationship-diminishing attributions lead to decreased satisfaction (Fincham & Bradbury, 1987). However, Karney and Bradbury (2000) posited that if attributions in marriage are not relatively constant, or if they change as a result of changes in marital satisfaction, then the causal role that attributions have been assigned may not be as accurate as once thought. Therefore, more recently, researchers have developed more complex models that posit reciprocal influences between relationship satisfaction and attributions (Fincham et al., 2000; Johnson, Karney et al., 2001; Karney & Bradbury, 2000).

There have been few longitudinal studies that have focused on changes in causal attribution. The longitudinal focus of these studies provides more nuanced information to understand the processes that may shape or be shaped by attributions. In one longitudinal study, Fincham and Bradbury (1987) found that for wives, initial levels of attributions predicted changes in marital satisfaction over 12 months. For husbands, this effect was of a similar magnitude but did not reach statistical significance. In contrast, satisfaction did not predict changes in attributions for either spouse. In a second study, Fincham and Bradbury (1993) found that for both spouses, initial attributions predicted changes in satisfaction over a 12-month period. However, initial satisfaction also predicted changes in attributions for husbands. Taken together, these findings do suggest potential bidirectional and causal influences between

attributions and marital satisfaction. Further, a longitudinal study by Fincham and Bradbury (2000) found that changes in causal attributions were associated with changes in spouse's satisfaction, to the same extent that changes in satisfaction were associated with deviations from a spouse's attributions. Therefore, there was no evidence supporting the causal dominance of one variable over the other at the within-subject level. What can be concluded from these findings is that changes in these two variables are highly associated.

Another important consideration is how causal attributions change over the course of one's relationship. Research has found that spouses are particularly inclined to making more attributions during the early stages of a relationship, before they have formed stable expectancies regarding their partners (Karney & Bradbury, 2000). As the relationship progresses, automatic processing dominates, relative to one making attributions for behaviours (Weiss, 1980). However, if an interpersonal conflict develops, the partner must again consider their relationship and why their partner's behaviours do not conform to their expectations (Holtzworth-Munroe & Jacobson, 1985). In a study by Holtzworth-Munroe and Jacobson (1985), they hypothesized that distressed couples would be more inclined towards attributional activity. Their results indicated that this prediction only held true for husbands, such that distressed and non-distressed wives produced attributions at equivalent rates.

Attributional Processing in Aging

Within the aging literature, there is a growing research suggesting that older adults rely on heuristic processing when making attributions and thus are more susceptible to judgment biases (Chen & Blanchard-Fields, 2000; Hess et al., 1998). For example, older adults tend to rely on stereotypes when making attributions (Mather et al., 1999) and to have a heightened tendency toward dispositional, or internal, inferences when making causal attributions (Blanchard-Fields,

1996, 1999). It has also been shown that older adults tend to rely on more easily accessible knowledge structures and schemas when making social judgments (Hess et al., 1998). For example, older adults were more likely than younger adults to make judgements biased in the direction of a primed trait construct (e.g., courageous, careless, adventurous; Hess et al., 1998). Further, age differences in schematic beliefs determined the extent to which blame attributions were made when a causal attribution task involved family conflict dilemmas (Stein et al., 2002). That is, when a person's beliefs were violated, older participants made stronger blame attributions toward a target who held opposing beliefs, than to targets who held views similar to their own. Further, there has been some evidence to suggest that older adults are more likely than younger adults to attribute undesired events or failures to internal and stable causes (Blanchard-Fields, 1994). That is, when participants read hypothetical vignettes that were ambiguous with respect to what caused a negative event outcome, older adults made more internal and global attributions than adolescents and younger adults (Blanchard-Fields, 1994). In another study, Blanchard-Fields and Beatty (2005) presented participants with interpersonal conflict situations and were asked to decide whether it was the main character in the story who was responsible (dispositional/internal attribution), or if it was something related to the situation (situational attribution) that was responsible for the outcome. Older adults consistently blamed the main character more often (i.e. made dispositional attributions about the person) than the younger adults did, particularly in relationship situations with negative outcomes.

It has been argued that internal attributions require little cognitive effort and are typically the initial, spontaneous response of individuals making causal attributions. In contrast, elaborative processing and cognitive effort are required when an individual deliberates on additional information, such as situational constraints, to adjust this initial response (Gilbert &

Malone, 1995; Trope & Gaunt, 2000). One potential explanation for this dispositional tendency in older adults is age-related decline in inhibition. This decline may cause older adults to have difficulty inhibiting their initial prepotent response, and relying on easily accessible dispositional information.

Cognitive decline is one mechanism that may explain age differences in attributions. Social psychology research demonstrates that considering both situational and dispositional aspects of a situation requires cognitive effort and resources (Gilbert & Malone 1995). Given cognitive limitations, older adults might respond with the more accessible dispositional explanations for another individual's behaviour (e.g. blaming). To test this mechanism, Chen and Blanchard-Fields (1997) presented social dilemmas to younger and older adults. In each situation, a character violated a social rule about what is appropriate social behavior. Participants rated the degree to which the character was to blame for the situation either immediately following the story or after a delay. Older adults made higher dispositional, or internal, ratings than young adults did in the immediate-rating condition. However, older adults made lower dispositional attribution ratings when given more time to think about the situations. This adjustment when given more time suggests that older adults' dispositional bias is partially due to cognitive limitations that make fast processing difficult. Similar findings were obtained with a different social judgment paradigm when using a distracter task instead of limited time (Chen & Blanchard-Fields 2000).

Parallel to the attribution literature, research on interpersonal coping has also highlighted changes with aging. Coping has been defined as constantly changing cognitive and behavioral efforts to manage specific external or internal demands that are appraised as taxing or exceeding the resources of a person (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). Cognitive

coping is the process of finding meaning from stressful events and then evaluating and rendering that event as less aversive. Age-related differences in the adoption of coping strategies have frequently been reported. It has been suggested that during the aging process, individuals shift from problem-focused coping toward more emotion-focused coping (Cavanaugh & Blanchard-Fields, 2011; Chen, et al., 2018; Melendez et al., 2017; Melendez et al., 2012). Problem-focused coping involves efforts to alter the troubled person's environment, whereas emotion-focused coping is usually defined as aiming to regulate distressing emotions (Lazarus & Folkman, 1984). Researchers have also shown that age strengthens the ability to distance oneself from stressful situations and reassess those situations positively, therefore leading to more adaptive coping styles (Folkman et al., 1987; Schryer & Ross, 2012). Executive functioning and emotion regulation skills have been identified as mechanisms involved in successful coping. That is, the stronger one's executive functioning and emotion regulation skills, the more adaptive coping styles are engaged. This is interesting to consider given that executive functioning declines with age, yet older individuals are found to use more adaptive coping strategies. As mentioned previously, Schmeichel and Tang (2015) found that individual differences in executive functioning predicted differences in successful emotion regulation. They also found that greater executive functioning skills were also associated with successful expressive suppression, cognitive reappraisal, self-enhancement following negative feedback, and coping with daily stressors. Thus, another area where we see a different pattern of results in younger versus older samples is coping. Similar to the emotion regulation literature, older adults seem to demonstrate more effective coping skills, despite the decline in executive functioning skills.

While the link between executive functioning and attributions has not been tested in the adult romantic literature, research between parents and children suggests that parents with lower

executive functioning skills tend to interpret children's externalizing symptoms as reflective of their personality, rather than contextual factors, which leads to greater parent-child conflict (Deater-Deckard, et. al, 2012). Within this study, mother's executive functioning was measured in addition to their parenting attributional bias. The results showed that mothers with lower executive functioning blamed their child for intending the misbehavior, rather than an external or environmental cause. Maternal executive functioning and hostile attribution biases were further associated with harsher parenting. In another study, Deater-Deckard and colleagues (2010) found that children with more challenging behaviour (compared with his or her sibling) received harsher caregiving, but only among mothers with lower executive functioning skills. Deater-Deckard and colleagues (2012) concluded that mothers with lower executive functioning were less able to engage in cognitive functions like inhibiting prepotent responses to reappraise a situation and respond differently, or update their beliefs and shift their thinking to react in accordance with situational factors.

Although the link between executive functioning and attributions has not been investigated within the adult romantic literature, there is compelling evidence from the child development literature that highlights the role of parent and child executive functioning skills in influencing parent-child interactions (Deater-Deckard, et. al, 2012). Parents must use inhibitory control to refrain from expressing 'knee-jerk' negative reactions that are often elicited by undesirable child behaviors. Additionally, working memory is important in order to maintain and manipulate information, while interacting with the child. Last, but not least, parents must use cognitive flexibility to switch between different situations and their corresponding demands (Barrett & Fleming, 2011). An inability to successfully carry out these actions can lead to an increasingly stressful situation and have a negative impact on how a parent interprets the actions

of the child and the preceding outcome. It is reasonable to look at extending this research to the adult romantic literature given that some of the same demands also exist within marital relationship and given that older individuals experience greater spousal dependency than younger couples.

The Current Study

The overall goal of the current study is to compare the association between executive functioning skills and partner attributions in younger versus older adults. Through this research, I hope to shed light on an important paradox that exists in the aging literature. More specifically, the Socioemotional Selectivity theory posits that as mortality becomes more salient, one's motivation shifts to maximizing emotional well-being (Carstensen, 2006; et al., 1999; Mather & Knight, 2006). As a result, older adults are able to employ cognitive strategies to improve emotion regulation because they are more focused on emotional goals. This shift is facilitated by an increase in one's overall maturity as they age, and a greater familiarity with one's social contacts over time (Carstensen et al., 1995; Charles et al., 2001; Diehl et al., 1996, & Baldwin, 1992). Further, these factors help to increase positivity in one's social relationships (Fredrickson & Carstensen, 1990).

While emotion regulation improves into older adulthood and supports positive relationships (Carstensen et al., 1995), paradoxically, it has also been well established that executive functioning systems decline with age (Dempster, 1992). Executive functioning has been shown to facilitate successful suppression of socially inappropriate emotional expressions including anger towards one's partner (Gross et al. 1997). Executive functioning also facilitates greater forgiveness within a relationship (Pronk et al., 2010). Further, research on executive functioning suggests declines should also be associated with less flexibility and more negative

attributions (Gross & John, 1998). As such, attribution research with older adults also suggests that they are more likely to make more internal and dispositional attributions for other's negative behaviours (Blanchard-Fields, 1996, 1999) but it is important to note that these studies did not investigate attributions for close others' behaviours.

While executive functioning supports positive relationships in adulthood, paradoxically, we see older adults who have an increase in positivity exhibiting executive functioning decline. The current study aimed to clarify this paradox by specifically testing the link between executive functioning and one's attributions for negative relationship events that they have experienced with their close romantic partners. More specifically, I compared the relationship attributions made by younger and older adults and assessed their executive functioning skills to clarify the role executive functioning skills play in intimate relationships at different stages of life. Consistent with the operationalization of executive functioning advanced by Miyake et. al., (2000), the current study assessed the three key constructs that are thought to comprise executive functioning abilities: working memory, inhibition, and task switching. Each of these domains was assessed using tasks that have been shown to be reliable and valid measures. Specifically, I used the digit span task from the Wechsler Adult Intelligence Scale to assess working memory, and the trail-making task and colour-word interference tasks from the Delis-Kaplin Executive Functioning battery as our measures of task-switching and inhibition.

I assessed relationship attributions using two methods: an interview-based methodology and a questionnaire methodology. Both of these methods have been developed and validated in past research (Fallis & Rehman, 2013). I asked participants to think about situations that occurred in the previous two weeks in which they were frustrated with their partner, and to report on why their partner may have behaved in the way they did. This allowed participants to directly

give attributions for situations that are relevant and emotionally salient to them and ensured I collected a meaningful measure of our key variable. The interview method has the added advantage of allowing participants to provide a range of causes of partner behaviours. By using a methodology where participants directly reported on specific partner problematic behaviours, I was able to directly assess whether executive functioning changes impact the attributions an individual generates for his or her partner's problematic behavior. This methodology was designed to improve upon a standardized self-report measure of partner attributions that has been used in past studies, the *Relationship Attribution Measure* (Fincham & Bradbury, 1991). A key limitation of the Relationship Attribution Measure is that it asks respondents to provide attributions for a set of standardized hypothetical relationship events that may or may not be applicable to the respondent's relationship. Past research has identified that results from hypothetical vignettes may not generalize to interpersonal situations in which the observer and actor are engaged in an ongoing relationship. For example, the content of causal attributions for the behavior of an actor varies depending on whether the observer is acquainted with the actor (Taylor & Koivumaki, 1976) and on whether the observer expects to interact or thinks that she or he is currently interacting with the actor (Knight & Vallacher, 1981).

In this research, I investigated the associations between executive functioning and relationship attributions in older and younger adults and compared the predictions that would be generated by the Socioemotional Selectivity theory to the predictions of the Frontal Aging hypothesis. From a Socioemotional Selectivity Theory perspective, I would predict that as individuals age they are able to make more favourable and more relationship-enhancing attributions for their partner's problematic behaviours. This prediction is consistent with the Socioemotional Selectivity Theory given that the theory posits that as individuals age, and the

possibility of mortality becomes more salient, participant's motivation shifts to maximizing emotional well-being. As such, this shift in motivation may allow for individuals to implement better emotion regulation strategies. With stronger emotional regulation skills, individuals may be more successful at interpreting and managing interpersonal conflicts and therefore make more positive attributions about negative relationship events. Therefore, if Socioemotional Selectivity Theory is supported by the data, I would expect a main effect of age on how an individual makes attributions for their partner's negative behaviours. The direction of the effect would be such that older adults make more positive attributions of their partner's behaviours as compared to younger adults.

From the perspective of the Frontal Aging Hypothesis, I would expect different results. Specifically, I would expect that individual differences in age-related declines in executive functioning skills would be associated with the type of attributions that individuals will generate for negative partner behaviour. This may be expected given that lower executive functioning has been shown to have a negative impact on the suppression of socially inappropriate emotional responses, is associated with less flexibility, and more internal and dispositional attributions. Therefore, compared to individuals with higher executive functioning skills, those with lower executive functioning skills could be more likely to make rigid and relationship-diminishing attributions of their partner's problematic behaviours (e.g., by viewing the cause of the problematic behaviour to stable, internal, and unchanging aspects of the partner). As such, if the Frontal Aging hypothesis is driving the results, I would expect to see a main effect of executive functioning on one's attributions for their partner's behaviour during negative relationship events. Given that both of these are plausible accounts for how older versus younger adults may differ in the attributions they make for partner behaviour, I am not offering specific directional

hypotheses. Rather, I detail the pattern of results that would be expected if our data support the Frontal Aging hypothesis, and the pattern of results that would be expected if the data support Socioemotional Selectivity theory.

In the first set of analyses comparing these two theories, I will examine whether older adults report more relationship-enhancing attributions, as compared to younger adults. If so, this would be (broadly) consistent with Socioemotional Selectivity Theory. I will also examine if higher executive functioning skills are significantly associated with more relationship-enhancing attributions. Given that the Frontal Aging hypothesis posits that one's executive functioning skills decline with age, I would expect the younger group to have more relationship-enhancing attributions. Next, I will investigate the unique contributions of age and executive functioning skills to the quality of attributions that individuals make for their partner's problematic behaviours. In addition to comparing age and executive functioning, I will also include relationship quality, given that relationship quality is robustly associated with the types of attributions individuals make for their partner behaviours (Fincham et al., 2000; Johnson et al., 2001; Karney & Bradbury, 2000). Through these analyses, I will be able to do a rigorous investigation of the contribution of each factor (relationship quality, age, and executive functioning) while controlling for the other factors.

In the final set of analyses, I will also include the interaction between relationship quality and age (interaction term 1) and relationship quality and executive functioning (interaction term 2). This will allow us to examine whether the influence of relationship quality is moderated by age and by executive functioning.

METHODS

Participants

The current sample consisted of two groups, a younger aged sample (N=63) and an older aged sample (N=69). All participants were in a mixed-sex relationship. Participants in both the younger sample and the older sample were required to be in a relationship for a minimum of two years. Within the younger sample, participants were required to be between the ages of 18-35 years old. The younger age group was recruited through the SONA pool at the University of Waterloo, in addition to fliers and ads posted around the city, and through the participant database developed and maintained by the Relationship Research Lab. The younger sample had been in their current relationships for an average of 6.95 years ($SD = 4.19$ years). The women participants ($n = 52$) had an average age of 26.94 years ($SD = 4.82$) and had completed on average 16.25 years ($SD = 2.11$) of education. The men participants ($n = 11$) had an average age of 27.36 years ($SD = 4.93$) and had completed 15.91 years ($SD = 2.51$) of education. For personal gross annual income, 12.7% of participants reported their income was below \$5,000, 54% of participants reported that their income was between \$5,000 and \$59,999, 11.1% reported that their income was between \$60,000 and \$100,000, and 19% reported an income that was over \$100,000. Two participants (3.2% of the younger sample), did not report their annual income. Among participants, 52.4% identified as Caucasian, 1.6% as African decent, 3.2% as Hispanic, 14.3% as South Asian, 15.9% as Other Asian, and 11.1% identified as “other”. One participant (1.6% of the sample) did not provide an answer related to their ethnicity.

The second group are individuals consist of the ‘older sample’. Participants in this group were required to be aged 60 years and older. The participants in the older age group were recruited through the Waterloo Research in Aging Participant Pool. This is a database that

connects individuals over 60 years' old who are willing to participate in research, with researchers in the Department of Psychology, Faculty of Applied Health Science and the Department of Kinesiology at the University of Waterloo. Participants in the study had been in their current relationships for an average of 44.75 years ($SD = 11.37$ years). The women participants ($n = 41$) had an average age of 69.08 years ($SD = 6.08$) and had completed on average 15.55 years ($SD = 2.81$) of education. The male participants ($n = 28$) had an average age of 72.46 years ($SD = 6.52$) and had completed 16.37 years ($SD = 3.98$) of education. For personal gross annual incomes, 30.4% of participants reported that their income was between \$20,000 and \$59,999, 35.7% reported that their income was between \$60,000 and \$100,000, and 25.4% reported an income that was over \$100,000. Six participants in the older age group (8.6% of the sample), did not provide information on their annual income. Among participants, 95.7% identified as Caucasian. The remaining male participants were of Asian (2.8%) descent, one participant (1.4% of the sample) did not provide an answer.

Measures

Background Questionnaire. This questionnaire was designed for the current study. It gathered information about participants' demographic characteristics (e.g., age, income, educational achievement) and the history of their current relationship (e.g., marital status, relationship length).

Quality of Marriage Index (Norton, 1983). This measure was used to assess relationship satisfaction. This questionnaire consists of five statements measured on a 7-point scale, where a response of "1" meant they strongly disagreed with the statement, a response of "4" meant they neither agreed nor disagreed with the statement, and a response of "7" meant they very strongly agreed with the statement. A sample item from the questionnaire states "*Our relationship is*

strong.” The questionnaire contains an additional sixth item, which asks participants to think about how happy they were with their relationship, and to rate that happiness on a 10-point scale, where “1” refers to “very unhappy,” “5” refers to “happy” and “10” refers to “perfectly happy”. In the current study, Cronbach’s alpha was .94. Although this measure has “marriage” in the title, it has been used to assess relationship satisfaction in different types of romantic relationships, including married, unmarried, cohabiting, and living apart. Also, the study participants did not see the title of the measure, only the items in the measure.

Attributions. Participants’ attributions were assessed using two methods: the Attribution Interview (that was subsequently coded) and the Attribution Questionnaire, a self-report measure. The protocol used to conduct the attribution interviews and to administer the attribution questionnaires are described below.

First, the participant was asked to think of a recent event (in the past two weeks) when they experienced conflict with their partner and to describe the event to the interviewer. They were then asked to explain *why* they believed the event happened. The interviewer was trained to ask follow-up questions until participants provided a responsibility attribution (i.e., what was the perceived *cause* of the event) (see Appendix 2 to see detailed guidelines for how the interview was conducted). After the interview was completed, the participant completed the *Attribution Questionnaire* (described below). Participants were then asked to think of a second event that occurred within the last two weeks where they experienced conflict with their partner. They completed a second attribution interview and a second attribution questionnaire. This methodology to assess attributions and to gather both interview data (subsequently coded) and questionnaire data is based on a study conducted by Fallis and Rehman (2013). In the original study, the authors used the methodology to compare attributions for sexual and nonsexual

problems in relationships. I used the same methodology, with one change: participants were not asked to specify whether the issue was sexual or nonsexual in nature. Fallis and Rehman (2013) demonstrated strong interrater reliability for the interview data and demonstrated the validity of the questionnaire data and the coded interview data by examining the association between attributions and relationship quality.

Attribution Topic 1 and 2. Each participant was asked to provide two events where they experienced a conflict with their partner. For each event, they completed the interview and the questionnaire. However, there was an important methodological difference between Topic 1 and Topic 2 for the participants who were in the older group. Several participants in the older group were not able to identify a second event that bothered them in the last two weeks. In the event that participants had a hard time generating a second conflict discussion, research assistants allowed participants to think beyond the initial two week time-frame. However, none of the participants in the younger sample reported difficulty finding two conflictual events in the past two weeks. As a result of this, any observed differences between the groups for the second topic could be due to the confound that the older group selected events in the more distant past that may have become less salient or less emotionally arousing (due to passage of time). For this reason, I focused only on the first event reported by participants.

Coding of Attribution Interviews. Participant interviews were coded using the Relationship Research Lab Attribution Coding Manual (Fallis & Rehman, 2013) (see Appendix 2). The manual was developed in order to characterize the nature of the attributions that people make for their romantic partners' behaviour. After data collection was complete, research assistants independently listened to each participant's audio-recorded interview. These research assistants were given detailed definitions, instructions, and training on each of the constructs

being coded. During the first review, raters listened to the conversation in its entirety, paying attention to the overall attributions that were made and ensuring the interview met certain criteria. The first criterion was ensuring that the participant was able to identify an example of a specific incident related to the problem domain. The second criterion was confirming that the interviewer's questions focused on the cause of the problem behaviour in the specific incident, and not the cause of the disagreement. For example, one domain in which a participant might want her partner to change is finances. The goal of the interview is to find a specific example of a time when the participant was upset with her partner's behaviour in the domain of finances and to assess her attributions for this behaviour. An ideal example of this would be something like: "I think it is important for us to save money to pay down our debt, but my partner likes to splurge on things he will enjoy. Last week we had a fight about finances because he came home from work with a new guitar. I was so angry we ended up getting in a big fight and didn't talk for two days." The attributions we are interested in are attributions around why the partner bought the guitar and NOT why the couple had a fight. Thus, the interviewer's question should be "Why did your partner *buy a new guitar?*" What was *the cause of him buying a guitar?*". If the criterion was not met (e.g., participants were not able to identify a specific incident, or the interviewer's questions were not following protocol) the data was excluded. There were a total of 20 attribution interviews that were excluded due to not meeting this criterion (N=2 from the younger group, and N=18 from the older group). Following this initial review, the raters then listened to the audio again and rated the identified attributions on a series of items, making specific ratings of the nature of the attributions that were provided for the issue. Coders rated to what extent the attributions were (a) *internal vs. external*, (b) *stable vs. unstable*, (c) *voluntary vs. involuntary*, (d) *intentional vs. unintentional*, (e) *relationships protecting vs. harmful*. These ratings were

made on a 5-point Likert scale, For the *internal vs. external domain*, “1” represented “very internal” and “5” represented “very external”. For the *stable vs. unstable domain*, “1” represented “very stable” and “5” represented “very unstable”. For the *voluntary vs. involuntary domain*, “1” represented “very voluntary” and “5” represented “very involuntary”. For the *intentional vs. unintentional domain*, “1” represented “very intentional” and “5” represented “very unintentional”. Finally, for the relationship *protecting vs. harmful*, “1” represented “very harmful” and “5” represented “very protective”. Coders also rated the how upsetting the event seemed to be for the participant. Higher scores on these items represent more relationship-enhancing attributions. See Appendix 2 to see detailed guidelines for how the interview was conducted. In the current study, Cronbach’s alpha for the relationship interview items was .87.

One research assistant coded all conversations and a second research assistant independently coded 46 randomly selected interviews (35% of total conversations) to examine interrater reliability. The interrater correlations for the six dimensions ranged from .85-.92 suggesting good overall reliability. When two raters were available, ratings were averaged. An exploratory factor analysis was used to examine the factor structure of these coded variables to see if these codes captured a unified variable of “relationship enhancing attributions”. The findings from the factor analysis are described in the Results section.

Attribution Questionnaire. After the interview was completed, each participant completed the *Attribution Questionnaire*, also designed to assess participants’ beliefs about why the event occurred. Some of the sample items from this measure are as follows: “*My partner’s behaviour during the event was motivated by selfish, rather than unselfish concerns*”, “*To what extent was your partner responsible for his/her behaviour during this event?*”, and “*My partner’s behaviour during the event was due to the type of person he /she is*”, and “*my partner’s actions affect other*

areas of our relationship". Each item was rated on a 7-point scale with "1" representing "not at all" and "7" representing "extremely." For ease of interpreting results and consistency with the other measures, these items were reverse scored. Therefore, higher scores on these items represent more relationship enhancing attributions. In the current study, Cronbach's alpha for the relationship questionnaire items was .60. An exploratory factor analysis was used to examine the factor structure of these attribution variables and is detailed below.

Executive Functioning Skills. Below I describe how I assessed the three skills that comprise executive functioning: working memory, inhibition, and task switching. Each of these executive functioning domains were assessed using tasks that have been shown to be reliable and valid measures of each domain (Faulkner et. al, 2019, Dawson et. al, 2015).

Working Memory. In order to assess a participant's working memory, they completed the Digit Span Backwards and Digit Span Sequencing from the Wechsler Adult Intelligence Scale – fourth edition (WAIS-IV; Wechsler, 2008). Higher scores indicate better performance.

In the digit span task (Wechsler, 2008), participants completed three conditions. In each condition participants heard an audio recording that presents the digits at 1,000 milliseconds per digit. Participants were then asked to repeat the digits back to the research assistant. Participants were given a practice item at the beginning of each condition in order to ensure their understanding of the rules. The first trial of each condition began with two digits. As participants progressed through the task, one digit was added to each subsequent string increasing the memory load on the participants. For the first condition, Digit Span Forwards, participants were given digits and asked to repeat them back verbatim. For the second condition, Digit Span Backwards, participants were given a series of digits and asked to repeat them back to the research assistant in reverse order. For the last condition, Digit Span Sequencing, participants

were asked to mentally rearrange and sequence the digits from smallest to largest. The dependent measure of working memory was the number of digits correctly recalled in during digit span backwards and sequencing conditions. Participants discontinued the task when they provided a wrong answer on two trials in a row. Cronbach's alpha for digit span backwards ranges from .79 to .89 in adults aged 18-35 and .78-.92 in older adults aged 60 to 90 (Wechsler, 2008).

Inhibition. Inhibition was measured using the Colour Word Interference from the Delis–Kaplan Executive Function System (D-KEFS; Delis, Kaplan, Kramer, 2001). This task is thought to assess inhibitory processes by requiring the respondent to ignore the automatic response of reading a printed word and to instead name the colour of ink in which the word is printed (Regard, 1981). Participants were given a practice item at the beginning of each condition in order to ensure their understanding of the rules. Each condition was timed. In the first condition, participants were shown a page with a series of coloured dots. Participants were then asked to name the colour in which the dots were printed (e.g., blue, green, red, or yellow) as fast as possible. In the second condition participants were presented with a page similar to what they saw in the first condition; however, the dots were replaced by the words of colours printed in black ink. Participants were asked to read the words as quickly as possible. In the third condition, participants were again presented with a sheet similar to what they saw in the previous condition; however, the colour names (i.e., blue, green, red, and yellow) were printed in lower case and in a coloured ink that was incongruent to the colour name (i.e., the word blue was printed in a yellow ink). Participants were asked to name the colour the word was printed in and inhibit themselves from reading the printed word. The dependent measure of inhibition was the time taken to complete Part C of the task. Lower scores on this task represent better performance. For the purpose of the current analysis, the inhibition time was reverse scored to indicate that higher

scores represented better performance, consistent with the working memory task. Cronbach's alpha ranges from .69 to .81 in adults aged 18-39 and from .80-.60 in adults aged 60 to 90 (Delis et al., 2001). The first and second condition of these tasks were used as a proxy of processing speed. These conditions were controlled for within our analyses in order to ensure that the results were reflective of one's executive functioning skills, and not impacted by one's processing speed.

Task Switching. To assess participants' task-switching ability, they completed two tasks, the first task was the final condition (Part D) from the Colour Word Interference activity from the D-KEFS, the second task was the fourth condition from the Trail Making task from the D-KEFS.

The final part of the Colour Word Interference task is thought to tap into the switching processes by requiring the respondent to switch between established rules in a timely manner. In Part D, participants completed a task very similar to Part C (mentioned above). Participants were presented with a sheet filled with colour words printed in different ink colours. They were then given a set of rules to follow when completing the task. Participants were then asked to read the ink colour the word was printed in unless the word appeared within a box, in which case, participants were asked to read the printed word, not the ink colour. Part of the dependent measure of task switching was the time taken to complete Part D of the task (Delis, Kaplan, Kramer, 2001). Typically lower scores represent better performance, however, for the purpose of the current analysis, the time was reverse scored to indicate higher scores represented better performance, consistent with the working memory task.

The Trail Making task (Delis, Kaplan & Kramer, 2001) was also used to assess task-switching ability by requiring participants to switch between a set of established rules. This task

consisted of five conditions, each of which was timed as a measure of individuals' performance. In the first condition participants were asked to scan a sheet for a specific number and cross out each one they could find as quickly as possible. This is a measure of their scanning abilities. In the second condition participants were asked to draw connecting lines to incremental numbers on a test sheet. In condition three they were asked to similarly draw connecting lines to incremental letters on a test sheet. In the fourth condition, participants were asked to alternate their connecting line between incremental numbers and alphabetical letters. The time taken to complete the fourth condition was the dependent measure of task switching. Typically lower scores represent better performance, however, for the purpose of the current analysis, the time was reverse scored to indicate higher scores represented better performance, consistent with the working memory task. In adults aged 55 to 90, Cronbach's alpha ranges from .77 to .86 for inhibition/switching and from .60 to .81 in letter-number switching (Delis et al., 2001). Finally, the last condition, was a test of motor speed in which the participants were asked to trace over a dotted line connecting circles as quickly as they could. The final condition of the trail-making task was used as a control for within our analyses as a measure of motor speed and discussed further within the results section.

A confirmatory factor analysis was used to examine the factor structure of the executive functioning variables and is described in the Results section.

Procedure

All study measures and procedures were approved by the University of Waterloo Office of Research Ethics. When the participants arrived at the lab, they reviewed the letter of information together with a research assistant and signed the study consent forms. Participants

began by completing the background questionnaire and then completed the executive functioning measures which were administered amongst a series of questionnaires unrelated to the current research. Participants also engaged in a one-on-one, face-to-face, semi-structured interview with the research assistant in the Relationship Research Lab as part of the attribution task. The study took approximately two hours to complete. Upon completion of the study, participants were asked if they had any questions, and given a debrief form with more information about the study, and contact information to use in case they have further questions before leaving.

RESULTS

Executive Functioning Construct. To create the executive functioning construct, a confirmatory factor analysis (CFA) was conducted for the working memory, inhibition, and task switching measures. The descriptive statistics for each individual condition are reported within Table 1 in Appendix 1. For the correlations between each of these measures, see Table 2 in Appendix 1. The working memory measures included the total number of digits participants recalled correctly on both digit span backwards and digit span sequencing. The task switching measures included the sum of the total amount of time it took participants to complete both colour word interference – condition 4 and trail making – condition 4. The Inhibition measures included the total amount of time participants took to complete colour word interference – condition 3. The CFA was conducted using structural equation modelling (SEM) in R with the lavaan (version 0.5- 23.1097) package. For the CFA model, Maximum Likelihood with robust standard errors was used and model fit was judged by assessing a variety of fit indices including significance testing of X^2 , CFI (>.90), TLI (>.90), RMSEA (<.08), and SRMR (close to .08 or below) (Brown, 2015; Kline, 2015). The executive functioning model did pass the exact fit test as measured by the X^2 . In addition, this model was acceptable by CFI (>.90), RMSEA (<.08, with 90% CI), SRMR (<.08), and TLI (>.95). Therefore, this model was retained, and no further modifications were made. The factor loadings for each of the executive functioning measures were all within the acceptable range (>.4). Further, the scree plot indicated a one factor solution (Figure 1). The executive functioning composite was created by standardizing the variables and creating a mean score. The details of the confirmatory factor analysis can be seen in Table 1 and Table 2. Higher scores on the executive functioning construct indicate better executive functioning performance.

Table 1. *Executive Functioning Confirmatory Factor Analysis*

Fit Indices CFA Model

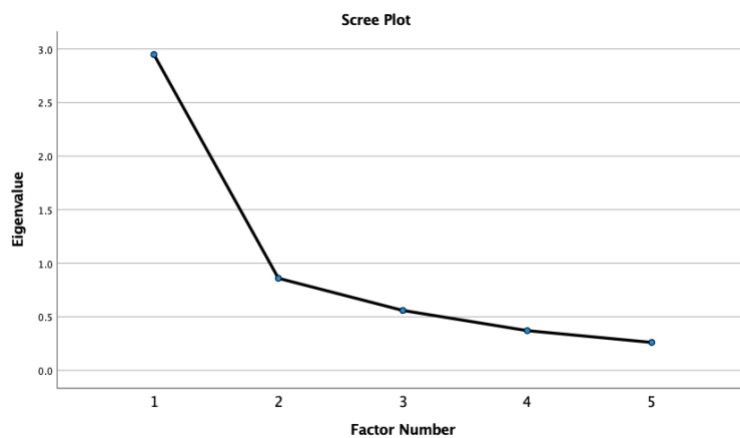
Model	Df	TLI	SRMR	χ^2 (<i>p</i> -value)	RMSEA (90% CI)	AIC	CFI	Decision
Executive Functioning Model	5	.97	.05	9.16 (<i>p</i> =0.10)	.08 (.00, .16)	1582.71	.98	Accept

Note. Model is based on robust MLM estimation

Table 2. *Executive Functioning Factor Loadings*

Item	Executive Functioning	
	Factor Loading	R-Square
Task Switching 1 – Trail Making 4	.77	.59
Task Switching 2 – Stroop 4	.87	.75
Inhibition – Stroop 3	.84	.71
Working Memory – DSB	.41	.17
Working Memory – DSS	.55	.30

Figure 1. *Scree Plot for Executive Functioning composite.*



Attribution Questionnaire Data. To investigate whether I could create an attribution questionnaire construct for the first relationship topic, an exploratory factor analysis (EFA) was conducted. The attribution questionnaire Topic 1 was comprised of 4 items. The items included one's ratings of their partner's selfishness, responsibility, disposition (internal vs. external), and globality (global vs. specific), reported on a Likert scale. The EFA was conducted within SPSS using the Maximum Likelihood extraction. The scree plot (Figure 2) indicated a two-factor solution. The items explained 44% of the variance with factor loadings from .20 to .78. The weak factor loadings, in addition to the poor Cronbach's alpha ($\alpha = 0.60$), indicate it would be inappropriate to create a composite measure. Further, while the scree plot may have suggested a 2-factor model, there was not a strong theoretical underpinnings to split the items. Therefore, the following regression analyses will be computed with the individual items. The details of the exploratory factor analysis can be seen in Table 3 and Table 4.

Table 3. *Summary of Exploratory Factor Analysis Results for Attribution Questionnaire Measure for Topic 1 Using Maximum Likelihood Estimation*

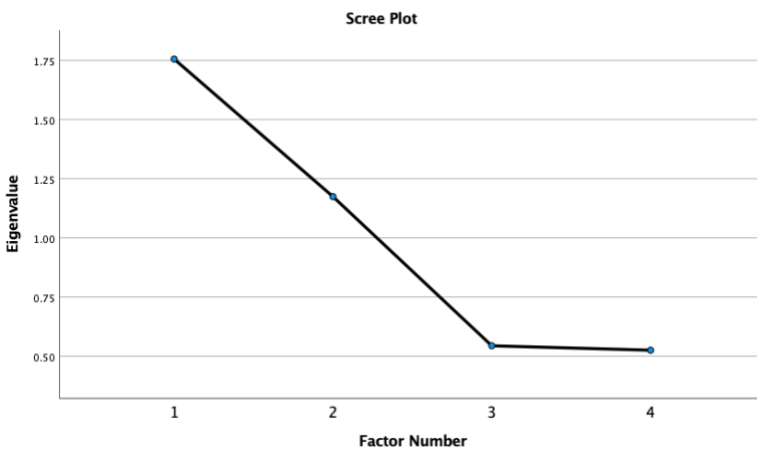
KMO And Bartlett's Test

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.56
Bartlett's Test of Sphericity	Approx. Chi-Square	64.84
	df	6
	Sig	.00
Goodness of Fit	Chi-Square	21.54
	df	2
	Sig	.00

Table 4. Attribution Questionnaire Topic 1 Factor Loadings

Attribution Questionnaire Topic 1		
	Factor Loading	Communalities
Selfish vs. Unselfish (E)	.78	.62
Responsibility (F)	.44	.19
Internal vs. External (G)	.20	.04
Global vs. Specific (H)	.53	.28
% of variance	43.89	

Figure 2. Scree Plot of Attribution Questionnaire Measure for Topic 1.



Attribution Interview Data. To investigate whether I could create an Attribution Interview construct for the first relationship topic, an exploratory factor analysis (EFA) was conducted. The attribution interview Topic 1 was comprised of 6 items. The items included the rating of the attribution's disposition (*internal vs. external*), stability (*stable vs. unstable*), intentionality (*intentional vs. unintentional*), protection (*protect vs. harm*), voluntariness (*voluntary vs. involuntary*), and *level of blame*. The EFA was conducted within SPSS using the Maximum

Likelihood extraction. The scree plot, (Figure 3), indicated a one factor solution. All items were retained. The items explained 64% of the variance with factor loadings from .62 to .97. An EFA was also conducted for the second relationship topic. Consistent with the first topic, the scree plot indicated a one factor solution and the factor loading suggested all items could be retained. The items explained 60% of the variance with factor loadings from .36 to .90. Given the strong factor loadings, in addition to the good Cronbach's alpha ($\alpha = 0.87$), it was determined acceptable to create a composite for the attribution interview data. The details of the exploratory factor analysis can be seen in Table 5 and Table 6. Higher scores on the attribution interview composite indicate more relationship enhancing attributions.

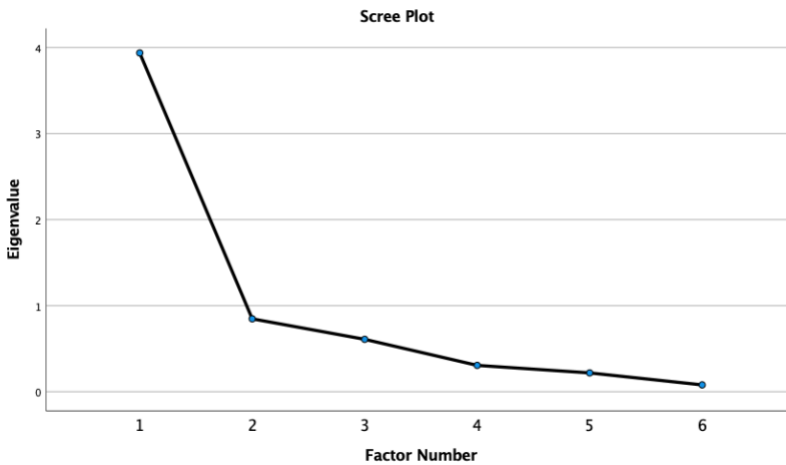
Table 5. *Summary of Exploratory Factor Analysis Results for Attribution Interview Measure for Topic 1 Using Maximum Likelihood Estimation.*

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.78
Bartlett's Test of Sphericity	Approx. Chi-Square	458.15
	df	15
	Sig	.00
Goodness of Fit	Chi-Square	87.25
	df	9
	Sig	.00

Table 6. Attribution Interview Topic 1 Factor Loadings

Attribution Interview Topic 1		
	Factor Loading	Communalities
Internal vs. External	.80	.64
Stable vs. Unstable	.62	.39
Voluntary vs. Unvoluntary	.75	.55
Intentional vs. Unintentional	.63	.39
Protect vs. Harm	.97	.94
Blame	.78	.61
% of variance	63.90	

Figure 3. Scree Plot of Attribution Interview Measure for Topic 1



In the Method section (p. 37), I described the rationale for not including the analyses of the second topic in the main analyses. However, for interested readers, I have included the exploratory factor analysis results for the second topic in Appendix 3.

Preliminary Analyses

Descriptive Information about Executive Functioning Measures

The mean scores and standard deviations of the individual executive functioning measures are provided in Table 1 in Appendix 1. In comparison to the standardization sample from the D-KEFS, the current sample's average raw score falls within the Average range of the normed scaled scored equivalents. The descriptive information for the executive functioning composite measure is provided below in Table 7.

Table 7. Means and standard deviations for Executive Functioning Composite.

<u>Measure</u>	<u>Mean (SD)</u>	<u>Missing Data</u>	<u>Alpha</u>
Executive Functioning Composite	-.01 (.79)	3	.71
Men (<i>n</i> =39)	-.31 (1.04)	1	.75
Women (<i>n</i> =93)	.12 (.63)	2	.66
Younger (<i>n</i> =63)	.29 (.55)	0	.53
Older (<i>n</i> =69)	-.29 (.88)	3	.71
Younger Men (<i>n</i> =11)	.60(.27)	0	.60
Younger Women (<i>n</i> = 52)	.23(.58)	0	.59
Older Men (<i>n</i> =28)	-.66(1.02)	1	.74
Older Women (<i>n</i> =41)	-.04(.67)	2	.65

The correlations among executive functioning constructs are presented in Appendix 1 Table 2. These variables can be interpreted such that **higher scores** on the executive functioning measures indicate **better executive functioning**. Consistent with other studies (Miyake et al., 2000), the different measures to assess executive functioning skills are associated positively with each other and the strength of the association varies from moderate to strong.

When collapsing across younger and older adult data, there was a significant gender difference between men ($M = -.31$, $SD = 1.04$, $n = 39$) and women ($M = .11$, $SD = .63$, $n = 93$) scores on the executive functioning composite, $t(49.98) = 2.31$, $p = .03$, such that the average executive functioning score for men was .41 lower than women, indicating worse executive functioning skills for men. There was a significant group difference between the younger group's and older group's executive functioning composite, $t(116.05) = 4.64$, $p < .001$, such that the average executive functioning scores for the older group were .68 lower than the younger group, indicating worse executive functioning skills for the older group.

Descriptive Information about Attribution Questionnaire Data for Topic 1

The attribution questionnaire data consisted of the following questions: (1) *My partner's behaviour during the event was motivated by selfish rather than unselfish concerns*, (2) *To what extent was your partner responsible for his/her behaviour during the event?* (3) *My partner's behaviour during the event is due to the type of person they are*, (4) *The reason my partner acted the way he/she does during the event does not affect other areas of our relationship*. These variables can be interpreted such that **higher scores** on the attribution questionnaire indicate **more positive attributions** (i.e., less selfish, lower on partner responsibility, less due to internal qualities of the partner, and less global). The descriptive information for each of the attribution questions are provided below in Tables 8 through Table 11.

Table 8. Means and standard deviations Attribution Questionnaire – Selfish vs. Unselfish.

<u>Measure</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u>Missing Data</u>
Attribution Questionnaire – Selfish vs. Unselfish	3.78 (1.17)	1-6	-.22	-1.24	3
Men (n=38)	4.05(1.73)	1-6	-.47	-1.08	1
Woman (n=91)	3.66(1.69)	1-6	-.13	-1.25	2
Younger (n=63)	3.66(1.78)	1-6	-.04	-1.41	0
Older (n=66)	4.08(1.59)	1-6	-.34	-1.05	3
Younger Men (n=11)	3.27(1.79)	1-6	.01	-1.30	0
Younger Women (n= 52)	3.50(1.79)	1-6	-.05	-1.44	0
Older Men (n=27)	4.36(1.64)	1-6	-.68	-.77	1
Older Women (n=36)	3.87(1.55)	1-6	-.14	-.99	2

Table 9. Means and standard deviations Attribution Questionnaire – Type of person

<u>Measure</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u>Missing Data</u>
Attribution Questionnaire – Type of person	2.46(1.36)	1-6	.76	-.06	3
Men (n=36)	2.59(1.60)	1-6	.76	-.40	1
Women (n=91)	2.40(1.34)	1-6	.66	-.11	2
Younger (n=63)	2.70(1.33)	1-6	.50	-.16	0
Older (n=66)	2.23(1.36)	1-6	1.10	.57	3
Younger Men (n=11)	2.91(1.51)	1-6	.82	.67	0
Younger Women (n= 52)	2.56(1.30)	1-6	.40	-.34	0
Older Men (n=27)	2.46(1.64)	1-6	.85	-.40	1
Older Women (n=36)	2.05(1.10)	1-6	1.08	1.01	2

Table 10. Means and standard deviations Attribution Questionnaire – Responsibility

<u>Measure</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u>Missing Data</u>
Attribution Questionnaire – Responsibility	4.18 (1.62)	1-6	-.43	-1.12	3
Men (n=37)	4.74(1.46)	1-6	-1.07	.05	2
Women (n=92)	3.95(1.63)	1-6	-.22	-1.23	1
Younger (n=63)	3.68 (1.43)	1-6	-.02	-1.26	0
Older (n=68)	4.65(1.48)	1-6	-.89	-.33	1
Younger Men (n=11)	2.73(2.33)	1-6	.93	-.85	0
Younger Women (n= 52)	2.42(1.29)	1-6	.46	.33	0
Older Men (n=26)	3.38(2.02)	1-6	.53	-.57	2
Older Women (n=41)	2.20(1.30)	1-6	1.43	3.12	1

Table 11. Means and standard deviations Attribution Questionnaire – Effects on other areas

<u>Measure</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u>Missing Data</u>
Attribution Questionnaire – Affects other areas	4.18 (1.62)	1-6	-.43	-1.12	1
Men (n=39)	4.74(1.46)	1-6	-1.07	.05	0
Woman (n=92)	3.95(1.63)	1-6	-.22	-1.23	1
Younger (n=63)	3.68 (1.43)	1-6	-.02	-1.26	0
Older (n=69)	4.65(1.48)	1-6	-.89	-.33	1
Younger Men (n=11)	3.82(1.72)	1-6	-.23	-1.31	0
Younger Women (n= 51)	3.65(1.62)	1-6	.03	-1.26	0
Older Men (n=28)	5.12(1.20)	1-6	-1.48	1.59	0
Older Women (n=40)	4.32(1.59)	1-6	-.57	-.87	1

The correlations among the specific attribution questionnaire items are presented in Appendix 1 Table 3. All items were significantly positively correlated with each other except for the item “*my partner’s behaviour during the event is due to the type of person they are*” was not correlated with “*my partner’s behaviour was motivated by selfish concerns*” and “*my partner’s behaviour does not affect other areas of our relationship*”

When asked to what extent their partner was responsible for their behaviour during the undesired event, women in the sample ($M = 2.33, SD = 1.29, n = 92$) were significantly more likely than men ($M = 3.19, SD = 2.11, n = 37$) in the sample to report that their partner was responsible for their behaviour, $t(47.32) = -2.32, p = .03$. In addition, when asked whether the reasons for their partner’s actions during the undesired event extend to other areas of their relationship, women in the sample ($M = 3.95, SD = 1.63, n = 92$) were significantly more likely than men ($M = 4.74, SD = 1.46, n = 39$) to report that the reasons for their partner’s behavior would also extend to other areas of their relationship, $t(129) = -2.63, p = .01$. There was no significant difference between men’s and women’s attributions when asked if their partner’s behaviour was motivated by selfish concerns or if their partner’s behaviour was due to the type of person they are.

Descriptive Information about the Attribution Interview Data Topic 1

The attribution interview composite data for topic 1 included the average data on six items. The coders rated the nature of the attributions made for the problematic incident on the following dimensions: If the attributions were (1) *internal vs. external*, (2) *stable vs. unstable*, (3) *voluntary vs. involuntary*, (4) *intentional vs. unintentional*, and (5) *whether the attributions seemed to protect or harm the relationship*, and (6) *how much blame* the participant assigned to their partner for the problematic incident. These variables can be interpreted such that higher

scores on the attribution interview items indicate more relationship protective attributions. The descriptive information for each of the attribution questions are provided below in Table 12.

Table 12. Means and standard deviations Attribution Interview Composite.

<u>Measure</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u>Missing Data</u>
Attribution Questionnaire – Composite	3.51 (1.22)	1-5	.05	-.31	20
Men (n=35)	4.00 (1.35)	1-5	.17	-.11	4
Women (n=77)	3.31 (1.10)	1-5	.04	-.33	16
Younger (n=60)	3.21 (1.22)	1-5	.09	-.86	2
Older (n=51)	3.80 (1.16)	1-5	.10	.29	18
Younger Men (n=10)	3.07(1.16)	1-5	-.49	-.94	1
Younger Women (n= 50)	2.20(1.01)	1-5	.50	-.85	2
Older Men (n=25)	1.99(1.01)	1-5	.68	-1.06	3
Older Women (n=26)	1.75(1.06)	1-5	1.72	1.94	15

The correlations among the specific attribution interview items are presented in Appendix 1 Table 5. All items within the attribution interview are associated positively with each other and the strength of the association varies from moderate to strong.

Similar to the attribution questionnaire, I compared the results for men and women for each item of the attribution interview, collapsing across the age groups. There was no significant difference between men and women’s attributions on the attribution interview data.

Quality of Marriage Data: There was a significant gender difference between men’s and women’s scores on the Quality of Marriage Index, $t(120.13)$, $p = .047$, such that the average QMI score for men was 2.13 higher than women, indicating that men had higher rating for their relationship satisfaction than women (see Table 13).

Table 13. Means and standard deviations Quality of Marriage.

<u>Measure</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>	<u>Missing Data</u>
Quality of Marriage Index (132)	38.51 (6.98)	13-45	-1.61	2.40	0
Men (n=39)	40.01 (4.30)	26-45	-1.25	1.75	0
Women (n=93)	37.89 (7.76)	13-45	-1.42	1.41	0
Younger (n=63)	38.04 (6.64)	17-45	.24	.90	0
Older (n=64)	38.94 (7.29)	13-45	-1.96	3.77	0
Younger Men (n=11)	39.82(3.46)	31-43	-1.99	4.07	0
Younger Women (n= 52)	37.67(7.10)	17-45	-1.04	.36	0
Older Men (n=28)	40.09(4.65)	26-45	-1.18	1.55	0
Older Women (n=41)	38.16(8.62)	13-45	-1.73	2.20	0

Correlations Among Key Study Measures. The correlations among key study variables are presented in Appendix 1 Table 7. As expected, age was negatively correlated with executive functioning, such that the older the individual, the lower their executive functioning skills. In addition, age was positively correlated with how one attributed the selfishness of the undesired behaviour, such that, older individuals tended to rate their partner’s behaviour in more favourable (less selfish) terms. In contrast, age was negatively correlated with one’s attributions on the interview data, such that the older individuals tended to rate their partner’s behaviour less favourably during the attribution interview.

Relationship satisfaction was significantly and positively correlated with the attribution questionnaire, such that the more satisfied one rated their relationship, the more favorably they viewed their partner’s undesired behaviour (Appendix 1, Table 7). That is, participants who had greater relationship satisfaction saw their partners as less responsible for the behaviour and less selfish. They also indicated that the behaviour was not a result of the type of person their partner

is, and that the behaviour did not affect other areas of their relationship. Relationship satisfaction was also positively correlated with the attribution interview data, suggesting that individuals with higher relationship satisfaction provided answers to the attribution interview that indicated that they viewed their partner's undesirable behaviour in more favourable terms, as compared to individuals who scored lower on relationship satisfaction.

Main Effects Models

In the following five analyses, I ran multiple regression analyses to test the main effects of relationship satisfaction, executive functioning skills, and age on each of the attribution variables. Relationship satisfaction and executive functioning were modeled dimensionally and age was modeled as a categorical variable (younger = 0; older = 1). Each model is distinguished by the specific outcome variable being tested, as specified below. While the attribution data for topic two was excluded (as mentioned in the above Methods section), the main effects tables are included in Appendix 3, Tables 5-8.

Supplementary analyses. Note that in addition to the primary main effects models described below, I re-ran each model with additional demographic covariates (gender and education). I chose to include these covariates because the descriptive statistics showed that attributions varied by gender. I also included education because it is associated with executive functioning skills. After I describe the main results for each model, I describe the findings for the supplementary analyses.

Model 1a. Outcome Variable is Item 1 from Attribution Questionnaire (*My partner's behavior was motivated by selfish rather than unselfish concerns*).

The results of the multiple regression analysis showed that higher relationship quality was associated with more unselfish attributions ($b = 0.10, p < .001$), but executive functioning ($b = -0.13, p = .50$) and age ($b = 0.48, p = .11$) were not associated with the extent to which the partner's behaviors was rated as selfish (see Table 14).

Model 1a Supplementary Analyses. When gender and education were added as covariates, ($|bs| = 0.08, ps > .10$), the results did not change ($R^2 = .21$) (see Table 15).

Table 14. *Main Effects Model for Selfish Attributions*

	<i>B</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
						<i>Lower</i>	<i>Upper</i>
Intercept	3.54	NA	0.20	17.38	<.001	3.14	3.95
Rel Qual	0.10	0.41	0.02	4.97	<.001	.06	.14
EF	-0.13	-0.06	0.19	-0.67	.50	-.50	.25
Age Group	0.48	0.14	0.29	1.62	.11	-.11	1.06

Note: $R^2 = .19$

Table 15. Main Effects Model for Selfish Attributions (with covariates included)

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
						Lower	Upper
Intercept	2.21	NA	0.82	2.69	.01	.59	3.82
Rel Qual	0.09	0.39	0.02	4.74	<.001	.06	.13
EF	-0.13	-0.06	0.19	-0.68	.03	-.51	.25
Age Group	0.51	0.15	0.30	1.70	.09	-.08	1.11
Gender	-0.08	-0.02	0.32	-0.24	.81	-.71	.56
Education	0.08	0.14	0.05	0.65	.10	-.01	.18

Note: $R^2 = .21$

Model 1b. Outcome Variable is Item 2 from Attribution Questionnaire (To what extent was your partner responsible for their behavior during the event).

Individuals who were more relationally satisfied were less likely to rate their partner as responsible for their behaviour ($b = 0.05, p = .01$). Also, individuals with higher executive functioning were more likely to rate their partner as responsible for their behaviour ($b = -0.39, p = .04$), but age was not associated with responsibility attributions ($b = -0.08, p = .80$) (see Table 16).

Model 1b Supplementary Analyses. When gender and education were added as covariates, relationship quality remained a significant predictor ($b = 0.04, p = .02$) but executive function dropped to non-significance ($b = -0.32, p = .10$). Men attributed less responsibility to their partners than women ($b = 0.76, p = .02$), though education was not a significant predictor ($b = -0.04, p = .47, R^2 = .13$) (see Table 17).

Table 16. Main Effects Model for Responsibility Attributions

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
						<i>Lower</i>	<i>Upper</i>
Intercept	2.62	NA	0.21	12.73	<.001	2.21	3.03
Rel Qual	0.05	0.22	0.02	2.55	.01	.01	.09
EF	-0.39	-0.19	0.19	-2.05	.04	-.76	-.01
Age Group	-0.08	-0.02	0.30	-0.26	.80	-.66	.51

Note: $R^2 = .08$

Table 17. Main Effects Model for Responsibility Attributions (with covariates included)

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
						<i>Lower</i>	<i>Upper</i>
Intercept	3.12	NA	0.84	3.73	<.001	1.47	4.78
Rel Qual	0.04	0.20	0.02	2.72	.02	.01	.09
EF	-0.32	-0.15	0.19	-1.65	.10	-.70	.05
Age Group	-0.17	-0.05	0.30	-.56	.58	-.76	.42
Gender	0.76	0.21	0.32	2.34	.02	.11	1.38
Education	-0.04	-0.06	0.05	-0.74	.47	-.14	.06

Note: $R^2 = .13$

Model 1c. Outcome Variable is Item 3 from Attribution Questionnaire (*My partner's behavior during the event was due to the type of person they are*).

Individuals who reported higher relationship quality ($b = 0.05, p < .01$) and those who were younger in age ($b = -0.62, p = .01$) were less likely to view the event as related to the type of person they believe their partner to be, but executive function was unrelated to essentialization of one's partner ($b = -0.19, p = .22$) (see Table 18).

Model 1c Supplementary Analyses. When gender and education were added as covariates, the results did not change (see Table 19).

Table 18. *Main Effects Model for Attributions Related to Essentialization*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
						<i>Lower</i>	<i>Upper</i>
Intercept	2.80	NA	0.17	16.16	<.001	2.44	3.12
Rel Qual	0.05	0.24	0.02	2.80	<.01	.01	.08
EF	-0.19	-0.11	0.16	-1.22	.22	-.51	.12
Age Group	-0.62	-0.22	0.25	2.49	.01	-1.11	-.13

Note: $R^2 = .10$

Table 19. *Main Effects Model for Attributions Related to Essentialization (with covariates included)*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
						<i>Lower</i>	<i>Upper</i>
Intercept	3.28	NA	0.70	4.72	<.001	1.91	4.65
Rel Qual	0.05	0.24	0.02	2.70	<.01	.01	.08
EF	-0.18	-0.10	0.16	-1.08	.28	-.50	.14
Age Group	-0.66	-0.24	0.25	-2.60	.01	1.16	-.16
Gender	0.26	0.09	0.27	0.94	.35	-.28	.79
Education	-0.03	0.07	0.04	-0.82	.44	-.12	.05

Note: $R^2 = .11$

Model 1d. Outcome Variable is Item 4 from Attribution Questionnaire (*The reason my partner acted the way they did does not affect other areas of our relationship*).

Individuals who reported higher relationship quality ($b = 0.13, p < .001$) and those who were older ($b = 0.89, p < .001$) were less likely to make global attributions of their partner. Executive functioning skills were not associated with making specific versus global attributions for partner behaviour ($b = -0.16, p = .30$) (see Table 20).

Model 1d Supplementary Analyses. Adding gender and education as covariates did not change these associations (see Table 21).

Table 20. *Main Effects Model for Specific versus Global Attributions*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
						<i>Lower</i>	<i>Upper</i>
Intercept	3.73	NA	0.17	22.44	<.001	3.40	4.06
Rel Qual	0.13	0.56	0.02	8.20	<.001	.10	.16
EF	0.05	0.03	0.15	0.34	.73	-.25	.35
Age Group	0.89	0.27	0.24	3.73	<.001	.42	1.36

Note: $R^2 = .41$

Table 21. *Main Effects Model for Specific versus Global Attributions (with covariates included)*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
						<i>Lower</i>	<i>Upper</i>
Intercept	2.95	NA	0.66	4.46	<.001	1.62	4.25
Rel Qual	0.12	0.55	0.02	7.92	<.001	.09	.16
EF	0.07	0.04	0.15	0.48	.63	-.21	.40
Gender	0.25	0.07	0.25	0.98	.33	.37	1.33
Education	0.04	0.06	0.04	0.88	.38	-.23	.79
Age Group	0.84	0.26	0.24	3.50	<.001	-.03	.12

Note: $R^2 = .43$

Model 1e. Outcome Variable is the Composite of Attribution interview.

Individuals who reported higher relationship quality ($b = 0.09, p < .001$) and were older ($b = 0.43, p = .02$) reported more positive attributions on the attribution interview, but executive function was not associated with the composite attribution interview ($b = -0.14, p = .23$) (see Table 22).

Model 1e Supplementary Analyses. When gender and education were added as covariates, the results did not change (see Table 23).

Table 22. *Main Effects Model for the Attribution Interview Composite*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
						<i>Lower</i>	<i>Upper</i>
Intercept	3.29	NA	0.13	24.97	<.001	3.03	3.56
Rel Qual	0.09	0.53	0.01	7.28	<.001	.07	.12
EF	-0.14	-0.09	0.12	-1.20	.23	-.38	.10
Age Group	0.43	0.18	0.19	2.30	.02	-.06	.81

Note: $R^2 = .34$

Table 23 - *Main Effects Model for the Attribution Interview Composite (with covariates included)*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
						<i>Lower</i>	<i>Upper</i>
Intercept	2.69	NA	0.53	5.09	<.001	1.33	4.55
Rel Qual	0.09	0.51	0.01	6.86	<.001	.03	.10
EF	-0.11	-0.07	0.12	-0.91	.36	-.50	.25
Age Group	0.39	0.16	0.19	2.03	0.04	-.58	.60
Gender	0.33	0.12	0.20	1.62	.11	-.70	.56
Education	0.03	0.07	0.03	0.96	.34	-.06	.14

Note: $R^2 = .36$

Moderation Models

In addition to the main effects tested in the models above, I was interested in the two-way interaction between executive functioning and age, as well as the two-way interaction between executive functioning and relationship satisfaction and age and relationships satisfaction. These interactions allow us to investigate whether the effect of executive functioning on attributions

varies by age and relationship quality, respectively. To test these interaction effects, I conducted a multiple moderation analyses for each outcome variable. All of the analyses reported below were conducted in two ways: with and without the covariates added. The covariates that were included were the same as the main effects model: gender and education. The results did not change in direction or significance so I am reporting the findings from the more parsimonious model.

Model 2a. Outcome Variable is Item 1 from Attribution Questionnaire (*My partner's behavior was motivated by selfish rather than unselfish concerns*).

The results of the moderation analyses showed a significant main effect for relationship quality ($b = 0.09, p < .01$), such that individuals who reported higher relationship quality were less likely to attribute their partner's behaviours to selfish reasons. In addition to this main effect, there was significant two-way interaction of relationship quality and executive function ($b = -0.08, p = .02$) (see Table 24). To examine this interaction, I conducted simple slopes analyses (Aiken and West, 1991) by examining the association between relationship satisfaction and selfish attributions at two different levels of executive functioning, one standard deviation above mean executive functioning and one standard deviation below mean of executive functioning. At low levels of executive function, relationship quality strongly predicted more unselfish attributions ($b = 0.15, p < .001$), but at high levels of executive function, relationship quality was no longer a significant predictor ($b = 0.03, p = .44$).

Table 24. Moderation Model for Selfish Attributions

	b	SE	t	p	95% Confidence interval	
					Lower	Upper
Intercept	3.57	0.24	14.98	<.001	3.09	4.04
Rel Qual	0.09	0.02	2.89	<.001	.05	.13
EF	0.03	0.22	0.15	.89	-.50	-.40
Age Group	0.40	0.31	1.18	.20	-.22	1.00
RQ × EF	-0.08	0.03	-2.35	.02	-.14	-.01
RQ × Age	-0.01	0.00	-0.10	.98	-.00	.00
EF × Age	-0.01	0.01	-0.44	.51	-.03	.01

Note: $R^2 = .24$

Model 2b. Outcome Variable is Item 2 from Attribution Questionnaire (To what extent was your partner responsible for their behavior during the event).

I found a main effect of relationship quality ($b = 0.05, p = .01$) and a significant interaction between relationship quality and executive function ($b = -0.07, p = .04$) (see Table 25). I broke down this interaction in the same way as above by conducting a simple slopes analyses (Aiken and West, 1991). At low levels of executive function, relationship quality predicted less selfish attributions ($b = 0.13, p < .01$), but at high executive function, the association was nonsignificant ($b = 0.03, p = .46$).

Table 25. Moderation Model for Responsibility Attributions

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
					<i>Lower</i>	<i>Upper</i>
Intercept	2.80	0.24	11.53	<.001	2.31	3.27
Rel Qual	0.05	0.02	2.47	.01	.01	.09
EF	-0.47	0.22	-2.13	.04	-.91	-.03
Age Group	-0.26	0.31	-0.83	.41	-.88	.36
RQ × EF	-0.07	0.03	-2.13	.04	-.14	-.01
RQ × Age	-0.00	0.00	-1.43	.15	-.00	.00
EF × Age	0.01	0.01	0.55	.58	.01	.02

Note $R^2 = .12$

Model 2c. Outcome Variable is Item 3 from Attribution Questionnaire (*My partner's behavior during the event was due to the type of person they are*).

I found a main effect of relationship quality ($b = 0.05, p = .01$) and of age ($b = -0.68, p = .01$), such that individuals who were more relationally satisfied were less likely to attribute their partners behaviour to internal reasons. Further, older individuals were more likely to attribute their partner's behaviour as stemming from something internal. There were no significant interactions ($|bs| < 0.1, ps > .49$) (see Table 26).

Table 26. Moderation Model for Attributions Related to Essentialization

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	95% Confidence interval	
					<i>Lower</i>	<i>Upper</i>
Intercept	2.85	0.21	13.74	<.001	2.44	3.26
Rel Qual	0.05	0.02	2.75	.01	.01	.08
EF	-0.24	0.19	-1.29	.20	-.62	.13
Age Group	-0.68	0.27	-2.53	.01	-1.20	-.15
RQ × EF	-0.02	0.03	-0.59	.56	-.07	.04
RQ × Age	-0.01	0.00	-0.89	.38	-.00	.00
EF × Age	0.03	0.01	0.31	.76	-.01	.02

Note: $R^2 = .10$

Model 2d. Outcome Variable is Item 4 from Attribution Questionnaire (*The reason my partner acted the way they did does not affect other areas of our relationship*).

I found main effects of age ($b = .96, p < .001$) such that older individuals were more likely to identify that their partner's behaviour affects other aspects of their relationship. Further, there was a main effect of relationship quality ($b = .13, p < .001$) such that individuals who were more relationally satisfied were less likely to identify that their partner's behaviour affects other aspects of their relationship. There were no significant interactions ($|bs| < .01, ps > .63$) (see Table 27).

Table 27. Moderation Model for Specific versus Global Attributions

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
					<i>Lower</i>	<i>Upper</i>
Intercept	3.68	.20	18.54	<.001	3.09	4.04
Rel Qual	0.13	0.02	7.92	<.001	.10	.16
EF	0.07	0.18	0.39	.70	-.29	.43
Age Group	0.96	0.26	3.75	<.001	-.45	1.46
RQ × EF	0.01	0.03	0.49	.62	-.04	.07
RQ × Age	>-0.01	0.01	0.25	.98	-.00	.00
EF × Age	-.01	0.01	-0.04	.63	-.02	.01

Note: $R^2 = .41$

Model 2e. Outcome Variable is the Composite of Attribution interview.

The results showed a significant main effect of relationship quality ($b = 0.09, p < .001$), a marginally nonsignificant main effect of age ($b = 0.37, p = .07$), and a significant interaction of relationship quality and executive function ($b = -0.05, p = .04$). To break this down, I conducted a simple slopes model (Aiken and West, 1991) with relationship quality as the predictor, executive function as the moderator, and age and the other two interaction terms as covariates. This interaction analysis was conducted by examining 1 standard deviation above and below the executive functioning mean. At low levels of executive function, relationship quality predicted positive attributions ($b = 0.14, p < .001$). At high levels of executive function, relationship quality remained a significant predictor, though not as strongly ($b = 0.07, p = .01$) (see Table 28).

Table 28. Composite Moderation Model

	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	<i>95% Confidence interval</i>	
					<i>Lower</i>	<i>Upper</i>
Intercept	3.33	0.15	21.64	<.001	3.04	3.65
Rel Qual	0.09	0.01	6.96	<.001	.06	.12
EF	-0.14	0.14	-0.95	.34	-.42	.15
Age Group	0.37	0.20	1.85	.07	-.03	.76
RQ × EF	-0.05	0.02	-2.08	.04	-.09	-.00
RQ × Age	0.00	0.03	-0.78	.44	-.00	.00
EF × Age	-0.00	0.01	-0.25	.80	-.01	.01

Note: $R^2 = .37$

All the analyses, including the main effects models and the moderation models were conducted again, sequentially controlling for Condition 1 and 2 of the Colour Word Interference task and Condition 5 of the Trail Making task. These conditions were controlled for in order to ensure that the results were reflective of one's executive functioning skills, and not impacted by one's processing speed. For Condition 1 and 2 of the Colour Word Interference participants were first asked to name the colour in which the dots were printed and read the printed words as quickly as possible. For Condition 5 of the Trail-Making task participants were asked to trace a dotted line connecting dots as quickly as possible. These conditions acted as a proxy for participant's processing speed. After controlling for these conditions, the direction and significance of the findings remained the same with the exception of the following analyses. Within the main effects analysis, when participants were asked the extent to which their partner was responsible for the unwanted behaviour, only relationship quality remained a significant predictor but executive function dropped to non-significance after controlling for Condition 1

and 2 for the Colour Word Interference task and Condition 5 for the Trail Making task. This pattern of results is consistent with the results when gender and education were controlled for.

DISCUSSION

The goal of the current study was to investigate the association between executive functioning skills and the attributions that individuals make for their romantic partner's negative behaviours and to investigate how this association varies by age. This goal was grounded within two theoretical perspectives, the Frontal Aging hypothesis and the Socioemotional Selectivity theory. These two theories highlight a paradox within the aging literature, first, that executive functioning declines with age, which may have implications on attributions one makes, and second, that emotion regulation increases with age, which may have potential positive implications on the attributions one makes. I aimed to clarify this paradox by specifically testing the link between executive functioning and one's attributions for negative relationship events that they have experienced with their close romantic partners.

Attributions are foundational to being human and making sense of the world around us, therefore, understanding this phenomenon is extremely important (Kelly, 1972). The act of inferring the causes of events or behaviors happens numerous times per day from infancy to death, usually without any awareness of the underlying processes and biases that lead to our inferences (Heider, 1976). Over the course of a single day, individuals make numerous attributions about their own behaviour as well as the behaviours of the people around them. Attributions have a prominent role in influential theories of relationship development, including cognitive-behavioural, attachment based, and relationship theories that are based on interpersonal theory (e.g., Baucom et al., 1991; Johnson et al., 1999). Further, they have been described as a target of change in interventions designed to alleviate or prevent marital dysfunction (e.g., Baucom, et al., 1990; Markman et al., 1994).

There is a robust relationship between marital satisfaction and the types of attributions couples make for negative relationship events (Bradbury & Fincham, 1990). When there is conflict in a marriage, distressed couples tend to view each other as the cause of the problem and place blame on each other. When couples make negative attributions, they are more likely to engage in harmful forms of communication when discussing areas of conflict (Bradbury et al., 1996; Bradbury & Fincham, 1992; Miller & Bradbury, 1995), which in turn is predictive of relationship dissatisfaction and instability (Karney & Bradbury, 1995). Along this line, Karney and Bradbury (2000) demonstrated that attributions in marriage often change over time and that changes in attributions predict longitudinal changes in relationship satisfaction. This conceptualization is consistent with Kelley's (1967) factorial model of attributions, which posits that the attributions a spouse makes for specific marital events are based on their previous experiences in the relationship. That is, spouses' global evaluations of the relationship should influence their interpretations and evaluations of specific marital events. Therefore, the kinds of attributions that spouses make should change as their global evaluations of the marriage wax and wane over time. Karney and Bradbury (2001), also found evidence for a bidirectional nature between attributions and marital satisfaction. That is, attributions predicted changes in marital satisfaction, and marital satisfaction also predicted changes in the attributions one makes for their partner's behaviour.

While past research has extensively examined how a range of *intrapersonal* (Forgas & George, 2001, Forgas & Locke, 2005) and *interpersonal* factors (Fincham & Bradbury, 1987) influence attributions, the role of executive functioning skills on attributions has yet to be investigated. Executive functioning skills are involved in higher level cognitive tasks and essential to maintaining interpersonal relationships (von Hippel & Gonsalkorale, 2005). These

skills been found to decline in older adulthood. Given that attributions can change or fluctuate, I was interested in exploring how age-related differences in executive functioning skills may influence one's attributions. When investigating the impact of executive functioning on the attributions one makes for their partners undesired behaviour, I could posit two different patterns of association between age, executive functioning skills, and relationship attributions, with each pattern being predicted by a different theoretical perspective. The first theory, Socioemotional Selectivity theory (Carstensen, 2006; Carstensen et al., 1999; Mather & Knight, 2006), suggests that as individuals age, their motivation shifts to maximizing emotional well-being. This process is achieved by increasing positivity within one's social relationships through maturity, familiarity, and contact frequency. It further posits that individuals acquire social skills from their lived experience and learn to better control their emotions (Carstensen et al., 1995; Charles et al., 2001). Therefore, as one ages, it is reasonable to assume that one may make more positive attributions about negative relationship events in order to maintain emotional well-being, regardless of their declining executive functioning skills. However, the second theory, the Frontal Aging hypothesis, posits that as individuals grow older, they experience a weakening in their frontal lobe, which supports their executive functioning skills (Dempster, 1992; West, 1996). Greater executive functioning skills have been associated with successful emotion regulation and expressive suppression, cognitive reappraisal, and self-enhancement (Gross & Levenson, 1993, Gross & John, 1998, & Alicke & Sedikides, 2009). Therefore, it is reasonable to assume from this theory that as one ages, their executive functioning skills decline, leading them to make more negative causal attributions. Before I review the rationale and describe the findings for our key hypotheses, I discuss how we assessed attributions and what the findings suggest about the psychometric properties of this measure.

I assessed participants' attributions of their partners' behaviour using two methods: an attribution questionnaire and an attribution interview. For both methods, the participants were asked to think of a recent event (in the past two weeks) when they experienced conflict with their spouse and to describe the event to the interviewer. They were then asked to explain why they believed the event happened. After the interview was completed, each participant completed the attribution questionnaire, which was also designed to assess participants' beliefs about why the event occurred. This process (identify recent event → interview → questionnaire) occurred twice for each participant, in order to collect data for two different events. As mentioned within the methods section, the data for the second topic was not included due to confounds between the younger and older group. That is, that the older group selected events in the more distant past that may have become less salient or less emotionally arousing (due to passage of time). To investigate whether I could create an attribution questionnaire construct for both events, an exploratory factor analysis (EFA) was conducted. The EFA revealed weak factor loadings, in addition to the unacceptable alphas, indicating that it would be inappropriate to create a composite measure. Therefore, the key analyses were computed with the individual items from the attribution questionnaire, rather than using a composite measure.

Similarly, an EFA was conducted for the attribution interview codes for both topics. Given the strong factor loadings, in addition to the good Cronbach's alpha, it was determined acceptable to create a composite for the attribution interview data. This is inconsistent with results of the attribution questionnaire EFA. One question that arises, is why did the attribution interview ratings load on to a single factor, whereas the attribution questionnaire ratings did not? One possible reason is due to coder drift. That is, although coders were provided clear instructions for how to code the attribution interviews (see Appendix 2 for a copy of the coding

manual), it is possible that they were influenced by the overall valence of the interview and tended to code on the degree of positivity/negativity expressed by the participant, rather than the specific attributions they were providing in the interview. This validates the decisions to have more than one method of assessment of the key construct, and highlights the need to investigate both reliability and validity of coding systems and measurements. It is important to highlight the differences in these two attribution methodologies. That is, the interview was generally open-ended and participants were not directly asked about the nuances of the attributions. Specifically, participants were asked “why do you think this event happened” and “what was the cause of your partner’s behaviour?”, whereas the questionnaire asked participants to specifically rate whether their partner’s behaviour was due to the type of person they are, if their partner had control over their behaviour, if their behaviour was motivated by selfish concerns, and if their behaviour impacted other areas of their life. It is also possible that the attribution interview is more strongly associated with the overall sentiment toward the relationship, rather than the specifics of the event.

The other key construct I assessed was executive functioning skills. Miyake and colleagues (2000) used a latent variable approach and reported that a three-factor model best described the structure of executive functioning, including shifting, updating (working memory), and inhibition. Consistent with previous research’s conceptualization of executive functioning, the inhibition, switching, and working memory tasks were combined to make an executive functioning construct. This was supported by a confirmatory factor analysis.

The executive functioning results are consistent with the abundant established literature which has found that normative aging is associated with a decline in executive functions (Phillips & Henry, 2008, Campbell, 1990; Christensen, 2001; Crawford et al., 2000). That is, within the

sample, older individuals had significantly lower executive functioning skills compared to the younger individuals. Further, the executive functioning composite I created is in line with previous studies on executive functioning (Faulkner et. al, 2019, Dawson et. al, 2015). These consistencies with past research on the structure of the executive functioning construct and the age-related changes in executive functioning demonstrate the validity of the conceptualization of executive functioning. These findings also support the Frontal Aging hypothesis, which states that as one ages, their executive functioning skills decrease. While these declines happen consistently with age, research has also demonstrated that older age is associated with significant inter- and intra-individual differences in the precise rate at which executive skills change (Christensen et al., 1994; Morse, 1998). This was also supported in the data as the older adult sample had a significantly greater variability in their EF scores, as compared to the younger sample.

In reviewing the results of the study and discussing their implications, I begin with findings of the preliminary analyses, followed by the main effects models. The interaction models will be investigated last.

Preliminary Analyses

I begin by discussing the findings for the attribution questionnaire data. There were four items in the questionnaire and they corresponded to the following attributions: (1) the extent to which the partner's behaviour reflected *selfishness*; (2) the extent to which the *partner was responsible* for the behaviour; (3) the partner's behaviour reflects the *type of person* they are; and, (4) the extent to which the partner's behaviour effects *other areas of the relationship*. Younger participants were significantly more likely to view their partner's behaviour in selfish terms and to view the behaviour as negatively impacting other aspects of the relationship.

Conversely, older adults were more likely to view the behaviour as due to the type of person their partner is. There were no significant differences between the two age groups regarding partners' responsibility for the behaviour. The attribution interview data suggested that older adults provided significantly more positive attributions about their partner's undesirable behaviour, as compared to younger adults. Not surprisingly and consistent with many past studies (Graham & Conoley, 2006, Fincham & Bradbury, 1987) both older and younger adults' data suggested that individuals who were happier in their relationship were more likely to provide more positive attributions. It is also noteworthy that while all four of the attribution questionnaire items were associated with younger adults' relationship quality, only two of them (selfishness; specific versus global) were associated with older adults' relationship quality. It is possible that as individuals get older, the link between how specific relationship events are processed and appraised becomes more weakly associated with overall relationship satisfaction. It is also possible that there is greater acceptance of the partner, that is, 'this event occurred because of who they are, and I am okay with that'. This acceptance may occur in an effort to preserve one's overall perspective of the relationship. If true, this would be consistent with Socioemotional Selectivity theory, but would need further examination to understand the processes by which older adults may be de-linking specifics from their overall relationship quality. Does this happen only for negatively valenced events? Do they try to ignore or withdraw from the negative event (encoding stage) or is it that they make this change through reformulating the meaning of the experience? These empirical questions would get at potential mechanisms and by doing so, they would further clarify theories of relational functioning in older adults.

The findings also show that it is important to consider different types of causal attributions, rather than only assessing attribution on a single dimension of valence (positive to negative). In the romantic relationship literature, many of the studies that have investigated attributions have focused on relationship-enhancing versus relationship-distressing attributions (Karney & Bradbury, 1995, Graham & Conoley, 2006). The pattern of results in this work suggests that this global categorization of attributions could miss more granular information about how different age groups think about the causes of their partner's behaviour. Also, most of the work in the area of relationship attributions has been done using sample of couples who are young or middle aged. In these younger and middle-aged samples, different types of causal attributions tend to be related in consistent ways to relationship quality; however, as we see in the current sample, the associations between different causal attributions and relationship quality does not follow the same pattern for older adults as it does for the younger sample. This further underscores the potential utility of examining different types of attributions, rather than *a priori* assuming that certain types of attributions are relationship-enhancing and others are relationship-distressing. This may be relevant when comparing across age groups as well as cultural groups. Like many other areas of Psychology, most of the work in the area of intimate relationships is based on North American samples. When research is extended to other populations (older adults, as compared to younger and mid-life adults; non-White cultural groups), the measures that have been developed and validated in the original samples are used, without always considering whether they are valid when research questions are being asked in understudied populations.

While older adults overall made more relationship-enhancing attributions, I also found that older adults were significantly more likely to view their partner's behaviour as due to the type of person they are; that is, older adults were more likely to make more dispositional

attributions as compared to younger adults. The finding that older adults were significantly more likely to view their partner's behaviour as due to *the type of person they are* is consistent with previous research findings that show that older adults tend to make more dispositional attributions as compared to younger adults. Past research has found that older adults tend to rely on stereotypes when making attributions (Mather et al., 1999) and to have a heightened tendency toward dispositional, or internal, inferences when making causal attributions for unknown people (Blanchard-Fields, 1996, 1999). I found similar results for those within close relationships. This item on the attribution questionnaire identifies the 'locus of control' for attributional activity, the belief that another's behaviour is guided by external factors, for example, their environment, or internal factors, such as the other's ability, effort, or personality. Distressed couples have often been found to make more internal attributions for their partners' negative behaviours, thereby enhancing the impact of those behaviours (Graham & Conoley, 2006). However, it could be that for older adults, this attribution is not a negatively valenced attribution. In the opening of the introduction, I discussed Meagan, and her experience walking into the kitchen to see dirty dishes and a mess left on the counter by her partner. I posited that she may think that this behaviour was uncharacteristic of him and reflective of the stress he is experiencing, thus making a relationship enhancing external attribution about said behaviour. However, what if Meagan came from a place of acceptance and thought "oh that's just Chris", and continued about her day. It is possible that the Socioemotional Selectivity theory could also play a role in the shifting of how one interprets behaviour, or how much that behaviour bothers their partner. That is, this theory posits that with age comes increased emotional maturity and increased familiarity with a partner which leads to increases positivity within the relationship. Therefore, this internal attribution may be more related to acceptance and familiarity.

When I looked at the pattern of results altogether, the findings from the preliminary analyses support aspects of both theories but provide greater support for Socioemotional Selectivity theory. Consistent with the Frontal Aging hypothesis, I found that executive functioning skills declined with age. However, contrary to the Frontal Aging hypothesis, older adults made more relationship-enhancing attributions, which suggests better emotional control. Socioemotional Selectivity theory posits that, as individuals age, their motivation to maintain emotional well-being increases. Although this mechanism was not tested in our work, the pattern of results is consistent with what Socioemotional Selectivity theory would have predicted.

With a decline in executive functioning, I would anticipate a decrease in emotion regulation and cognitive reappraisal. That is, I would expect that older individuals may make more relationship-diminishing causal attributions due to their weakened executive functioning skills. This was not the case, however, as I found that older individuals in fact make more relationship-enhancing attributions for their partner's behaviour when compared to younger individuals. This indicates that the results align with the Socioemotional Selectivity theory more closely than the Frontal Aging Hypothesis. Older participants were significantly less likely to view their partner's behaviour in selfish terms and less likely to view the behaviour as negatively impacting other aspects of the relationship than younger participants. It is possible that the personal importance of their own marital quality and emotional well-being was activated as a protective factor when participants were making attributions for their partner's behaviour. Further, one's familiarity with their long-term partner may allow individuals to anticipate and successfully cope with problems that have arisen in their relationship over the years. As such, older adults may hold relational schemas that allow them to anticipate and manage conflict in

their close, long-term relationships, thus bolstering against declines in executive functioning skills.

Main Effects Analyses

In the preliminary analyses I examined the effects of the predictor variables (age, executive functioning, relationship satisfaction) on each attribution. To investigate the unique contributions of each of these key variables, I simultaneously regressed each attribution variable on age, executive functioning, and relationship satisfaction. I found a significant main effect of relationship satisfaction across all of the attribution questionnaire items. This was the most consistent finding across all the attribution outcomes that were tested. Specifically, those with higher relationship satisfaction were less likely to see their partner's behaviour being motivated by selfish concerns, less likely to see their partner as responsible for the undesired behaviour, less likely to see their partner's behaviour as internally motivated, and were less likely to view their partner's undesired behaviour as affecting other aspects of their relationship. For other variables, the findings were less consistent, and are discussed in more detail below. For the attribution interview, relationship satisfaction and age contributed significantly to the model, such that those with higher relationship satisfaction, and those who were older, rated their partner's behaviour more positively.

These findings are consistent with previous research on causal attributions and relationship satisfaction. Distressed couples have often been found to make stable, internal, and global attributions for their partners' negative behaviours, thereby enhancing the impact of those behaviours. When faced with negative relationship events, couples that make negative attributions, like those described above, have a more difficult time sustaining the quality of their relationship. Conversely, the relationship quality of couples that make more positive attributions

about their relationship has been found to be relatively unaffected by stressful events (Graham & Conoley, 2006). Therefore, consistent with past findings, I found that attributions were robustly associated with relationship quality. The current study also adds to the existing literature by investigating this within two separate samples, a younger and an older sample. Further, the attributions measured within this study were unique and meaningful to each individual participant.

When investigating the impact of executive functioning skills on attributions, I found a significant main effect of executive functioning when participants were asked how responsible their partner was for the undesired behaviour during the disagreement. It is important to note that when covariates (gender, education, and relationship length) were included to the main effects model, executive functioning skills were no longer associated with responsibility attributions. Executive functioning did not have a direct effect on participants perceptions of whether their partner was acting selfishly during the event, if their partner's behaviour was motivated by internal or external factors, or if their partner's specific behaviour affected other areas of their relationship and these null findings were present in models without covariates as well as models with covariates. The findings are very consistent here and suggest that the unique effects of executive functioning skills do not exist once overall relationship quality and age are included in the models.

Further, age was found to be a significant factor when participants were asked whether their partner's behaviour during the event was due to the type of person they are, such that older participants rated their partner's behaviour as being caused by internal attributes of their partner. This is consistent with the findings for the zero-order correlations (discussed in the previous section). Age was also found to be significant predictor of participants' perception of the extent

to which the partner's behaviour was localized or effected other areas of the relationship. Specifically, older participants did not believe that their partner's behaviour affected other aspects of their relationship. This result further fits with what would be predicted with Socioemotional Selectivity theory in that older participants saw the impact of negative behaviour in a more narrow and contained manner, rather than viewing it as having a spill-over into other aspects of the relationship. Further, within the attribution interview, I found that the older group had more relationship-enhancing attributions than the younger group.

In summary, across both the preliminary results and the main effect results, I found that older adults tended to make more relationship-enhancing attributions towards their partner's undesired behaviour, except when they were asked to rate the extent to which their partner's behaviour was due to the type of person they are. In this instance, older adults tended to endorse this internal attribution, indicating that the reason their partner acted in that way, was due to the type of person they are. This is also consistent with the aging literature, as it has been found that older adults tend to make more dispositional attributions. I have already discussed above why older adults may make more internal attribution and how these may not be suggestive of a "relationship-diminishing attribution".

Moderation Models

Given what we know about the importance of marital satisfaction on the impact of couple's attributions (see earlier discussion), and the role it may play in the Socioemotional Selectivity theory (see earlier discussion), I was interested in investigating whether relationship satisfaction moderated the relationship between executive functioning and attributions. Also, to further test the Frontal Aging hypothesis, I was interested in testing how age moderated the relationship between executive functioning and attributions.

When participants were asked on the attribution questionnaire, whether their partner's behaviour was motivated by selfish or unselfish concerns, I found a significant interaction between executive functioning and relationship satisfaction. That is, I found that at low levels of executive function, higher relationship quality predicted more unselfish attributions, but at high levels of executive function relationship quality was no longer a significant predictor of the selfishness of attributions. That is, those with lower executive functioning skills tended to see their partner's behaviour as motivated by unselfish concerns, rather than selfish concerns, when their relationship satisfaction was good. At high levels of executive functioning, there was no association between relationship quality and selfishness attributions.

When participants were asked to what extent their partner was responsible for the undesired behaviour, I found a significant interaction between relationship functioning and executive functioning. At low levels of executive functioning, relationship quality significantly predicted the extent to which their partner was responsible for the undesirable behaviour, such that individuals who were more relationally satisfied were less likely to rate their partner as responsible for the undesirable behaviours. At high levels of executive functioning there was no association between relationship quality and responsibility attributions.

None of the two-way interactions (relationship quality x executive functioning skills; relationship quality x age; executive functioning x age) were significant when participants were asked the extent to which their partner's behaviour was motivated by internal, as opposed to contextual factors, or the extent to which the partner's behaviour was localized or effected other areas of the relationship.

Using past research as a guide, I would like to take a closer look at the significant interaction effects which showed that, for individuals with low executive functioning skills,

higher relationship quality predicts less likelihood of viewing their partner as selfish or responsible for the undesirable behaviour. There was no significant association for individuals with high executive functioning skills and their relationship quality. Hofmann and colleagues (Hofmann et al., 2009) found that automatic precursors such as implicit attitudes and impulses predict behavior better for individuals with low self-regulation versus high self-regulation, whereas controlled precursors such as explicit attitudes and conscious self-restraint goals predict behavior better for individuals with high relative to low self-regulatory strength. When one's executive functioning skills are lower, such as one's working memory and inhibitory control, this may allow other precursors to come 'online' and allow for implicit attitudes and impulses to control their attributions. Therefore, in alignment with the socioemotional selectivity theory, it may be that middle age and older participant's maturity, familiarity, and contact frequency with their partner allows their implicit attitudes to dominate, and when coupled with high relationship satisfaction, they are able to default to more positive attributions. Drawing from the social cognitive perspective, it may be that middle age and older adults hold relational schemas that allow them to anticipate and manage conflict in their close, long-term relationships. Relational schemas are defined as beliefs and expectations of one's self and others, which guide subsequent behaviours (Baldwin, 1992). Within relationships, schemas lead individuals to interpret ambiguous information in a way consistent with their expectations, fill in gaps, and to preferentially recall information that is consistent with, or highly relevant to that specific schema (Baldwin, 1992). Further, individuals can become accustomed to specific negative aspects of their relationships and no longer be upset by them or perceive them as problematic. We know from past research that those with higher relationship satisfaction respond to partner offenses more constructively and less destructively (Graham & Conoley, 2006). As such, with increased

familiarity and high relationship satisfaction, older individuals have been able to establish well defined relational scripts that allow them to anticipate actions and reactions of significant others and use heuristics to interpret those events in a more positive way. Therefore, when executive functioning skills are lower, these heuristics may be more accessible to help fill in the gaps when making attributions for their partner's behaviour. That is, when one's working memory is lower, individuals may rely on their well-defined relationship scripts when making attributions regarding ambiguous behaviour. This is also consistent with the Socioemotional Selectivity theory.

Strengths and Limitations

The current study includes a number of strengths. Firstly, our study was theoretically grounded and sought to clarify whether the findings for attributional activity would be more consistent with the predictions that would result from Socioemotional Selectivity theory or the Frontal Aging hypothesis. The Frontal Aging hypothesis is based on evidence that executive functioning systems decline with age (Dempster, 1992). Declines in executive functioning skills have been shown to have a negative impact on the suppression of socially inappropriate emotional expressions, forgiveness within a relationship, and the capacity to engage in interpersonal interactions with flexibility (Gross et al. 1997, Pronk et al., 2010, Gross & John, 1998). However, just because executive functioning has been found to decline with age, other processes could come 'online' automatically to protect against these changes. Consistent with this reasoning, the Socioemotional Selectivity theory posits that older adults are able to employ cognitive strategies to improve emotion regulation because they are more focused on emotional goals (Carstensen et al., 1995; Charles et al., 2001; Diehl et al., 1996; & Baldwin, 1992). As such, our study was able to shed light on an important paradox that exists in the aging literature

between the differing predictions offered by these two theoretical frameworks on how interpersonal processes change as a result of aging.

Secondly, I selected measurement tools that had strong psychometric properties and had been used in past research. Furthermore, I used multiple methods to assess the key constructs; to measure attributions, I used both a questionnaire and interview format that has been validated in past research (Fallis & Rehman, 2014). The interview method provided the added advantage of allowing participants to provide a range of causes of partner behaviours. Further, when measuring participant attributions, I asked participants about a situation that had occurred within the previous two weeks. This allowed participants to directly give attributions for situations that are relevant and emotionally salient to them and ensured I collected a meaningful measure of the key variable. This methodology was designed to improve upon a self-report measure of attributions that has been used in past studies, the *Relationship Attribution Measure* (Fincham & Bradbury, 1991). Fincham and Bradbury's measure provided participants with hypothetical relationship events that may or may not be applicable to the respondent's relationship. Past research has identified that results from hypothetical vignettes may not generalize to interpersonal situations in which the observer and actor are engaged in an ongoing relationship (Taylor & Koivumaki, 1976).

Further, the measurement of executive functioning was theoretically driven. Consistent with Miyake et. al.,'s (2000) operationalization of executive functioning, the current study measured the three key constructs that are thought to comprise executive functioning abilities; working memory, inhibition, and task switching. Further, I assessed each of these Executive Functioning domains using tasks that have been shown to be reliable and valid measures of each domain (Faulkner et. al, 2019, Dawson et. al, 2015).

Finally, the younger sample was quite diverse, recruiting participants from a number of ethnic backgrounds within the Waterloo Region. Among participants, 52.4% identified as Caucasian, whereas 46.1% of participants identified as African decent, Hispanic, South Asian, Other Asian, and “other” (see results section for a full breakdown). Within the 2021 Canadian Census, within the Waterloo Region, 27.5% of respondents identified as a visible minority, whereas 72.5% identified as not a visible minority (Statistics Canada, 2021 Census of Population).

While the current study has some important strengths, there are also some limitations. Firstly, the study was cross-sectional in nature, and therefore we must be careful in not assuming causal relationship between variables. To test whether changes in any of the predictor variables (executive functioning, age, relationship quality) precede changes in attributional activity, I would have to use a longitudinal design. This will be further discussed below within the future directions.

While the younger sample was ethnically diverse, the older sample was significantly homogeneous and does not represent the cultural background of the Waterloo Region. Therefore, more effort to recruit a representative older sample would be advantageous. The current study was also limited in representing different relationship types, given that all participants were in mixed-sex relationships. I focused the recruitment efforts on mixed-sex couples because I was concerned that I would not be able to recruit enough older participants in same-sex relationships, with the implication that their sample would be too small to run separate statistical analyses testing whether the pattern of results differ by relationship type. My thinking on this issue has changed since I designed and gathered data for this study and as I have learned about research findings and methods that can be used even when a subgroup within the sample might be small.

These include methods such as sensitivity analyses. Further, relationship researchers have begun to shift their approach and work from a gender-as-relational perspective (West & Zimmerman, 2009, Umberson et. al, 2015). This perspective emphasizes that the ways men and women enact gender depends on whether they are interacting with a man or a woman (Goldberg 2013; Springer et al., 2012; West and Zimmerman 2009). Given this perspective, researchers should aim to include four groups for comparison in qualitative and quantitative research. These groups include men in relationships with men, women in relationship with women, men in relationships with women, and women in relationships with men. This approach allows for unbiased gender effects (West et al., 2008) and broadens our understanding of gender and relationships (Carpenter & Gates, 2008). As one example, Umberson and colleagues (2015), highlighted that researchers may incorrectly conclude that relationship dynamics differ for same- and mixed-sex couples, when it is in fact parental status differences that shapes the dynamics and creates differences between couples. As discussed within the future directions below, it would be advantageous to work from a gender-as-relational perspective to investigate gender differences in the attributions that were made for partner behaviour, specifically the influence of gender role conformity within the four comparison groups.

One further limitation within the current study was how attributions were conceptualized. The initial conceptualization of attributions was informed by past research by Graham and Conoley (2006), which found distressed couples often make stable, internal and global attributions for their partners' negative behaviours, thereby potentiating the impact of those behaviours. I considered these relationship-diminishing attributions. Within the current study older adults tended to endorse more relationship-enhancing attributions except when it came to internal or dispositional attributions. That is, older individuals were more likely to endorse that

the reason their partner acted in a certain way was due to the type of person they are. It is possible that there could be a shift in how we view dispositional attributions with age or within different relationship types; that is, instead of dispositional attributions being seen as negative during relational conflicts, they could be seen as coming from a place of acceptance, this will be discussed further below, related to future research directions.

Future Directions

Within the preliminary analysis I examined whether there were gender differences in executive functioning skills and the attributions that were made for partner behaviour. While gender was not a key focus of the current research and not included in the main analyses, it poses an interesting direction for future research. When investigating gender differences and executive functioning, the results found that overall, women seemed to have stronger executive functioning skills than men. However, when looking within each group, younger men had stronger executive functioning skills than younger women, and older women had stronger executive functioning skills than older men. The correlational data found similar results, both women and men's age was negatively correlated with executive functioning, such that older women and men had weaker executive functioning skills. When investigating normative differences in executive functioning across gender, past researchers have found varying results. When examining attention across the life span, Gaimbra and Quilter (1989) failed to find any gender differences in one's level of attention. With regards to normative differences in impulsivity, research found that men tend to be more impulsive (Bezdjian, et al., 2009). Further, tasks designed to measure working memory have largely failed to identify any gender differences across a wide developmental range, from young children to elderly populations, though there are significant age-related changes in this ability (Chelonis et al., 2000). It would be interesting to further

investigate gender differences in executive functioning to see if the current data replicates. It may be interesting to see if examining executive functioning in separate constructs, that is, working memory, inhibition, and shifting, highlights further gender differences.

When investigating gender differences and attributions, women were more likely to make more relationship-diminishing attributions than men, reporting that their partner was more responsible for their undesirable behaviour, and that the behaviour affected other areas of their relationship. Similarly, within our older sample, older women were more likely than older men to rate their partners responsible for the undesired behaviour and to view the undesirable behaviour as impacting other aspects of their relationship. Similar gender differences to the attribution questionnaire were identified when looking at the attribution interview data, such that women made more relationship-diminishing attributions than men regarding their partner's undesirable behaviour. An interesting and consistent finding in past attribution research is that women tend to make more negative attributions for their partner's behaviours (Bradbury et al., 1996). Further, correlations between attributions and behavior, as well as correlations between attributions and relationship quality, are stronger for wives than for husbands (Bradbury et al., 1996; Bradbury & Fincham, 1992; Miller & Bradbury, 1995). These differences could be due to a number of reasons. They may be due to the fact that wives tend to be more attentive to the subtle details of interpersonal interactions, whereas husbands may be less likely to respond based on the specifics of the situation and more likely to draw inferences based on their overall sentiment (Acitelli, 1992). It is also possible that the impact of partner behaviour varies by gender. For example, when the behaviour may involve household responsibilities, the man may hold less relationship-diminishing attributions if he does not feel that he will be responsible for the task if his partner has not handled it. Conversely, women may be more likely to assume that

the responsibility is theirs, thus contributing to the negativity of their attributions. It would be interesting to investigate how socialization influences these gender differences. That is, including measures on gender role conformity and examining possible interactions that may arise between gender role conformity and the attributions one makes for their partner's behaviours.

Historically, women have taken on more of the caretaker role and have been responsible for more of the household chores and mental load, it may be that this role has influenced the attributions women make. This could be relevant to the current study considering that I found that, compared to older men, older women make more negative attributions for their partner's behaviours. Generational differences could explain the study results and would be interesting to explore further.

In future studies, it would be interesting to investigate if there is a shift in how we conceptualize causal attributions and age, as highlighted within the study's limitations. That is, previous research has found that distressed couples have often been found to make stable, internal and global attributions for their partners' negative behaviours, thereby potentiating the impact of those behaviours, while also making unstable, external and specific attributions for their partners' positive behaviours, thus diminishing their impact (Graham & Conoley, 2006). Blanchard-Fields (1994) has also found that in comparison with young adults, older adults are more likely to make dispositional attributions during interpersonal disagreements. Hence, they do not give as much weight to other situational or extenuating circumstances (e.g., work pressure or family pressure) that also could have contributed to the outcome (Blanchard-Fields et al., 1998; Blanchard-Fields & Norris, 1994). It has been argued that dispositional inferences require little cognitive effort and are typically the initial, spontaneous response of individuals making causal attributions. In contrast, elaborative processing and cognitive effort are required when an

individual deliberates on additional information, such as situational constraints, to adjust this initial response (Gilbert & Malone, 1995; Trope & Gaunt, 2000). Within the current study I consistently found that older adults generally made more positive attributions towards their partners undesired behaviour, except when they were asked to rate the extent to which their partner's behaviour was due to the type of person they are. In this instance, older adults tended to endorse this internal attribution, indicating that the reason their partner acted in that way, was in fact, due to the type of person they are. It is possible that there could be a shift in how we evaluate dispositional attributions with age, that is, instead of dispositional attributions being seen as negative during relational conflicts, they could be seen as coming from a place of acceptance. Within older and more mature relationships there is increased emotional maturity and increased familiarity with their partner which leads to increases in positivity within their relationship. Therefore, when a transgression occurs within a relationship, the older individual may view and accept this act as part of who their partner is. In future studies it would be interesting to measure the emotional valence of the dispositional attributions, and how they change over time to see whether dispositional attributions are correlated to more distress within a relationship, or whether they could actually be a protective factor as one ages, similar to the other attributional processes. This possible shift may have additional methodological implications for the future. That is, when researchers are studying relationship attributions in samples that have not been typically examined in past research (e.g., culturally diverse groups, sexually diverse dyads), it would be advisable to assess attributions at a granular level and to then investigate which types of attributions are associated with broader constructs, such as personal or relational well-being. This could also provide important information on how factors such as cultural context influence how humans construe the meaning of different types of events.

Given that older individuals have lower executive functioning skills, I would expect these individuals to may make more negative causal attributions due to their weakened executive functioning skills. However, in the current study, I found that older individuals in fact make more positive attributions for their partner's behaviour, when compared to younger individuals. It would be interesting to investigate if this remains true in all of one's relationships as they age. That is, do older individual make more positive attributions within their relationships with their children, brothers or sisters, and close friends, or is this specific to their marital relationships? The Socioemotional Selectivity theory suggests that as the possibility of mortality becomes more salient and therefore one's motivation shifts to maximizing emotional well-being, this shift occurs within one's relationships through maturity, familiarity, and contact frequency. Therefore, we may assume that older individuals may make more positive attributions across all of their important relationships, but this is an empirical question that needs to be investigated and would help to further refine Socioemotional Selectivity theory. Specifically, are older adults motivated to maximize only their own emotional well-being or are they motivated to maximize others' well-being or both.

Given that this study was cross-sectional in nature, it would be advantageous to examine how attributions change longitudinally during the aging process and in conjunction with changes in executive functioning skills. Prior research by Fincham and Bradbury (2000) investigated longitudinal changes in attributions and marital satisfaction over a 12-month period. They found that changes in causal attributions were associated with changes in spouse's satisfaction to the same extent that changes in satisfaction were associated with deviations from a spouse's attributions. Therefore, there was no evidence supporting the causal dominance of one variable over the other at the within-subject level. While this longitudinal research has been completed,

investigating attributions and marital satisfaction, there has been no research thus far looking at how attributions themselves change as individuals age. Investigating how attributions change in relation to executive functioning, through the lens of the Socioemotional Selectivity theory would provide a more nuanced understanding of the attributional process and could be helpful in informing important relationship mechanisms in older age.

Another interesting avenue to investigate is whether older individuals are able to modify the attributions they make, depending on the type of transgression, given that one's cognitive flexibility decreases with age. As the results show, middle age and older individuals with lower executive functioning skills tend to make more positive attributions for their partner's behaviour when they have high levels of relationship satisfaction. However, work by Overall and McNulty (2017) shows that successful interpersonal communications require different tactics and strategies for minor transgressions. Although Overall and McNulty (2017) did not directly assess how individuals changed their construal of the event, this would presumably be required in order to change their response to serious transgressions. Older individuals may have a harder time accessing their cognitive flexibility and altering their attributions successfully. As mentioned previously, older individuals have been found not to give as much weight to other situational or extenuating circumstances, and therefore use more dispositional inferences, in part because those inferences require less cognitive effort. It would be interesting to see if older adults can access flexibility and change their attributions as new information is revealed, or if older individuals are static in their attributions after receiving new information.

Within the study, when operationalizing executive functioning, I created a composite of working memory, inhibition, and task switching. These skills are central to theories of executive functioning and are supported by distinct, though overlapping neural networks, in which

prefrontal brain regions play a particularly important role (Aron et al., 2004; Cohen et al., 1994). Working memory, task switching, and inhibitions are considered to be the building blocks of more complex executive tasks and other aspects of cognition (Miyake et al., 2000). As individuals age, the Frontal Aging hypothesis posits that executive functioning skills decrease. It would be interesting to investigate whether one of these executive functioning components uniquely drives attributional processes. For instance, we know that inhibition, the ability to voluntarily control behaviour that conflicts with an automatic and prepotent response, could be central in one's automatic reaction to their partner's transgression when making attributions. That is, those with lower inhibition skills may have a much harder time inhibiting an automatic negative reaction to their partner's transgressions. Shifting, that is, the ability to shift attention back and forth between multiple tasks or information, and working memory, the ability to maintain and manipulate information in mind for a short period, would be important in synthesizing the information regarding our partner's transgressions and deciding how to react. It would be interesting to examine whether one of these processes in particular has more influence on the attributions that one makes for their partner's transgressions.

Conclusion

The overall goal of the current study was to compare the association between executive functioning skills and partner attributions in younger versus older adults, and to compare the divergent predictions of two influential aging theories, the Socioemotional Selectivity theory and the Frontal Aging hypothesis. Overall, the study findings provided greater support for Socioemotional Selectivity Theory as older adults tended to provide less relationship-diminishing attributions for their partner's undesirable behaviours. Further, the study findings showed that middle aged and older individuals with lower executive functioning skills tend to

make more relationship-enhancing attributions for their partner's behaviour when they have high levels of relationship satisfaction. Therefore, while I found that executive functioning does decline with age, in line with the Frontal Aging hypothesis, the consequences of those declines on one's attributions are protected by other mechanisms that come 'online' when older individuals are satisfied within their relationships. In future work, it will be important to see if the observed effects can be replicated and if they are explained by older adults' maturity and their familiarity with their partner, as predicted by Socioemotional Selectivity theory.

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Appendix 1

DESCRIPTIVES AND CORRELATION TABLES

Table 1. Means and standard deviations for scores on executive functioning measures

<u>EF Measures</u>	<u>Mean (SD)</u>	<u>Min-Max</u>	<u>Skewness</u>	<u>Kurtosis</u>
DSB	8.17 (2.20)	4-15	.60	.40
Men	8.66 (2.43)	4-15	.73	.22
Women	8.73 (2.11)	4-15	.55	.59
Younger	8.40 (1.97)	4-13	.24	-.16
Older	9.00 (2.38)	4-15	.70	.30
DSS	9.20 (2.05)	4-14	-.10	-.28
Men	8.84 (2.19)	4-13	-.34	-.53
Women	9.35 (1.99)	5-14	.07	-.28
Younger	9.43 (2.13)	5-14	-.09	-.40
Older	8.99 (1.97)	4-14	-.18	-.12
Stroop 3	-57.23 (17.20)	-115-(-22)	-1.06	1.35
Men	-65.38 (20.57)	-115-(-31)	-.57	.17
Women	-54.22 (14.68)	-110-(-22)	-1.19	2.22
Younger	-47.17 (12.44)	-110-(-22)	-2.22	9.71
Older	-66.41(15.80)	-115-(-43)	-1.04	.94
Stroop 4	-62.94 (18.62)	-130-(-15)	-.98	1.48
Men	-68.61 (23.84)	-130-(-15)	-.58	.94
Women	-60.62 (15.59)	-110-(-37)	-.94	.31
Younger	-54.06 (14.70)	-94-(-15)	-1.03	1.92
Older	-71.16 (18.17)	-130-(-43)	-1.09	1.60

Trail-Making	-76.98 (33.82)	-211-(-29)	-1.59	3.15
Men	-90.35 (41.47)	-211-(-29)	-.92	.75
Women	-71.30 (28.40)	-200-(-30)	-1.98	6.02
Younger	-62.49 (19.61)	-119-(-29)	-.61	.30
Older	-90.40 (38.52)	-211-(-34)	-1.25	1.36

Note. DSB = Digit Span Backwards; DSS = Digit Span Sequencing, Stroop 3 & 4 and Trail Making were reverse coded such that higher scores indicate better executive functioning.

Table 2. *Correlations among executive functioning constructs.*

	DSB	DSS	Stroop 3	Stroop 4	Trail Making
DSB	--	.411**	.316**	.331**	.325**
DSS		--	.445**	.455**	.430**
Stroop 3			--	.734**	.669**
Stroop 4				--	.652**
Trail Making					--

Note. DSB = Digit Span Backwards; DSS = Digit Span Sequencing

* Correlation is significant at the .05 level, (2-tailed).

** Correlation is significant at the .01 level, (2-tailed).

Note. Scores are not standardized. DSB = Digit Span Backwards; DSS = Digit Span Sequencing, Stroop 3 & 4 and Trail Making were reverse coded such that higher scores indicate better executive functioning.

Table 3. *Correlations among attribution questionnaire topic 1 measures.*

	AQ Selfish	AQ Responsible	AQ Internal	AQ Global
AQ Selfish	--	.327**	.126	.449**
AQ Responsible		--	.407**	.185*
AQ Internal			--	.019
AQ Global				--

Note. AQ Selfish = The behaviour motivated by selfish concerns. AQ Responsible = How responsible the partner was for their behaviour. AQ Internal = The extent the behaviour was due to the type of person the partner is. AQ Global = the extent the behaviour affects other areas in the relationship.

* *Correlation is significant at the .05 level, (2-tailed).*

** *Correlation is significant at the .01 level, (2-tailed).*

Table 4. *Correlations among attribution questionnaire topic 2 measures.*

	AQ Selfish	AQ Responsible	AQ Internal	AQ Global
AQ Selfish	--	.386**	.187*	.280**
AQ Responsible		--	.223*	.197*
AQ Internal			--	.005
AQ Global				--

Note. AQ Selfish = The behaviour motivated by selfish concerns. AQ Responsible = How responsible the partner was for their behaviour. AQ Internal = The extent the behaviour was due to the type of person the partner is. AQ Global = the extent the behaviour affects other areas in the relationship.

* *Correlation is significant at the .05 level, (2-tailed).*

** *Correlation is significant at the .01 level, (2-tailed).*

Table 5. *Correlations among attribution interview measures topic 1.*

	AI Internal	AI Stable	AI Vol	AI Intent	AI Protect	AI Blame
AI Internal	--	.392**	.663**	.378**	.778**	.770**
AI Stable		--	.254*	.350**	.666**	.277**
AI Vol			--	.547**	.706**	.699**
AI Intent				--	.624**	.443**
AI Protect					--	.739**
AI Blame						--

Note. AI Internal = Internal vs. External. AI Stable – Stable vs. Unstable. AI Vol = Voluntary vs. Involuntary. AI Intent = Intentional vs. Unintentional.

* *Correlation is significant at the .05 level, (2-tailed).*

** *Correlation is significant at the .01 level, (2-tailed).*

Table 6. *Correlations among attribution interview measures topic 2.*

	AI Internal	AI Stable	AI Vol	AI Intent	AI Protect	AI Blame
AI Internal	--	.187	.761**	.221*	.762**	.813**
AI Stable		--	.171	.396**	.479**	.390**
AI Vol			--	.355**	.783**	.720**
AI Intent				--	.442**	.201*
AI Protect					--	.757**
AI Blame						--

Note. AI Internal = Internal vs. External. AI Stable – Stable vs. Unstable. AI Vol = Voluntary vs. Involuntary. AI Intent = Intentional vs. Unintentional.

* *Correlation is significant at the .05 level, (2-tailed).*

** *Correlation is significant at the .01 level, (2-tailed).*

Table 7. Correlations among main study measures.

	Age	Rel Length	QMI	EF Comp	Selfish	Responsible	Internal	Global	AI1 Comp
Age	--	.943**	.086	-.421**	.179*	.081	-.166	.328	-.210*
Rel Length		--	.081	-.376**	.020	-.015	-.032	.104	-.189
QMI			---	.015	.405**	.213*	.223*	.579**	.206*
EF Comp				--	-.094	-.175*	-.019	-.058	.109
Selfish					--	.327**	.126	.449**	.236*
Responsible						--	.407**	.185*	.446*
Internal							--	-.019	.371**
Global								--	.082
AI1 Comp									--

Note. QMI = Quality of Marriage Index; EF Comp = EF Composite Score; Selfish = The behaviour motivated by selfish concerns. Responsible = How responsible the partner was for their behaviour. Internal = The extent the behaviour was due to the type of person the partner is. Global = the extent the behaviour affects other areas in the relationship. AI1 Comp = Attribution Interview Composite.

* Correlation is significant at the .05 level, (2-tailed).

** Correlation is significant at the .01 level, (2-tailed).

Table 8. *Correlations among men's and women's scores on study measures.*

	Age	Rel Length	QMI	EF Comp	Selfish	Responsible	Internal	Global	AI1 Comp
Age	--	.016	.015	-.605**	.261	.108	-.156	.362*	-.401*
Rel Length	-.070	--	-.068	.155	.243	-.023	-.106	.212	-.254
QMI	.055	-.042	---	-.096	.415**	.157	.092	.571**	.078
EF Comp	-.239*	.012	.114	--	-.260	-.235	-.145	-.147	.364*
Selfish	.109	-.143	.406**	.070	--	.305	.160	.670**	.108
Responsible	-.048	-.122	.221*	.013	.326**	--	.443**	.192	.302
Internal	-.219*	.024	.272**	.132	.099	.366**	--	-.024	.283
Global	.251*	.028	.578**	.093	.350**	.113	-.041	--	.056
AI1 Comp	-.207	-.119	.234*	-.020	.286*	.552**	.418**	.060	--

Note. QMI = Quality of Marriage Index; EF Comp = EF Composite Score; Selfish = The behaviour motivated by selfish concerns. Responsible = How responsible the partner was for their behaviour. Internal = The extent the behaviour was due to the type of person the partner is. Global = the extent the behaviour affects other areas in the relationship. AI1 Comp = Attribution Interview Composite. Correlations between men's scores appear above the diagonal, correlations between women's scores appear below the diagonal.

* Correlation is significant at the .05 level, (2-tailed).

** Correlation is significant at the .01 level, (2-tailed).

Table 9. Correlations among younger group's and older group's scores on study measures.

	Age	Rel Length	QMI	EF Comp	Selfish	Responsible	Internal	Global	AI1 Comp
Age	--	.671**	.091	-.084	-.012	.084	-.009	.193	.053
Rel Length	-.242*	--	.126	-.087	-.062	-.063	.100	.220	-.194
QMI	.117	-.091	---	.394**	.356**	.294*	.272*	.559**	.320*
EF Comp	-.371**	.108	-.142	--	.211	.030	.076	.253*	.008
Selfish	.008	.058	.453**	-.197	--	.412**	.272*	.348*	.426**
Respons	.083	-.051	.147	-.270*	.236	--	.340**	.235	.586**
Internal	.012	-.085	.206	-.193	.054	.495**	--	.097	.296*
Global	.097	.083	.623**	-.067	.506**	.124	-.025	--	.264*
AI1 Comp	.132	-.180	.092	.067	.067	.338*	.400**	-.014	--

Note. QMI = Quality of Marriage Index; EF Comp = EF Composite Score; Selfish = The behaviour motivated by selfish concerns. Responsible = How responsible the partner was for their behaviour. Internal = The extent the behaviour was due to the type of person the partner is. Global = the extent the behaviour affects other areas in the relationship. AI1 Comp = Attribution Interview Composite. Correlations between younger group's scores appear above the diagonal, correlations between older group's scores appear below the diagonal.

* Correlation is significant at the .05 level, (2-tailed).

** Correlation is significant at the .01 level, (2-tailed).

Appendix 2

Relationship Research Lab Attribution Coding Manual

Background

The Attribution Coding Manual was developed in order to characterize the nature of the attributions that people make for their romantic partners' behaviour. Attributions were elicited through the following process. Participants completed questionnaires that asked them to identify areas in which they desired changes in their relationships. After rating a number of areas, they were asked to identify which areas comprised the most important problem domains (i.e., "issues") in their relationships. Participants then completed the Attribution Interview. The Attribution Interview required them to provide an example of one specific incident that had occurred within each problem domain. The incident was to be one that caused disagreement, caused the participant to become upset with his or her partner, or in which the participant wished his or her partner had behaved differently. For each specific incident, the interviewer asked a general question (i.e., "In your opinion, why did this incident occur?") designed to elicit attributions for the incident. If the participant did not make an attribution for his or her partner's behaviour in response to the general question, the interviewer asked a follow up question specific to the cause of the partner's behaviour (i.e., "What was the cause of your partner's behaviour? Why did your partner do/not do (*restate identified behaviour*)?") Following the verbal questions, participants made written ratings on several dimensions. Interviews were audio recorded and have been transcribed.

Attribution Coding

The purpose of this coding manual is to guide coding of the attributions on several theoretically relevant domains. Coding will occur in two parts. In the first part, each issue will be reviewed in order to determine if the interview met certain criteria. In the second part, coders will make global ratings of the nature of the attributions that were provided for the issue.

Process

- Please read the transcript related to the relevant issue in full before making any ratings.
- Complete all Part 1 ratings before continuing to Part 2.
- Please note you will need to read the transcript twice: Once before completing Part 1 and a second time before completing Part 2. During the second reading please focus on identifying the attributions. Please highlight the attributions in order to remind yourself which statements to focus on and which statements to disregard while making your ratings.
- Focusing only on the attribution statements, consider and the record your attribution ratings in any order.

Part 1 – Interview Check

Criteria 1: Did the participant identify an example of a specific incident related to the problem domain?

- A **specific incident** is one specific example of a time when the participant experienced a disagreement with, became upset with his/her partner because of his/her partner's behaviour and/or wished his/her partner had behaved differently.
- If the participant has a specific incident in mind, he /she should know information such as when the incident occurred, what happened, how serious the disagreement was, etc. Note that the participant does not need to state or describe all of these things in order to infer he/she had a specific incident in mind.
- **If the participant identified and/or indicated that he/she had a specific incident in mind code (1), if the participant did not identify or indicate that he or she had a specific incident in mind code (0) under Criteria 1 on the coding sheet.**

Criteria 2: Do the interviewer's questions focus on the cause of the problem behaviour in the specific incident and not the cause of the disagreement?

- The goal of the interview was to elicit participants' attributions for particular behaviours by their partners that they found upsetting. In order to elicit these behaviours the participant was asked to think of an example of a time when he/she became upset with the partner, had a disagreement with the partner or wished his/her partner behaved differently within a particular domain.
- In some cases, this created confusion and the participant and/or the interviewer focused on making attributions for the disagreement rather than upsetting behaviour that caused the disagreement.
- For example, one domain in which a participant might want her partner to change is finances. The goal of the interview is to find a specific example of a time when the participant was upset with her partner's behaviour in the domain of finances and to assess her attributions for this behaviour. An ideal example of this would be something like: "I think it is important for us to save money to pay down our debt, but my partner likes to splurge on things he will enjoy. Last week we had a fight about finances because he came home from work with a new guitar. I was so angry we ended up getting in a big fight and didn't talk for two days." The attributions we are interested in are attributions around why the partner bought the guitar and NOT why the couple had a fight. Thus, the interviewer's question should be "Why did your partner *buy a new guitar*?" What was *the cause of him buying a guitar*?" NOT: "Why did you and your partner *get in a disagreement* about him buying the guitar? What was *the cause of the disagreement*?"
- **If the focus of the interview and the attributions was on the example of the upsetting behaviour (e.g., buying the guitar) within the problem domain code (1) under Criteria 3. If the focus of the interview and the attributions was the cause of the disagreement (e.g., having the fight) code (0) under Criteria 3.**

Part 2 – Attribution Ratings

Definition of Attributions

Broadly, attributions are explanations for other people's behaviour. Thus, **attributions are statements that speak to one or more causes or reasons for another person's thoughts, feelings, and behaviours.** Note that attributions can take into account different types of factors that are thought to play a role in others' behaviours. Some examples of different factors that may appear in attributions include:

- characteristics of the person about whom the attribution is made
- characteristics of other people relevant to the situation
- characteristics of the situation (both one's life situation broadly and specific to the situation being discussed)

Also note that although an individual statement may not describe or directly restate the "problem behaviour" it can still be an attribution. The number of attributions present may vary widely from participant to participant.

Examples of Attributions

- I guess he has been too tired to go out because he has been very busy at work.
- She doesn't do the dishes because she's lazy.
- We've been together for a long time, so I guess we're both less excited about sex than we used to be.
- He's a guy.
- She worries what the neighbours will think.
- I've been more distant lately.
- When she sees something she wants she buys it.
- He just didn't think about it.
- It's not his fault.
- She did it on purpose.
- It wasn't intentional.

Ratings

Please review the attribution statements you have highlighted and then rate the nature of the attributions made for the incident/problem domain on the following dimensions. Ratings are to reflect the nature of all attributions considered together.

1) To what extent are the attributions (taken altogether) Specific vs. Global?

1	2	3	4	5
Very Specific	Somewhat Specific	Combination	Somewhat Global	Very Global

- ***Global*** – the cause(s) impact many or all aspects of the relationship/life
- ***Specific*** – the cause(s) impact relatively few aspects of the relationship/life

Score zero (0) for Not Applicable (responsibility was placed solely on the interviewee)

2) To what extent are the attributions (taken altogether) Internal Vs. External?

1	2	3	4	5
Very Internal	Somewhat Internal	Combination	Somewhat External	Very External

- ***Internal*** – the cause(s) are due to something about the partner
- ***External*** – the cause(s) are things outside of the partner; often situational factors or other people

3) To what extent are the attributions (taken altogether) Stable vs. Unstable?

1	2	3	4	5
Very Stable	Somewhat Stable	Combination	Somewhat Unstable	Very Unstable

- ***Stable*** – the cause(s) are long-standing and not likely to change
- ***Unstable*** – the cause(s) are not long-standing and likely to change

Score zero (0) for Not Applicable (responsibility was placed solely on the interviewee)

4) *To what extent are the attributions (taken altogether) Voluntary vs. Involuntary?*

1	2	3	4	5
Very Voluntary	Somewhat Voluntary	Combination	Somewhat Involuntary	Very Involuntary

- **Voluntary** – the partner had control over the situation and chose to act this way
- **Involuntary** – the partner did not have control over the situation or did not choose to act in this way

5) *To what extent are the attributions (taken altogether) Intentional (done with negative intent) vs. Unintentional (done without negative intent)?*

1	2	3
Intentional	Combination	Unintentional

- **Intentional or done with negative intent** – the partner either intended for the consequence(s) of his/her behaviour to occur OR engaged in the behaviour with the expectation that it would have negative consequences even though that's not what happened.
- **Unintentional or done with positive intent** – the partner either did not intend for the negative consequence(s) of his/her behaviour to occur OR engaged in the behaviour with the expectation that it would have positive consequences (even though that's not what happened).

Score zero (0) for Not Applicable (responsibility was placed solely on the interviewee)

6) *To what extent are the attributions (taken altogether) seem to protect/harm the relationship?*

1	2	3	4	5
Very Harmful	Slightly Harmful	Neutral	Slightly Protecting	Very Protecting

Assuming that the discussion is about a negative or problematic behaviour (which should be the case for the attribution interviews), attributions that **protect** are ones that attribute the cause of the partner's behaviour to things that are:

- **External** – the cause(s) are things outside of the partner; often situational factors or other people
- **Unstable** – the cause(s) are not long-standing and likely to change
- **Specific** – the cause(s) impact relatively few aspects of the relationship/life
- **Involuntary** – the partner did not have control over the situation or did not choose to act in this way

- *Unintentional or done with positive intent* – the partner either did not intend for the negative consequence(s) of his/her behaviour to occur OR engaged in the behaviour with the expectation that it would have positive consequences (even though that’s not what happened). (**responsibility was placed solely on the interviewee**)
-

7) To what extent is the partner only versus the participant and/or external circumstances assigned blame or responsibility for the problematic incident? (Focus of Blame)

*Please note that “participant” refers to the interviewee and “partner” refers to the interviewee’s partner.

1	2	3	4	5
Partner Only	Mostly Partner and/or External Circumstances	Combination of Partner + Participant and/or External Circumstances	Mostly Participant and/or External Circumstances	Participant

8) How upsetting did this event seem to be for the participant?

1	2	3
Upset	Neutral	Calm

How to Address Special Circumstances

Transcript includes attributions for the disagreement (re: Criteria 3)

- If there are attributions for both the disagreement and the specific incident, focus only on the attributions for the specific incident. (You may want to highlight these in a different colour.)
- If there are attributions only for the disagreement, code the attributions for the disagreement.

Appendix 3

Table 1. *Summary of Exploratory Factor Analysis Results for Attribution Questionnaire Measure for Topic 2 Using Maximum Likelihood Estimation*

KMO And Bartlett's Test

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.61
Bartlett's Test of Sphericity	Approx. Chi-Square	40.45
	df	6
	Sig	.00
Goodness of Fit	Chi-Square	2.61
	df	2
	Sig	.27

Table 2. *Attributions Questionnaire Topic 2 Factor Loadings*

Attribution Questionnaire Topic 2		
	Factor Loading	Communalities
Selfish vs. Unselfish (E)	.71	.50
Responsibility (F)	.56	.31
Internal vs. External (G)	.29	.08
Global vs. Specific (H)	.36	.12
% of variance	42.01	

Figure 1. *Scree Plot of Attribution Questionnaire Measure for Topic 2.*

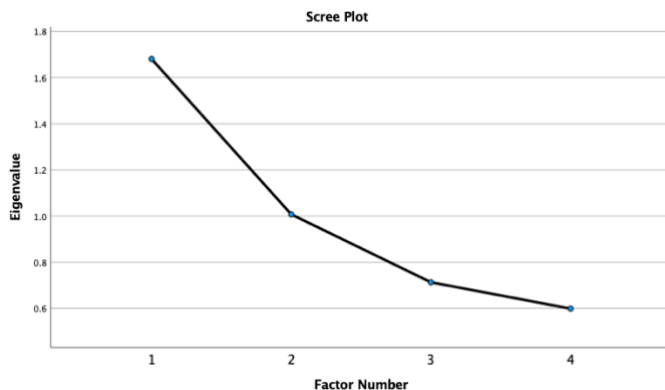


Table 3. *Summary of Exploratory Factor Analysis Results for Attribution Interview Measure for Topic 2 Using Maximum Likelihood Estimation*

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.70
Bartlett's Test of Sphericity	Approx. Chi-Square	455.97
	df	15
	Sig	.00
Goodness of Fit	Chi-Square	80.30
	df	9
	Sig	.00

Table 4. *Attributions Interview Topic 2 Factor Loadings*

Attribution Interview Topic 2		
	Factor Loading	Communalities
Internal vs. External	.88	.77
Stable vs. Unstable	.37	.14
Voluntary vs. Unvoluntary	.85	.73
Intentional vs. Unintentional	.36	.13
Protect vs. Harm	.90	.80
Blame	.87	.76
% of variance	60.59	

Figure 2. *Scree Plot of Attribution Interview Measure for Topic 2*

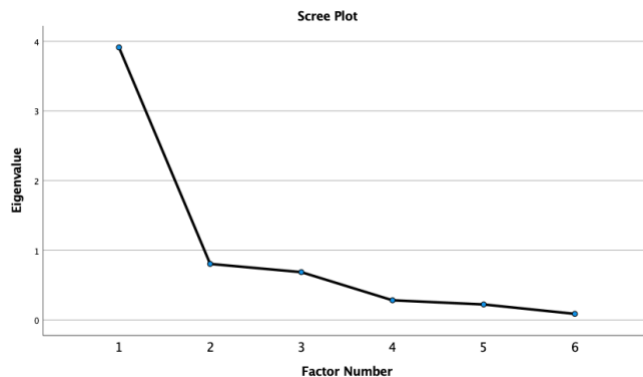


Table 5. *Main Effects Model for Selfish Attributions*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	3.57	NA	0.20	17.62	<.001
Rel Qual	0.07	0.29	0.02	3.35	.001
EF	-0.10	-0.05	0.19	-0.55	.58
Age Group	-0.03	-0.01	0.29	-0.11	.91

Note: $R^2 = .08$

Table 6. *Main Effects Model for Responsibility Attributions*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.63	NA	0.21	12.73	<.001
Rel Qual	0.01	0.02	0.02	0.28	.78
EF	-0.30	-0.15	0.19	-1.58	.12
Age Group	-0.30	-0.10	0.30	-1.01	.32

Note: $R^2 = .02$

Table 7. *Main Effects Model for Attributions Related to Essentialization*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	2.59	NA	0.18	14.52	<.001
Rel Qual	0.03	0.13	0.02	1.52	.13
EF	0.09	0.05	0.16	0.55	.59
Age Group	-0.41	-0.15	0.26	-1.62	.11

Note: $R^2 = .05$

Table 8. *Main Effects Model for Specific versus Global Attributions*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	3.37	NA	0.16	21.63	<.001
Rel Qual	0.11	0.52	0.02	7.20	<.001
EF	-0.13	-0.07	0.02	-0.89	.38
Age Group	0.61	0.21	0.23	2.64	.009

Note: $R^2 = .34$

Table 9. *Main Effects Model for the Attribution Interview Composite*

	<i>b</i>	β	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	3.22	NA	0.14	23.52	<.001
Rel Qual	0.06	0.38	0.01	4.59	<.001
EF	-0.17	-0.12	0.13	-1.32	.19
Age Group	0.09	0.04	0.20	0.47	.64

Note: $R^2 = .16$