

Multiple Motivations Underlying Children's Affiliative Behaviour:
The Functional Role of Affiliative Language

by

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A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Doctor of Philosophy
in
Psychology

Waterloo, Ontario, Canada, 2026

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Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Statement of Contributions

I am either the majority contributor or sole contributor to all of the work presented in this thesis. This includes Chapters 2 and 3 which are co-authored with my collaborators Linda Sosa-Hernandez, Dr. Kristie Poole, and my supervisor Dr. Heather Henderson, and Chapter 4 which is co-authored with my supervisor Dr. Heather Henderson. Citations and information regarding the publication of these works can be found in their respective chapters.

Abstract

Social connection is one of the most fundamental human needs, shaping behaviour across the entire lifespan. As children develop, language becomes an increasingly central means through which they express their desire to connect with others – their *social motivations*. Yet relatively little is known about how and why children use language to signal their social motivation, or what individual and contextual factors shape its use. The three studies presented in this dissertation address these gaps by introducing a validated measure of children’s affiliative language use, examining how trait-level individual differences shape communicative patterns across the early stages of a developing peer relationship, and directly testing how experiences of social exclusion influence affiliative language use and the affective processes that may underlie it. Chapter 2 introduces and validates the Child Affiliative Language (CAL) dictionary – a novel, LIWC-based tool for quantifying children’s affiliative language use during naturalistic peer interactions. Affiliative language, as captured by the CAL dictionary, was meaningfully distinct from general talkativeness and broader linguistic ability, but was associated with positive social outcomes including greater peer-reported liking, higher observer-rated social engagement, and increased prosocial sharing. Children also used significantly more affiliative language during an unstructured get-to-know-you task than during a goal-oriented brainstorming task, consistent with the interpretation that the measure captures shifts in social motivation across contexts rather than stable individual differences in communicative style. Chapter 3 uses a longitudinal dyadic approach to examine how temperamental shyness shapes children’s verbal communication across three sessions with the same previously unfamiliar peer. Despite speaking less than their less shy peers, shy children used a greater proportion of affiliative language during their initial interaction, suggesting that when shy children do speak, they are more likely to do so in ways

that signal warmth and the desire to connect. Verbal reticence also longitudinally mediated the association between shyness and outside observers' ratings of social engagement; yet shy children were liked just as much by their own interaction partners, highlighting a meaningful discrepancy between how children's peer relationships appear to outside observers and how those relationships are experienced. Chapter 4 uses an experimental paradigm to examine how experiences of social exclusion shape affiliative language use in children and adolescents. Excluded youth spoke significantly less than those in the inclusion condition during a subsequent social interaction. Contrary to expectations, social exclusion did not directly predict greater affiliative language use. Age was also unexpectedly negatively associated with affiliative language use, such that older adolescents used less affiliative language than younger children across conditions. Importantly, individual differences in perceived physiological reactivity to the exclusion task uniquely predicted greater affiliative language use, suggesting that it may be the subjective affective experience of social stress, rather than the objective experience of exclusion itself, that shapes how youth use language to signal their social motivations. Together, these findings suggest that affiliative language is a sensitive, dynamic index of children's social motivation – one shaped by both stable individual differences and the social situations that children find themselves in. The results further suggest that affiliative language may serve not only an interpersonal function, but an intrapersonal, regulatory function as well. These studies lay the groundwork for a broader program of research into the motivated, context-sensitive, and multiply determined nature of children's social communication, and offers a new lens through which children's social development can be understood and supported.

Acknowledgements

To say I have been supported throughout this process would be an understatement. I am lucky enough to have been surrounded by the kind of love and community that most people only dream of.

First, I want to thank my family. Although you may never fully understand what I do, you've been the unwavering foundation of my support since the beginning, and that might be even more special. Thank you for the sacrifices you've made (financially and otherwise) to see me through multiple degrees and multiple moves, and the many challenges that have come with that. Thank you for always reminding me where I come from, for instilling in me the value of working hard and helping others, and for never letting me forget how proud you are.

To the best friends, lab mates (past and present), and Dev area pals a girl could ask for, I truly could not have done this without every single one of you. That said, there are a few of you who undoubtedly deserve some extra love. Kristie and Linda – my Dream Team – thank you for being a constant source of support, validation, and encouragement. So much of my growth over the years comes from having you both as two of my biggest cheerleaders. I really did hit the collaborator (and friend!) jackpot with the two of you. Claudia, my day one grad school bestie. Thank you for the love and laughs and long-winded rants. Although it's hard to put into words, I hope you know that my journey wouldn't have been half of what it was without you. Zoe, thank you for providing me with an endless supply of gluten free treats and for always being down to discuss our latest reality TV obsession. Emma, thank you for always remembering to schedule our virtual bi-monthly(ish) coffee dates – I look forward to them more than you know. And to Sarah and Laura, in the most literal sense, I would not be where I am today without you. Here's to a lifetime of friendship. I love you to B09 and back.

To my committee – Liz, Daniela, Grit, and Louis – thank you for sharing your time and expertise with me throughout this process. I’ve thoroughly enjoyed our discussions, thinking about your questions, and I’m excited to take the knowledge I’ve gained from you into my future work.

To Katherine, you are quite simply one of the best people there is. Over the past few years, you have shown up for me in more ways than I can put into words; and always when I needed it most – *a lighthouse*, if you will. Not everyone is lucky enough to find a friend like you, and that’s something I’ll never take for granted. Thank you for giving me one of the most meaningful friendships I have ever known.

And finally, to save the best for last, as they say: Heather, it has truly been the honour, privilege, and joy of a lifetime to get to do “this” with you. I have always been in awe of your profound ability to make hard things feel easier, whether in research or in life, and of your grace and groundedness through it all. Over the past six years, you have shaped the researcher, the mentor, the teacher, the friend, and the person I’ve become – and for that I am endlessly grateful. Thank you for your unconditional, unwavering support and belief in me; for every “Hey, m’lady!” and meeting that went too long because we just wouldn’t stop talking; for every word of encouragement; for every knowing look that said everything I needed to know without words; and for your friendship – thank you for everything. There is no world in which I would have been able, nor wanted, to do this without you.

Dedication

For Papa – who never met a stranger. His was the life of human connection.

Table of Contents

Examining Committee Membership.....	ii
Author’s Declaration.....	iii
Statement of Contributions	iv
Abstract.....	v
Acknowledgements.....	vii
Dedication.....	ix
List of Figures.....	xii
List of Tables	xiii
Chapter One: General Introduction	1
Theoretical Framework: The Need to Belong	2
The Evolutionary Function of Affiliative Behaviours: A Case for Affiliative Language.....	3
Approach-Avoidance Motivational Conflict	6
Social-Contextual Influence: The Effects of Social Exclusion	8
The Dyadic Nature of Social Interactions	9
Affiliative Language as Intrapersonal Regulation?.....	10
Overview of Dissertation.....	11
Chapter Two: Connection in Conversation: Validation of a Novel Measure of Children’s Affiliative Language Use During Peer Interactions	13
Method.....	21
Results	30
Discussion	35
Chapter Three: It’s Not How Much You Say: Shyness, Verbal Communication, and the Development of Peer Relationships Across Time	42
Method.....	48
Results	54
Discussion	60

Chapter Four: Social Stress Speaks: How Social Exclusion Shapes Youth Affiliative Language Use	67
Method.....	75
Results	80
Discussion	86
Chapter Five: General Discussion	94
Summary of Findings and Overview of Discussion.....	94
Affiliative Language as an Indicator of Social Motivation.....	97
Two Pathways to Affiliative Language: Trait-Level and Social-Contextual Motivations	100
The Regulatory Function of Affiliative Language	105
Developmental Considerations.....	107
Methodological Contributions: Child Affiliative Language Dictionary	110
Future Directions.....	111
Conclusion.....	114
References.....	115
Appendices	133
Appendix A.....	133
Appendix B.....	135
Appendix C.....	136
Appendix D	137
Appendix E.....	138

List of Figures

Figure 1. Full Conceptual Model for Understanding the Multiple Motivations Underlying Children’s Affiliative Language Use	2
Figure 2. Mean-Level Differences in Affiliative Language Proportions by Task	34
Figure 3. Longitudinal Structural Equation Models of Shyness and Verbal Communication Patterns Across Three Peer Interaction Sessions	59
Figure 4. Word Count as a Longitudinal Autoregressive Mediator of Shyness and T3 Social Outcomes	61
Figure 5. Mean-Level Differences in Perceived Physiological Arousal at Baseline and Post-Cyberball by Condition	85
Figure 6. Associations Between Change in Physiological Arousal from Baseline to Post-Cyberball and Percentage of Self-Focused Affiliative Language Use	86
Figure 7. Full Conceptual Model for Understanding the Multiple Motivations Underlying Children’s Affiliative Language Use	101
Figure 8. Updated Conceptual Model for Understanding the Motivational and Affective Mechanisms Underlying Children’s Affiliative Language Use	107

List of Tables

Table 1. Study Measures Used to Assess Convergent and Discriminant Validity of Affiliative Language Measure in Study 1	26
Table 2. Descriptive Statistics and Correlations Among Study Variables for Study 1	33
Table 3. Means and Standard Deviations for Word Count and Proportions of Self-Focused, Other-Focused, and Total Affiliative Language During the Get to Know You and Brainstorming Tasks for Study 1	34
Table 4. Unstandardized Beta Coefficients from Multilevel Models Testing Word Count and Proportions of Self-Focused, Other-Focused, and Total Affiliative Language as Predictors of Convergent and Discriminant Validity Measures for Study 1	36
Table 5. Descriptive Statistics for All Study Variables for Study 2	55
Table 6. Correlations Among Study Variables for Study 2	56
Table 7. Descriptive Statistics and Correlations Among Study Variables for Study 3	82

Chapter One: General Introduction

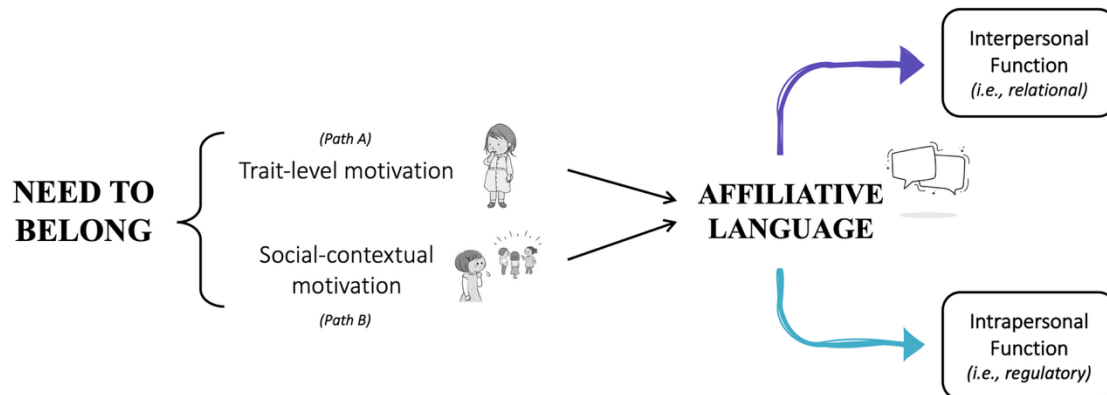
Consider the following scenario: it's the first day of overnight summer camp. For many children, this might be the first time they need to navigate a new social world largely on their own – no parents to cling to, no familiar classmates, no established friendships to fall back on. In this setting, two children might approach a new peer through conversation, but for very different reasons. For Katelyn, meeting someone new has always felt like a balancing act. She wants to connect with the other kids – genuinely – but something holds her back. She listens more than she speaks, chooses her words carefully, and when she does open up, it tends to come out in small but deliberate ways: a question here, a detail about herself there. Kelyn's experience has been different. She's had a harder afternoon – left out of the larger group, she arrives at dinner carrying the pain of spending the day alone, watching the other kids playing together. When someone sits down beside her, something shifts. Kelyn begins to talk – asking questions, sharing details about her favourite games and her pets at home – in a way that feels less like a choice, and more like a need.

Both children are using affiliative language – words and short phrases that signal warmth, interest, and a desire for social connection. But the forces driving their language use are not the same. For Katelyn, it is shaped by something internal and enduring: a trait-level motivational conflict between wanting to connect but fearing how an interaction might go. For Kelyn, it is something more immediate and reflexive – a response to an immediate social context that has threatened her sense of belonging. Same behaviour, different motivations.

These two pathways – and the role they play in shaping children's affiliative language use – are the central focus of this dissertation (see Figure 1). Despite the importance of social connection for children's overall development and well-being, relatively

Figure 1

Full Conceptual Model for Understanding the Multiple Motivations Underlying Children's Affiliative Language Use



Note. Path A reflects trait-level motivational influences; Path B reflects social-contextual motivational influences.

little is known about how and why children use language specifically as a means of expressing social motivation, or how the motivations for that language use vary across individuals and contexts. In my dissertation, I addressed these gaps across three studies.

Theoretical Framework: The Need to Belong

Humans are inherently social beings. Baumeister and Leary (1995) argue that belonging is not simply a preference, but something that people fundamentally *need*. Like other basic needs such as food and shelter, it must be regularly satisfied for individuals to thrive, and lacking belonging carries many negative consequences. When people lack meaningful social connections, they experience increased negative affect, loneliness, reduced well-being, and long-term physical and mental health consequences (Baumeister & Leary, 1995; Cacioppo & Patrick, 2008). This need for belonging is universal and present from the very beginning of life; even infants seek out social contact, respond with distress when bonds are threatened, and are

exquisitely attuned to the affiliative signals of others (Bowlby, 1969; Over, 2016). Importantly, this need does not fade with age. As children develop, the need to belong continues to shape their social behaviour in meaningful ways – motivating them to seek out peer relationships, invest in their maintenance, and respond with real distress when those connections are lost or feel threatened (Fiske, 2010; Rubin et al., 2006).

What makes the need to belong particularly useful as a theoretical framework is that it does not simply describe why individuals feel distress – it explains behaviour. When belonging feels secure, people act to sustain it. When it is threatened, they act to restore it through affiliative behaviours directed at re-establishing social connection (Baumeister & Leary, 1995; Lakin et al., 2008; Vacaru et al., 2020). Importantly, the need to belong is sensitive not only to actual experiences of disconnection, but to the anticipation of them as well – meaning that both individual differences in social wariness and momentary experiences of social threat can activate the same fundamental drive to connect (Pickett et al., 2004). This is why affiliative behaviours vary so much across individuals and contexts, and why affiliative language, as a flexible and responsive behaviour, may be an especially useful tool for fulfilling these affiliative goals. As depicted in Figure 1, the need to belong provides the motivational foundation from which both trait-level and social-contextual pathways to affiliative language use emerge, providing a unifying framework for the studies that follow.

The Evolutionary Function of Affiliative Behaviours: A Case for Affiliative Language

Extensive research in both human and animal populations supports the notion that expressing and responding to affiliative behaviours are fundamental for forming social connections (Bowlby, 1969; Taylor, 2012). From an evolutionary perspective, these behaviours have emerged as adaptive mechanisms to ensure survival, particularly during early development.

They keep caregivers close, elicit care and protection, and support the development of social bonds, which are critical for adaptive development and connectedness (Bowlby, 1969; Knutson, 1996; Furl et al., 2012; Pearlstein et al., 2019). Importantly, affiliative motivations are not limited to contexts of safety and comfort. Across species, affiliative behaviours become especially prominent under stressful or threatening conditions. Both human and non-human animals persist in – and even intensify – their efforts to connect when faced with aversive experiences (Cairns, 1966a; Francis et al., 1999). Animal models offer particularly compelling evidence for this, showing that affiliative behaviour under stress carries effects that extend beyond the immediate situation. For instance, research in rats has shown that maternal affiliative behaviours, such as licking and grooming, not only buffer their offspring’s immediate stress responses, but also predict long-term differences in how offspring respond to stress later in life (Francis et al., 1999, Meaney, 2001). Moreover, non-human mammals have also been shown to exhibit preferential attachment behaviours toward objects that provide only physical comfort, with no fulfillment of basic needs such as food or water (Cairns, 1966a; Bowlby, 1969). Together, these findings underscore the universal role of affiliative or *social motivations* in forming bonds and regulating stress that go beyond fulfilling immediate physical needs required for survival.

In humans, these social motivations are present from the earliest stages of life. As previously mentioned, infants exhibit clear signs of distress (e.g., crying, negative affect) when separated from caregivers, drawing them back into close proximity and eliciting an affiliative response. Similarly, studies show that when babies receive purely social responses from others (e.g., smiles, infant-directed speech) that do not fulfill other primary needs like satisfying hunger or thirst, they exhibit increased positive emotional responses (e.g., McClure et al., 2020; Jordan & Thomas, 2017), and more complex babbling behaviours (Goldstein et al., 2003). The need for

social connection and support appears to persist throughout the lifespan, with humans of all ages experiencing distress, sadness, or agitation when separated from their close social connections. These findings suggest that social interactions are inherently rewarding, further highlighting the fundamental need to belong (Baumeister & Leary, 1995). While there are many common affiliative behaviours across species (e.g., feeding, comforting), beyond infancy, humans have the unique ability to explicitly communicate their social motivations through spoken language.

Affiliative Language

Affiliative language signals one's desire to connect with another individual by using words and phrases that convey warmth, empathy, and the motivation to form and nurture social bonds (Leaper & Smith, 2004). Examples include sharing personally relevant information (e.g., "My favourite colour is blue"), seeking personal information from one's social partner (e.g., "Do you have any pets?"), and affirmations that convey active listening, support, and interest (e.g., "Oh, that's cool!"); Leaper & Smith, 2004). In contrast, language that functions to convey information that is more factual (e.g., "The question part took a long time"), descriptive (e.g., "Right click, then select 'Choose video filter', and then pick whatever one"), or responsive yet lacking a personal connection (e.g., "Not now, but it was snowing here earlier"), *does not directly* signal social motivations. Importantly, affiliative language does not just reflect a desire for social connection – it also facilitates it, by signalling affiliative intentions *and* eliciting reciprocal social communication (O'Donnell et al., 2015).

Previous work has shown that exhibiting language-based affiliative behaviours, such as verbal imitation and conversational alignment with one's social partner, signals the desire to connect and predicts positive social interactions (e.g., Howe et al., 2023; Riordan et al., 2014). Communication Accommodation Theory (Giles & Coupland, 1991) provides a useful framework

for understanding how and why individuals adapt their language to convey social motivations during interactions. According to this theory, individuals adjust their communicative behaviours to foster social approval (i.e., to be viewed positively by one's interaction partner), minimize social distance (i.e., to increase feelings of connectedness), and increase mutual understanding; adjustments that are dynamic, context-sensitive, and shaped by the interpersonal goals of the interaction. Beyond these moment-to-moment adaptations, individual differences in temperament, relationship dynamics, and social context also shape affiliative motivations, which in turn influence how and when individuals use affiliative language during social interactions. Importantly, however, we know relatively little about how children and adolescents use language to signal their social motivations – and even less about what individual and contextual factors shape that use.

Approach-Avoidance Motivational Conflict

One factor that may shape the use of affiliative language is individual differences in approach-avoidance motivational tendencies. Cheek and Buss (1981) defined an approach-avoidance motivational conflict as the simultaneous experience of a desire to affiliate with a desire to avoid social interactions due to a fear of negative evaluation or rejection (Asendorpf, 1990; Cheek & Buss, 1981). This conflict occurs when two distinct motivational systems are activated: one that is associated with reward seeking (approach motivation), and another that is associated with avoidance of threat (avoidance motivation).

This conflict is commonly used to describe the experience of shy individuals (Asendorpf, 1990; Cheek & Buss, 1981). Shyness is a temperamental trait characterized by increased wariness in response to social novelty and/or fear of negative evaluation (Kagan et al., 1988; Melchior & Cheek, 1990) and is expressed as a cautious and inhibited approach to social

contexts. Critically, shyness is theoretically and empirically distinct from *affiliativeness* (i.e., the desire to have social interactions with others). That is, shy children often *want* to affiliate with others (high approach motivation), but their preoccupation with being negatively perceived and possibly rejected prevent them from doing so (high avoidance motivation). Consider Katelyn – who genuinely wants to connect with other kids at camp, but finds herself holding back, carefully choosing when to speak and what to say. This tension is particularly pronounced during initial social interactions, such as joining a new peer group for the first time, where the perceived threat of negative evaluation is heightened. This is especially relevant during middle childhood and early adolescence, a developmental period marked by increasing reliance on peer relationships and growing sensitivity to social evaluation (Rubin et al., 2006). For a child like Katelyn, using affiliative language, such as simple statements like “Hi, what’s your name?” or “I have two dogs. Do you have any pets?” may function as a subtle, low-cost (i.e., low likelihood of rejection) strategy to signal a desire to connect and facilitate a smooth interaction. Importantly, this strategy may uniquely fulfill both approach *and* avoidance motivations.

It is well-established that shyness is associated with verbal reticence during peer interactions (Asendorpf & Meier, 1993; Crozier & Badawood, 2009), and that speaking less can carry real social consequences – including being perceived as less engaged, a greater risk for peer rejection, and lower quality friendships over time (Rubin et al., 2009; Wojslawowicz Bowker et al., 2006). Yet little is known about the specific type of speech shy children use when they *do* engage with peers. Affiliative language may be a particularly effective strategy for navigating competing approach and avoidance motivations, allowing shy children to signal their desire to connect while minimizing the risk of negative evaluation.

Social-Contextual Influence: The Effects of Social Exclusion

Given the fundamental *need to belong* (Baumeister & Leary, 1995), individuals are particularly sensitive to interpersonal cues that may threaten their belonging (Pickett et al., 2004). Social exclusion represents one of the most direct and powerful threats to belonging, capable of triggering real psychological distress, including feelings of being unwanted, invisible, and disconnected from others (Williams, 2007). Importantly, this threat does not just elicit feelings of distress – it motivates behaviour. Experiencing social exclusion threatens both children and adults’ need to belong and increases fears of negative evaluation, while potentiating affiliative behaviours as an (unconscious) strategy to achieve affiliative goals and re-establish one’s sense of belonging (Carter-Sowell et al., 2008; Abrams et al., 2011; Taylor et al., 2000; Taylor, 2002; Taylor, 2012; Watson-Jones et al., 2016; Hopkins & Branigan, 2020; Vacaru et al., 2020). For a child like Kelyn, the pain of spending the afternoon alone is not just an unpleasant feeling – it induces a motivational state that actively orients her toward re-establishing connection with others.

Indeed, studies have shown that both adults (e.g., Lakin et al., 2008) and children (e.g., Over & Carpenter, 2009b) who experience exclusion exhibit an increase in affiliative behaviours compared to those who experience inclusion. Excluded individuals engage in a greater number of affiliative/prosocial acts (e.g., Carter-Sowell et al., 2008) and reciprocal interpersonal behaviours, like social mimicry or “mirroring” (e.g., Vacaru et al., 2020). Importantly, these behaviours seem to function as a *global* strategy for (re-)establishing social connections. That is, rather than targeting only those who excluded them, excluded individuals direct their affiliative behaviour toward any available social partner, suggesting that exclusion triggers a drive to restore a general sense of belonging (Maner et al., 2007; Over & Carpenter, 2009b; Watson-Jones

et al., 2016). This pattern emerges not only following direct experiences of exclusion, but also when exclusion is merely witnessed. For example, children who observed another child being excluded show similar increases in affiliative and prosocial behaviour (Over & Carpenter; 2009b; Song et al., 2015), underscoring just how attuned children are to signs of social disconnection.

Emerging evidence suggests that this re-affiliative response extends to language as well. Exclusion shapes not just what children do, but also what they say in subsequent social interactions (e.g., Hopkins & Branigan, 2020). This is particularly important given that language becomes one of the main ways that children engage in social connection across childhood and adolescence (Levin & Rubin, 1983; Rubin et al., 2006). Taken together, these findings highlight that social exclusion may be a particularly salient context that motivates using language to re-affiliate with a social group and maintain one's sense of belonging.

The Dyadic Nature of Social Interactions

Throughout this dissertation, affiliative language is examined as an index of an individual child's social motivation. However, it is important to remember that social interactions are inherently dyadic. Using affiliative language does not occur in isolation – it is something that unfolds between (at least) two people, each bringing their own motivations, temperament, and social history to the interaction. Therefore, understanding affiliative language use requires attending not only to what an individual child says, but to the social context that both the child and their partner create and the ways in which each child's behaviour shapes the other's.

The dyadic nature of social interactions has both theoretical and methodological implications. Theoretically, affiliative language is not simply a signal that one person sends – it is one that another individual both perceives and responds to. The warmth and social interest

conveyed through affiliative language encourages reciprocal engagement, and the quality of that response, in turn, shapes subsequent language use. This is supported by previous research where children within the same dyad tended to align on their affiliative language use ($r = .41$), suggesting that social affiliation within the context of a conversation is co-facilitated, rather than individually determined (English et al., 2026a). The characteristics of one's social partner matter as well. For instance, a child interacting with a shy or withdrawn peer may converse very differently than they would if interacting with an engaged, expressive partner – potentially adjusting their own language to facilitate the interaction or to fill conversational gaps (Wilson et al., 2024). Methodologically, this means that treating children's language use as an individual-level variable risks misrepresenting or misinterpreting nuanced social dynamics. The studies presented in this dissertation account for this in various ways, utilizing multilevel models that nest children within dyads, and structural equation models that explicitly examine both inter- and intrapersonal effects, capturing the inherently relational nature of affiliative language use.

Affiliative Language as *Intrapersonal* Regulation?

The work outlined thus far positions affiliative behaviours as serving a primarily interpersonal function. That is, affiliative behaviours themselves are *strategies* that individuals use to build, maintain, and repair social connections with others, fulfilling the need to belong. This is the function that has received the most empirical attention, and it is the primary lens through which affiliative behaviour has been studied. However, a growing body of evidence suggests that affiliative behaviours may also serve a second, less recognized function – one that is *intrapersonal* rather than *interpersonal* in nature. In other words, beyond their role in facilitating connections between individuals, affiliative behaviours may help regulate the aversive affective states elicited by perceived and experienced social threats. When belonging is

threatened, individuals experience increased physiological and emotional arousal – discomfort, anxiety, and heightened sensitivity to social cues (Eisenberger, 2012; Pickett et al., 2004). Engaging in affiliative behaviour may help manage that internal experience; reducing distress while also restoring a sense of connection in the process (Beckes & Coan, 2011; Zaki & Williams, 2013).

Affiliative language may be a particularly sensitive index of this regulatory process. Given it is spontaneous and relatively less deliberate compared to more overt prosocial acts, affiliative language may capture not only intentional efforts to connect, but the subtler ways that social stress shapes how individuals communicate. Consider Katelyn and Kelyn – both using affiliative language, but potentially for very different reasons. For Katelyn, her careful questions and small self-disclosures may reflect an effort to manage the anxiety of a new social situation just as much as they reflect a genuine desire to connect with someone new. Kelyn’s words may be doing something similar – reducing the aversive affective experience of exclusion *through* the act of connecting with another person. Whether these interpersonal and intrapersonal functions operate independently, interact with each other, or shift across development remains an important open question that the studies presented in this dissertation begin to explore.

Overview of Dissertation

The three studies presented in this dissertation examine the multiple motivations underlying children’s affiliative language use from complementary angles. First, in Chapter 2, I develop and validate a novel measure of children’s affiliative language use during peer interactions, providing the methodological foundation for the studies that follow. In Chapter 3, I examine how trait-level individual differences – specifically, the approach-avoidance motivational conflict that characterizes temperamental shyness – shape children’s affiliative

language use across the early stages of a developing peer relationship (Figure 1, Path A). In this study, I use a dyadic approach to both conceptually and analytically examine how the temperament of an individual child and the temperament of their social partner relate to affiliative language use across the early stages of a developing peer relationship. Finally, in Chapter 4, I use an experimental paradigm to directly examine how social-contextual factors, such as experiences of social exclusion, influence affiliative language use in children and adolescents (Figure 1, Path B). I further examine whether the affective experience of social stress plays a role in eliciting that language use. Together, these studies offer a more complete picture of the multiple motivations underlying children's affiliative behaviour and begin to elucidate the functional role that affiliative language plays in children's social lives.

Chapter Two:

Connection in Conversation: Validation of a Novel Measure of Children's Affiliative Language Use During Peer Interactions

A version of this paper is under review:

English, S. D., Sosa-Hernandez, L., Poole, K. L., & Henderson, H. A. (2026a). Connection in Conversation: Validation of a Novel Measure of Children's Affiliative Language Use During Peer Interactions. (In prep).

Social connection is a fundamental human need that motivates many of our behaviours (Baumeister & Leary, 1995). One specific set of behaviours driven by our desire for social connection are *affiliative behaviours*, which include verbal and non-verbal behaviours that promote positive social engagement (e.g., Leroy et al., 2010; Depue et al., 2005). From an evolutionary perspective, affiliative behaviours have emerged as an adaptive mechanism for ensuring survival and maintaining proximity to caregivers, particularly during early development (Bowlby, 1969). These behaviours, such as smiling, physical touch, vocalizations, and eye contact, not only elicit care and protection but also help regulate stress and support the development of social bonds (Francis et al., 1999; Taylor, 2012). Importantly, affiliative behaviours are not just biologically rooted; they are also inherently social in nature, relying on both the expression of affiliative signals (e.g., smiling, offering comfort, sharing resources) and the perception and interpretation of those signals by others (e.g., noticing a peer's smile, responding to offers of comfort, recognizing when a peer is being generous). While non-human animals express their desire for connection through physical proximity or nurturant behaviours (e.g., nursing, grooming), humans have the unique ability to explicitly communicate their social motivations through spoken language. For example, a child might express a desire to connect by asking a peer questions (e.g., "What games do you like?"), sharing information about themselves (e.g., "I like soccer"), or offering affirming statements (e.g., "That's really cool!"). These verbal expressions – which are referred to as *affiliative language* – represent a distinct and meaningful

way in which humans build and maintain relationships. Affiliative language serves a relational function – it is used to express warmth, empathy, and interest in others (Leaper & Smith, 2004). Despite its importance, affiliative language remains underexplored, particularly as a measurable construct in the field of developmental research. One promising approach for capturing affiliative language involves dictionary-based linguistic analysis, which identifies the frequency of words associated with specific categories (Pennebaker et al., 2007). Applying such methods to children’s natural language can provide valuable insights into how they use language to express social motivation, seek connection, and build relationships with their peers. The present work seeks to address this gap by conceptualizing, defining, and measuring affiliative language as a window into children’s social motivations when interacting with a new peer.

Theoretical Framing: Communication Accommodation Theory

To better understand how children use language to meet affiliative goals, it is helpful to consider a theoretical lens that emphasizes the adaptive and socially motivated nature of communication. Communication Accommodation Theory (CAT; Giles & Coupland, 1991) provides a framework for understanding how and why individuals may adapt their linguistic and communicative behaviour to signal social motivations in social interactions. According to this theory, individuals adjust their verbal and non-verbal behaviours during interactions to gain social approval, reduce social distance, and increase mutual understanding (Giles & Coupland, 1991). These adjustments reflect the idea that language use is dynamic, responsive to social context and interpersonal goals, and can foster feelings of connectedness between social partners.

CAT therefore provides a useful foundation for understanding the interpersonal functions of affiliative language. While the theory emphasizes adaptive, socially motivated communication, the present work draws on CAT to guide the identification and measurement of

language that serves affiliative functions. Specifically, the current study applies CAT's emphasis on adaptive, socially motivated communication to the development of a linguistic dictionary that captures verbal signals of affiliation in children and adolescents. By focusing on the *function* of language within interaction – rather than simple alignment in *form* – this approach offers a novel way to operationalize social motivation as it naturally unfolds in dyadic exchanges. In doing so, the present work leverages CAT to develop a methodological tool for capturing affiliative behaviour through language in naturalistic settings.

Current Methods of Measuring Affiliative Behaviour

In children and adolescents, social behaviours are commonly assessed using broad, trait-level measures of temperament, personality, or social skills, rather than direct assessment of children's language use. These measures typically rely on parent, teacher, or third-party reports of children's general tendencies to seek out, maintain, or enjoy social relationships, often including items assessing friendliness, cooperativeness, or sociability (e.g., Ellis & Rothbart, 2001). These measures offer valuable insights into stable patterns of affiliative behaviour and children's general orientation toward others but may conflate social motivation with related traits (e.g., sociability) and overlook context-specific ways that children signal connection during live, moment-to-moment interactions.

Behavioural observations, in contrast, may provide more direct insights into children's affiliative behaviours in naturalistic (e.g., school classrooms, playgrounds) or semi-structured contexts (e.g., lab-based interactions). These observations typically include coded behaviours such as sharing, helping, turn-taking, and physical proximity – behaviours that are often categorized as prosocial but may be interpreted as indicators of social motivation. In experimental paradigms, children are often observed providing help, comfort, or resources to

(real or hypothetical) peers, or adult experimenters (e.g., Saija et al., 2025, Carpenter et al., 2013; Benenson et al., 2007), or engaging in collaborative problem-solving tasks (e.g., Plötner et al., 2015). In less structured settings, such as classrooms or playgrounds, children's affiliative intent is often inferred from how they navigate peer groups – such as who they spend time with, how they initiate or respond to their peers, and whether they seek out familiar partners or form new connections (e.g., Beffel & Neal, 2023; Rubin et al., 2015).

While these common approaches can capture meaningful behavioural indicators of social motivation, they tend to focus on observable actions and prosocial choices, rather than the communicative strategies children use to express their desire to connect. For example, a child choosing to share her toys with a peer may be coded as displaying affiliative behaviour, but the language used within the interaction – including expressions of interest, empathy, or encouragement – often goes unmeasured. This distinction matters, as prosocial acts may be driven by various motivations (e.g., compliance, reward-seeking, empathy), and not all reflect a genuine desire to affiliate. This leaves a gap in our understanding of how children express their social motivation through verbal communication. While previous research in adult populations and within parent-child dyads suggests that communicative behaviours such as self-disclosure are linked to greater liking and perceived closeness (e.g., Sprecher et al., 2013; Brummelman et al., 2024), it remains unclear which communicative strategies children themselves use to form and sustain friendships.

In the earliest stages of life, the desire to connect is expressed through symbolic communication and emotional expressions (Lipschits & Geva, 2024). During early childhood, social connections are largely formed through play-based activities (e.g., McElwain et al., 2016). However, as children move into middle and late childhood, they increasingly rely on language

and conversational exchanges, suggesting that affiliative language may become a particularly salient means of expressing a desire to connect with age (Levin & Rubin, 1983; Göncü, 1993; Rubin et al., 2006). Given this developmental shift, as well as evidence that linguistic patterns can reveal underlying affective and motivational states (e.g., Nook, 2023; Burkhardt et al., 2021), analyzing what children say may provide a meaningful marker of their social motivation.

Affiliative language may offer a powerful window into children's in vivo social motivations – ones that are dynamic, context-sensitive, and shaped by the immediate goals of the interaction. Children may use affiliative language to initiate rapport with a new peer, sustain closeness in a developing relationship, or repair fractures following conflict or exclusion. Taken together, integrating our current knowledge of communicative strategies and linguistic indicators of affiliation can shed light on the specific ways children express their social motivations and navigate their social world.

This functional flexibility underscores the unique value of capturing affiliative language as a moment-to-moment behaviour that reflects children's social motivations in action. Unlike broader behavioural categories (e.g., helping, sharing), language may provide a window into children's intentions and strategies, allowing us to examine what children are saying, how and why they are saying it, and how those efforts change across contexts and time. These varying interpersonal goals reflect the long-standing human need to belong (Baumeister & Leary, 1995) and highlight the need for tools that can identify how children adapt their communicative behaviours to support these goals.

Defining Affiliative Language

Affiliative language refers to verbal behaviours that convey a desire to connect with another individual, signalling warmth, empathy, and a motivation to form, sustain, and

sometimes even repair social bonds (Leaper & Smith, 2004). Some examples of affiliative language include sharing personally relevant information (e.g., “My favourite colour is blue”), seeking personal information from one’s social partner (e.g., “Do you have any pets?”), and using affirmations that show active engagement and support (e.g., “Oh, that’s cool!”; Leaper & Smith, 2004). In contrast, language that functions primarily to convey factual information (e.g., “The question part took a long time”), procedural descriptions (e.g., “Right click, then select ‘Choose video filter’, and then pick whatever one”), or observational statements that lack a personal connection (e.g., “Yeah, it snowed earlier”), lacks the affiliative intent that characterizes this construct.

Importantly, affiliative language does not merely reflect a desire for social connection – it also facilitates it. By explicitly communicating interest, warmth, and receptivity, affiliative language invites reciprocal social responses and promotes more positive, collaborative interactions (O’Donnell et al., 2015). Previous research with children and adults has often measured affiliative language by coding the pragmatic function of speech by classifying utterances according to the communicative purpose (e.g., seeking/sharing information, responding to questions, providing affirmations; Wilson et al., 2024). Moreover, higher levels of affiliative language use have been positively linked to children’s social competence (Leaper & Smith, 2004). While previous work on linguistic alignment has emphasized how people tend to mirror their conversation partner’s language – such as through repeating words, using similar sentence structure, or matching conversational tone (e.g., Tian et al., 2024; Howe et al., 2023; Misiak et al., 2020; Doyle & Frank, 2016) – these patterns primarily reflect similarity in linguistic *form*. In contrast, affiliative language, as defined here, is concerned with *function*. That is, how language is used to convey social intent and promote interpersonal connection. Building

on previous coding approaches, our dictionary-based method allows us to examine the lexical content of children's language and capture potential word-level patterns and thematic content reflective of social motivation. Importantly, while linguistic alignment and affiliative language both support affiliative goals, the two constructs are conceptually distinct.

One key aspect of affiliative language is whether it is Self-Focused or Other-Focused. Self-Focused language, which aligns closely with the concept of self-disclosure, involves sharing personal thoughts, preferences, or experiences, functioning primarily as personal disclosure that conveys one's own subjective perspective. As previous research has shown self-disclosure to be associated with increased social liking and positive social impressions (Sprecher et al., 2013), it suggests that Self-Focused affiliative language is important for strengthening social bonds. In contrast, Other-Focused language involves asking questions or responding to a conversation partner, signalling attention and interest in fostering reciprocal engagement. This distinction is theoretically significant as it reflects differences in social motivations and interaction styles in conversation. Effective and enjoyable conversations typically require a balance both personal disclosure as well as responsiveness to others (Clark & Schaefer, 1989). Self-Focused language allows individuals to share personal experiences while simultaneously fostering intimacy and positive social impressions, whereas Other-Focused affiliative language promotes engagement and signals interest in one's conversation partner, which also strengthens social connection (e.g., Aron et al., 1997; Reis & Shaver, 1988). Therefore, both types of affiliative language play important complementary roles in building and maintaining meaningful social relationships.

Research Aims

This study aims to demonstrate how children use language to express their motivation to connect during social interactions. Specifically, we focus on quantifying affiliative language use

in the context of a dyadic conversation with an unfamiliar peer to gain insight into the ways language can function as a strategy for engaging in social interactions. To achieve this, the goal of the present study was to create and validate a novel measure of affiliative language using the Linguistic Inquiry and Word Count software (LIWC; Pennebaker et al., 2015). While previous work has primarily focused on quantifying the types of utterances (e.g., questions, statements, responses; Wilson et al., 2024), the specific function of these utterances – particularly their affiliative nature – remains underexplored. Recognizing this gap, we identified LIWC – a dictionary-based text-analysis software – as a promising tool for analyzing language use across social contexts. LIWC contains over 100 built-in dictionaries designed to capture various social and psychological states as indexed in spoken or written language. The pre-existing dictionaries were screened for relevance to affiliative language, and two dictionaries were identified as potentially relevant: the “affiliation” and “social” dictionaries. Following an extensive review of the words and phrases in each, it was determined that neither dictionary adequately captured the way children naturally express affiliative language as it was conceptualized for the present study, in part because existing dictionaries were developed based on adult populations. To address this limitation, we reviewed video recordings of children’s interactions with unfamiliar peers to identify words and phrases children naturally use when interacting with each other. These examples were then used to create a novel dictionary in LIWC, allowing us to more accurately capture how children express social motivations through language. Following dictionary development and refinement, we sought to validate the affiliative language measure against several informant report and observational measures. For convergent validity, we focused on indicators of children's social engagement, peer perceptions of the liking, prosocial behaviour, and trait-based affiliative tendencies. For discriminant validity, we examined associations with

broader individual difference measures, including self-esteem, social skills, and general verbal ability, which are conceptually distinct from social motivation. To account for variability in the amount that children talked, we quantified affiliative language use as a proportion of total words spoken rather than using raw counts of affiliative words. This approach ensures that the measure reflects the relative use of affiliative language, independent of how talkative a child was during the interaction. We hypothesized that:

(H1): Children would use more affiliative language in an explicit affiliative task than in a goal-oriented task, demonstrating sensitivity to social-contextual demands.

(H2): The proportion of affiliative language use would be positively associated with measures of observed social engagement, partner-reported liking, prosocial behaviour (i.e., sharing), and trait-level affiliativeness. This pattern would provide evidence for convergent validity, demonstrating that affiliative language aligns with other indicators of children's motivation to form social connections.

(H3): The proportion of affiliative language use would not be significantly associated with measures of children's self-esteem, broader social skills, or general verbal ability. This pattern would provide evidence for discriminant validity, showing that affiliative language reflects a distinct aspect of social communication, separate from general social and linguistic abilities.

Method

Participants and Study Design

Participants included a Canadian community sample, with the majority of families residing in Southwestern Ontario. The final sample included 186 9- to 12-year-old children (108 girls; $M_{\text{age}} = 10.72$ years, $SD_{\text{age}} = 1.09$) and their families who were recruited through various

social media platforms (e.g., Twitter, Kijiji) and local community events. Parent reports of children's ethnic backgrounds indicated the majority of children were White (75.7%), followed by mixed ethnicity (8.8%), South Asian (6.6%), Chinese (2.8%), Black (1.7%), West Asian (1.7%), Korean (1.1%), Latin American (1.1%), and Arab, (0.6%). Household income was in CAD dollars and had the following distribution: under \$25,000 (2.8%), \$25,000–\$49,999 (6.2%), \$50,000–\$74,999 (8.4%), \$75,000–\$99,999 (14.6%), \$100,000–\$149,999 (33.7%), and > \$150,000 (34.3%). Reports of parental education indicated most parents were highly educated, with 92.3% earning a college or graduate degree, 2.2% earning high school/secondary school diplomas, and 5.6% completing other forms of training (e.g., partial college training).

The study took place online via Zoom and consisted of three sessions separated by approximately two weeks. As part of the larger project, children and their parents completed a battery of questionnaires regarding the child's temperament, emotion regulation, and social skills. Children completed both individual and dyadic tasks. The first Zoom session took approximately 90 minutes to complete, and families were compensated with a \$20.00 gift card. Subsequent sessions lasted approximately 60 minutes and families were compensated with a \$15.00 gift card. Parental consent and child assent were obtained at the beginning of each session, and all procedures were approved by the University of Waterloo Research Ethics Committee. Data collection occurred between 2021 and 2022. Inclusion criteria required children to be English-speaking with access to a computer and internet. Children born prematurely or with complications or a diagnosed autism spectrum disorder were excluded. For the purposes of the current study, only data from the first session were used to validate the affiliative language measure. Measures of interest for the current study are described below.

For the dyadic portion of the visit, children were randomly paired with an unfamiliar sex-matched peer within six months of age. The two children joined a shared Zoom meeting. After a brief introduction, children were instructed to “get to know each other” (GTKY) for five minutes, with no additional instructions (Usher et al., 2015). During this time, research assistants turned their cameras and microphones off to limit distractions and simulate leaving the children alone in a laboratory setting. Following this initial interaction, children were put into separate breakout rooms with their respective research assistants where they completed a questionnaire to assess their social perceptions and metaperceptions. Dyads then completed a drawing task, followed by a cooperative brainstorming task where they were instructed to work together to design a COVID-19 face mask company. They were given 5 minutes to brainstorm ideas such as the name of the company and what the masks would look like. At the end of the session, children individually completed a final questionnaire to assess how they thought the overall interaction went (Usher et al., 2018), as well as a donation task (Benenson et al., 2007). The current study focused specifically on the GTKY and brainstorming tasks, as I was primarily interested in comparing children's affiliative language use in an unstructured, explicitly affiliative task versus a structured, goal-oriented task.

Measures

Affiliative Language

Children's affiliative language use was quantified using the Child Affiliative Language (CAL) dictionary, which we developed within the LIWC software for the current study (Pennebaker et al., 2015).

Developing the Child Affiliative Language Dictionary. To create and validate the CAL dictionary, we followed a three-step approach: 1) word collection, 2) word refinement and

categorization, and 3) validation. This approach was based on previous work that developed dictionaries using the LIWC software (e.g., Schweitzer & Waytz, 2021).

Initial Word Collection. As an initial step, the existing “affiliation” and “social” LIWC dictionaries were reviewed, and relevant words were retained. These dictionaries provided a foundational set of words commonly associated with social closeness, support, and positive social engagement. However, given that affiliative language can be highly context-dependent, we randomly selected and analyzed 20 transcripts of children’s conversations to identify additional words and sentence fragments that fit the definition of affiliative language, supplementing the words retained from the existing dictionaries. For example, commonly used affiliative words and phrases were identified and supplemented with alternative forms (e.g., “I’ve got a cat” vs. “I have a cat”). Additionally, we expanded the set of affirmations beyond frequently used terms like “nice” and “cool” by including words such as “awesome”, “wow”, and “oh yeah” to better capture children’s diverse expressions of enthusiasm and encouragement.

Word Refinement and Categorization. Once the preliminary word list was created, each word was evaluated for inclusion and categorization by two independent raters. Words were retained based on rater agreement, and disagreements were settled by discussion. Two mutually exclusive categories were defined based on the *social function* of the words: Self-Focused and Other-Focused. Self-Focused affiliative language includes words and phrases used to describe things about oneself (e.g., “I am...”, “My favourite...”, etc.), and Other-Focused affiliative language includes words and phrases used to learn things about or respond to another person (e.g., “Do you like...”, “Wow, your team did really good then!”), and affirmations (e.g., “Cool!”). Thus, words and phrases were given a secondary code of Self-Focused or Other-

Focused affiliative language within the broader category of Total affiliative language. See Appendix A for a complete word list and categorization.

Quantifying Affiliative Language. Children’s video-recorded conversations from the GTKY and brainstorming tasks were transcribed using the Microsoft SharePoint transcription feature and cross-checked for accuracy by a trained research assistant. The dyadic conversation was then filtered by participant ID and the utterances spoken by each child were copied into individual transcript documents. Individual transcripts were analyzed and a proportion score for each child was obtained. To quantify the amount of affiliative language used, the number of *affiliative* words spoken was divided by the *total* number of words spoken by each child during the interaction, creating a proportion score. Scores were calculated for Self-Focused and Other-Focused, which were summed to create a score for Total affiliative language. To ensure the affiliative language being captured by the dictionary was accurate (i.e., was affiliative in the context of a *dyadic conversation*), dyad-level transcripts were screened for a second time by two trained coders. Words were removed and added as necessary and proportion scores were updated accordingly.

Validity Measures

Table 1 provides an overview of the convergent and divergent measures used in the current study.

Convergent Validity Measures

Observed Social Engagement. Using a coding scheme adapted from Usher et al., 2018, trained research assistants provided ratings of each participant’s global *Openness*, *Social Ease*, and *Conversational Efficacy* during the GTKY task. Openness ratings ranged from 1 (*Completely closed off from interaction*) to 5 (*Completely open to interaction*). Primary indicators included

eye contact and body posture (ICC = .83). Social Ease ratings ranged from 1 (*Completely uncomfortable in the interaction*) to 5 (*Completely comfortable in the interaction*). Primary indicators included positive affect (e.g., smiling, nodding, excited tone of voice) and negative affect (e.g., gaze aversion, stuttering, fidgeting; ICC = .79). Conversational Efficacy ratings ranged from 1 (*Poor conversational efficacy*) to 5 (*Excellent conversational efficacy*). Primary indicators were related to conversational content and skills (e.g., responding appropriately to partner, not interrupting; ICC = .77). The three behaviours were highly correlated ($r_s = .58 - .66$; $p_s < .001$) and thus a *Total Social Engagement* score was created by summing the three behaviours.

Table 1

Study Measures Used to Assess Convergent and Discriminant Validity of Affiliative Language Measure

Domain	Measure	Convergent Validity	Discriminant Validity	Measure Type
Indicators of Affiliation	Observed Social Engagement	✓		Third-party observer
	PMQ – Partner-Rated Global Liking Composite	✓		Peer-report
	Sharing Task (# of tickets shared with partner)	✓		Behavioural
	EATQ-R – Affiliation Subscale	✓		Parent-report
Socioemotional Functioning	Child Rosenberg Self-Esteem Scale		✓	Child-report
	SSIS – Relationship Skills		✓	Parent-report
	PVT		✓	Behavioural

Note. EATQ-R = *Early Adolescent Temperament Questionnaire–Revised*; PMQ = *Perceptions and Metaperceptions Questionnaire*; PVT = *Picture Vocabulary Test*; SSIS = *Social Skills Improvement System*.

Peer Liking. Children's overall impressions of their social partner and the interaction were assessed using a subset of six items from the *Perceptions and Metaperceptions Questionnaire* (PMQ; adapted from Usher et al., 2018). Each item was rated on a 5-point scale ranging from 1 (*Not at all*) to 5 (*The most*). Three items assessed children's social perceptions (e.g., "How much do you like [name of social partner]?"; "How much do you want to continue a friendship with [name of social partner] outside the lab?"; "How well did your interaction with [name of social partner] go overall?"). Items were highly correlated ($r_s = .49$ to $.68$), and an average Global Liking score was created ($\alpha = .79$), reflecting how affiliative children were perceived to be.

Sharing Task. At the end of each session, children completed a variation of the *Dictator Game* (Benenson et al., 2007). Children were told that in addition to the gift card they would receive for completing the session, they would have an opportunity to win an additional \$25.00 gift card once the study was fully completed. Children were given 10 tickets, each worth one entry into the gift card draw. They were instructed that they could keep all 10 tickets for themselves or share any number of tickets between 0 and 10 with their social partner. They were also reminded that the other child would never find out how many tickets they chose to share and that their decision would remain a secret. Children were provided with a survey link to anonymously indicate how many tickets they wanted to share with their social partner. Of interest in the current study was the number of tickets the child gave to their partner, reflecting (indirect) prosocial behaviour. See Appendix B for task instructions.

Trait Affiliativeness (Parent-Report). *The Early Adolescent Temperament Questionnaire-Revised* (EATQ-R; Ellis & Rothbart, 2001) is a 62-item measure that assesses various dimensions of children's temperament. Parents rated how true each statement was of

their child using a 5-point Likert scale ranging from 1 (Almost always untrue of your child) to 5 (Almost always true of your child). For the purposes of convergent validation, we focused on the **affiliation subscale**, which includes 6 items assessing children's general desire for closeness and connection with others (e.g., "Wants to have close relationships with other people"). Item scores were averaged, with higher scores indicating higher levels of affiliation. The affiliation subscale demonstrated good internal consistency in the current sample ($\alpha = .75$).

Discriminant Validity Measures

Self-Esteem (Child-Report). *The Child Rosenberg Self-Esteem Scale* (Wood et al., 2021) is a 10-item questionnaire assessing adolescents' feelings of self-esteem and self-worth. Sample items include: "I feel that I'm as good as everyone else" and "Sometimes I think I am no good at all" (reverse scored). Each item is rated on a 4-point scale ranging from 1 (*Definitely not true*) to 4 (*Very true*). Item scores are summed, with higher scores indicating higher levels of self-esteem. The measure demonstrated good internal consistency in the current sample ($\alpha = .73$).

Social Skills (Parent-Report). *The Social Skills Improvement System–Social-Emotional Learning Edition* (Gresham & Elliot, 2008) is a 96-item learning system that assesses children's social and emotional skills. Items are rated on a 4-point scale, ranging from 0 (*Never*) to 3 (*Almost Always*). Of interest was the Relationship Skills subscale, which includes 14 items (e.g., "Takes turns in conversations"). Item scores are averaged, with higher scores indicating greater relationship skills. The Relationship Skills subscale demonstrated good internal consistency in the current sample ($\alpha = .83$).

Receptive Vocabulary. The *Picture Vocabulary Test* (PVT; Gershon et al., 2013)

provides a measure of children's receptive vocabulary. Children completed a series of trials¹ in which they were presented with an audio clip of a single word and viewed four images. On each trial, they were asked to select the image that most closely matched the meaning of the word. Each correct response is scored as 1 point. The raw score is then converted into an Uncorrected Standard Score, which compares the child's performance to a nationally representative normative sample, controlling for age, sex, or other demographic factors. The Uncorrected Standard Score uses a normative mean of 100 and a standard deviation of 15, with higher scores indicating better performance. Scores typically range from approximately 55 to 145, depending on the child's performance. The PVT was administered using the NIH Cognitive Battery (Gershon et al., 2013).

Data Analyses Plan

Data from the initial interaction were used to evaluate the convergent and discriminant validity of the affiliative language measure. For affiliative language variables, children who did not speak during the interaction were retained, as this was considered a meaningful observation rather than missing data. Given the nested structure of the data, we first determined whether multilevel modelling was appropriate. Empty (null) models were estimated for each outcome to check for nonindependence of children within dyads. Intraclass correlation coefficients (ICCs) indicated sufficient dyadic clustering for several outcomes, supporting the use of multilevel models (MLMs). Accordingly, all primary analyses were conducted using MLMs that accounted for the nonindependence of partners within dyads by including Dyad ID as a random intercept, even in cases where intraclass correlation coefficients (ICCs) were near zero or model fit

¹ The PVT uses an adaptive, staircase procedure where the number of items and their difficulty adjust based on the child's performance. The test ends when the child reaches a ceiling (a set number of incorrect responses) or a basal (a set number of correct responses).

warnings indicated minimal between-dyad variance. In such cases, fixed effects remain valid and interpretable, and we retained the MLM approach to ensure consistency across outcomes and to appropriately model nesting where present.

To investigate whether children's use of affiliative language varies across social contexts (hypothesis 1), MLMs were used to compare the proportion of affiliative language used during the GTKY task (explicit affiliative task) to the proportion used during the brainstorming task (goal-oriented task), to examine whether affiliative language use varies as a function of social context. To evaluate convergent validity (hypotheses 2) and discriminant validity (hypothesis 3) of affiliative language, a series of MLMs were conducted to examine the associations between proportions of affiliative language (Self-Focused, Other-Focused, Total) and measures of theoretically related (i.e., observed social engagement, partner-reported liking, prosocial behaviour, and trait-level affiliativeness) and unrelated constructs (i.e., self-esteem, social skills, and receptive vocabulary; see Table 1).

All analyses were conducted in R 4.5.1 (R Core Team, 2025) using the lme4 and lmerTest packages.

Results

Descriptive Statistics and Preliminary Analyses

Descriptive statistics for all study variables are presented in Table 2. Children's total word count in the five-minute unstructured GTKY task varied widely, with boys tending to talk more than girls ($M = 234$ vs. 192 words), $t(161.92) = 2.45$, $p = .015$. There were no sex differences for word count in the brainstorming task ($p > .05$). Older children also spoke slightly more than younger children in both the GTKY task, $r = .16$, $p = .033$, and the brainstorming task, $r = .15$, $p = .04$. However, affiliative language use (Self-Focused, Other-Focused, Total) did not

differ between boys and girls ($ps > .05$) and was unrelated to age ($ps > .05$). To examine similarity between dyad members, we calculated within-dyad correlations using the pairwise method to account for interdependence of dyad members for each outcome variable (Griffin & Gonzalez, 1995). Children in the same dyad tended to show similar patterns of language use. Within-dyad correlations were $r = .38$ for word count, $r = .44$ for Self-Focused affiliative language, and $r = .41$ for Total affiliative language ($ps < .001$). Other-Focused affiliative language was not correlated within dyads ($p > .05$). Correlations among study variables are presented in Table 2.

Model assumptions of residual normality, homoscedasticity, as well as absence of influential dyads were evaluated, and no substantive violations were detected. Predictors were entered separately as fixed effect at the individual (actor) level, and separate models were run for Self-Focused, Other-Focused, and Total affiliative language. As a sensitivity analyses, we also performed the analyses using total word count to better isolate the role of *affiliative language* use from general talkativeness.

Context Sensitivity of the Child Affiliative Language Dictionary

To examine whether the CAL dictionary captures context-sensitive variations in children's language use, we compared affiliative language use across two tasks: a get-to-know-you (GTKY) task and a goal-oriented brainstorming task. Although children spoke a similar amount in the GTKY and the brainstorming task, they used a greater proportion of Self-Focused, Other-Focused, and Total affiliative language in the GTKY task (where they were explicitly instructed to get acquainted) than in the brainstorming task (where they were focused on completing a specific task), as indicated by significant differences in the unstandardized beta

coefficients from multilevel models (Self-Focused: $b = -6.01, p < .001$; Other-Focused: $b = -6.04, p < .001$; Total: $b = -6.73, p < .001$; see Figure 2). This provides evidence of the validity of the affiliative language measure by showing that children's affiliative language use is sensitive to social-contextual task demands. Table 3 shows means and standard deviations across tasks.

Convergent Validity of the Child Affiliative Language Dictionary

To determine model specification, theoretical considerations were prioritized alongside various model fit indices including the Akaike information criterion (AIC) and Bayesian information criterion (BIC). For observed social engagement, the model including both actor and partner Self-Focused affiliative language was a better fit than the actor-only model. As social engagement was coded by third-party observers during a dyadic interaction where children naturally influence each other's behaviour, this may be reflected in observer ratings. Therefore, including partner language for this predictor was considered theoretically appropriate. This pattern was also consistent for total word count. For all other outcomes, partner affiliative language did not improve model fit, and actor-only models were used for consistency. For models including both actor and partner predictors, multicollinearity was low ($VIFs < 1.2$).

Results indicated that the measure of affiliative language use derived from the CAL dictionary had good convergent validity with third-party observers' social engagement codes (Self-Focused: $b = 0.07$; Total: $b = 0.04, ps < .05$), such that children who used a greater proportion of Self-Focused and Total affiliative language were rated as being more socially engaged. Further, Self-Focused affiliative language use was significantly positively associated with partner-rated Global Liking scores ($b = 0.03, p < .05$), as well as the number of tickets children shared with their partner ($b = 0.08, p < .05$). That is, children who used higher proportions of Self-Focused affiliative language were liked more by their partners and engaged

Table 2*Descriptive Statistics and Correlations Among Study Variables*

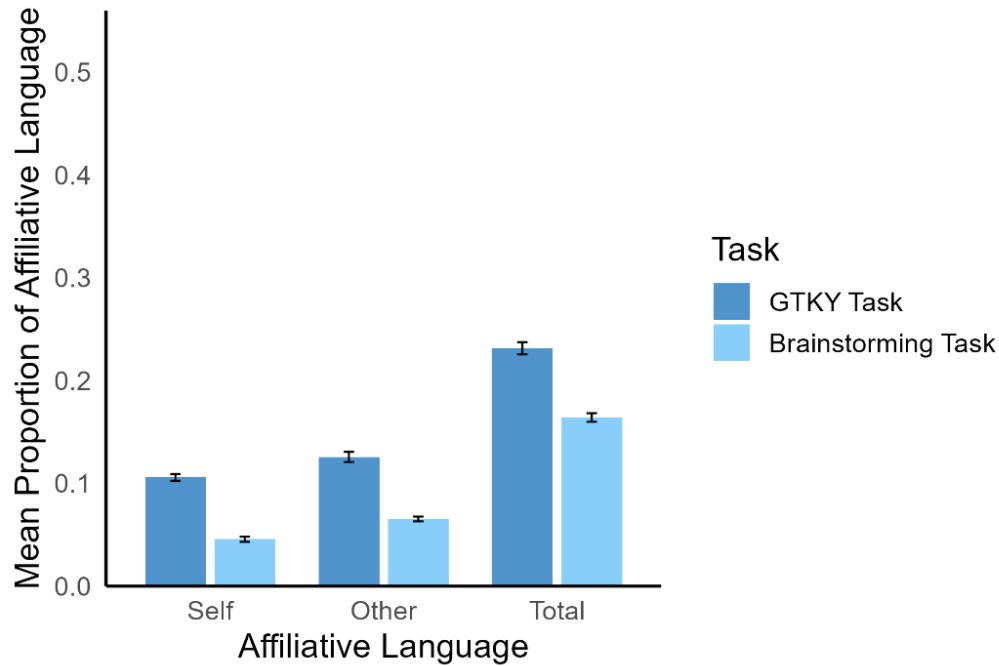
Variable	N	M	SD	Range	Correlations													
					1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Age	186	10.72	1.09	9.01-12.98	—													
2. Sex	186	—	—	—	.06	—												
3. Total Word Count (GTKY)	186	209	117	0-453	.16*	-.18*	—											
4. Total Word Count (Brainstorming)	184	208	119	0-557	.15*	-.14	.63***	—										
5. Self-Focused Affiliative Language	186	.11	.05	.00-.22	-.12	.07	.11	.00	—									
6. Other-Focused Affiliative Language	186	.13	.07	.00-.38	-.05	.01	-.32***	-.2**	-.01	—								
7. Total Affiliative Language	186	.23	.08	.00-0.45	-.11	.04	.16*	-.16*	.55***	.83***	—							
8. Social Engagement	183	9.63	2.08	3-13	.04	-.11	.51***	.27***	.23**	.09	.20**	—						
9. Partner Rated Global Liking Composite	184	3.72	.74	1.67-5.00	-.05	.17*	.06	.04	.17*	-.01	.09	0.12	—					
10. Sharing Task (# of tickets given)	185	3.81	2.11	0-10	.07	.08	.05	.03	.16*	-.04	.06	-.07	-.13	—				
11. Affiliativeness (EATQ-R-PR)	179	3.96	.64	2-5	-.10	.18*	.08	-.02	-.01	-.08	-.07	.12	-.02	.17*	—			
12. Self-Esteem	185	3.31	.41	1.90-4.00	-.05	-.02	.07	-.06	-.12	.06	-.01	.07	.07	-.13	.22**	—		
13. Relationship Skills (SSIS-SEL-PR)	180	97.83	13.14	69-128	-.08	.04	.15*	.00	.01	-.04	-.02	.15	-.02	.05	.64***	.19*	—	
14. PVT	162	87.56	8.08	65-123	.41***	-.07	.10	.22**	-.13	-.07	-.13	.04	.07	-.06	-.08	.08	-.18*	—

Note. M = mean; SD = standard deviation. Sex was dummy coded (0 = boys, 1 = girls).

* $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 2

Mean-Level Differences in Affiliative Language Proportions by Task



Note: All task differences are statistically significant at the $p < .001$ level.

Table 3

Means and Standard Deviations for Word Count and Proportions of Self-Focused, Other-Focused, and Total Affiliative Language During the Get to Know You and Brainstorming Tasks

	Word Count	Self-Focused Affiliative Language	Other-Focused Affiliative Language	Total Affiliative Language
Task	M (SD)	M (SD)	M (SD)	M (SD)
GTKY Task	209 (117)	.11 (.05)	.13 (.07)	.23 (.08)
Brainstorming Task	208 (119)	.05 (.03)	.07 (.03)	.16 (.06)

Note. N = 184, GTKY = get to know you; SD = standard deviation. Self- and Other-Focused proportions were calculated separately and may not sum exactly to Total due to rounding.

in greater prosocial sharing. Contrary to expectations, however, parent-reported temperamental affiliation was unrelated to affiliative language use (Self-Focused, Other-Focused, Total; $ps > .05$). Importantly, these associations were specific to affiliative language use, as demonstrated by the fact that three of the four convergent validity measures were unrelated to *how much* a child spoke (i.e., total word count; $ps > .05$), with the exception of third-party ratings of social engagement ($b = 0.01, p < .01$).

Divergent Validity of the Child Affiliative Language Dictionary

The CAL dictionary also demonstrated good discriminant validity in that affiliative language was unrelated to measures of self-esteem ($bs = -0.01$ to $< 0.01, ps > .05$), social skills ($bs = -0.14$ to $-0.06, ps > .05$), and receptive vocabulary ($bs = -0.23$ to $-0.08, ps > .05$).

Unstandardized beta coefficients from the MLMs are presented in Table 4.

Discussion

The present study introduces a novel method for quantifying children's affiliative language during naturalistic dyadic conversations. The results provide initial validation for a Child Affiliative Language (CAL) dictionary as a tool for quantifying children's affiliative language use in dyadic peer interactions. The CAL dictionary quantified affiliative language use which was sensitive to social-contextual demands and demonstrated convergent and discriminant validity. Importantly, the measure captured affiliative language use in children's speech that provides unique information beyond general talkativeness or receptive language ability, offering a nuanced lens into how children use language to establish connections with previously unfamiliar peers.

Context Sensitivity

Children systematically varied their use of affiliative language, but not total amount of talking, based on task demands, supporting the validity of the CAL dictionary. Children's overall affiliative language, and both their Self-Focused and Other-Focused language, varied across

Table 4

Unstandardized Beta Coefficients from Multilevel Models Testing Word Count and Proportions of Self-Focused, Other-Focused, and Total Affiliative Language as Predictors of Convergent and Discriminant Validity Measures

	Word Count	Self-Focused Affiliative Language	Other-Focused Affiliative Language	Total Affiliative Language
Convergent Validity Measures				
Social Engagement	0.01**	0.07*	0.03	0.04*
Partner Rated Global Liking Composite	< 0.01	0.03*	< 0.01	0.01
Sharing Task (# of tickets given)	< 0.01	0.08*	-0.01	0.02
Affiliativeness (EATQ-R-PR)	< 0.01	< 0.01	-0.01	-0.01
Discriminant Validity Measures				
Self-Esteem	< 0.01	-0.01	< 0.01	< 0.01
Relationship Skills (SSIS-SEL-PR)	0.01*	-0.02	-0.07	-0.04
PVT	0.01	-0.22	-0.08	-0.13

Note. EATQ-R-PR = Early Adolescent Temperament Questionnaire-Revised-Parent Report; PVT = Picture Vocabulary Test; SSIS-SEL-PR = Social Skills Improvement System-Social Emotional Learning-Parent Report; Values listed as < |0.01| indicate non-zero coefficients smaller than ± 0.005 ; * $p < .05$; ** $p < .01$.

tasks, reflecting sensitivity to the social goals of each task. Specifically, children used significantly more affiliative language in the get to know you (GTKY; Usher et al., 2015) task, which had an explicit affiliative goal, than in the goal-oriented collaborative brainstorming task. These findings align with the Communication Adaptation Theory (Giles & Coupland, 1991), which posits that individuals adapt their communication style based on context and goals of the interaction. In the present study, children appeared to “ramp up” their affiliative language during an explicit relational task, more so than in a task with instrumental goals. This is consistent with the measure capturing dynamic shifts in motivation across different social interaction contexts. Importantly, the increase in affiliative language in the GTKY task was not due to children being more talkative in the GTKY task, as word count did not significantly differ between tasks. In the GTKY task, where the goal was to “get to know each other”, children may have been more socially motivated to share about themselves and express interest in their partner. In contrast, the nature of the brainstorming task likely caused children to prioritize instrumental goals over relational goals, which may account for the reduced affiliative language use. These findings support the idea that affiliative language is not a fixed trait but rather a flexible, context-sensitive behaviour that may reflect children’s shifts in social motivation and sensitivity to conversational demands.

Convergent Validity

The CAL dictionary demonstrated good convergent validity, showing meaningful associations with indicators of social connectedness including third-party observers’ ratings of social engagement, partner-reported liking, and prosocial sharing. Specifically, both Self-Focused and Total affiliative language were positively associated with third-party ratings of social engagement. That is, children who used a greater proportion of affiliative language were

seen as being more open and comfortable in the interaction and more effective in maintaining the flow of conversation, suggesting that their use of affiliative language factored into observers' impressions of these social behaviours. Self-Focused affiliative language was also positively associated with how much a child's interaction partner reported liking them at the end of the session, highlighting the role of self-disclosure in fostering positive peer impressions during an initial interaction (Collins & Miller, 1994). Recall that partners' language tended to align within dyads, particularly for Self-Focused affiliative language, suggesting that self-disclosure may elicit reciprocal sharing and create a back-and-forth dynamic that reinforces social connection across the interaction. Finally, Self-Focused affiliative language was positively associated with children's prosocial sharing behaviour, such that children who used higher proportions of Self-Focused affiliative language shared more tickets with their partner. This finding extends evidence of convergent validity beyond perceptual and interaction-based outcomes, suggesting that affiliative language use is also linked to concrete prosocial behaviour within the interaction context. In contrast, Other-Focused affiliative language showed less alignment with dyads, suggesting that simple responsiveness may not be as effective during brief, initial interactions with previously unfamiliar peers. Critically, these associations were independent of the overall amount a child spoke, suggesting that the CAL dictionary captures the *quality*, rather than the mere quantity, of children's spoken language. While these associations support the validity of the dictionary, parent-reported temperamental affiliative tendencies were not significantly associated with affiliative language use.

Although how much children talked was generally unrelated to convergent measures, word count was positively associated with third-party ratings of social engagement. However, this likely reflects the common perception that children who are more talkative are more socially

engaged and socially competent, even if their language is not explicitly affiliative (Custode et al., 2024). Importantly, we do not believe this undermines the validity of the CAL dictionary, as the proportion of affiliative language was still uniquely associated with how children experienced the interaction.

Discriminant Validity

The CAL dictionary demonstrated strong discriminant validity. Specifically, all forms of affiliative language (i.e., Self, Other, Total) were not significantly associated with children's self-esteem, general social skills, or receptive vocabulary ability. The absence of these associations suggests that affiliative language use reflects context-specific communicative processes, rather than stable individual differences in self-evaluation, social competence, or language ability. Affiliative language may therefore capture flexible, interaction-level strategies that children draw on when engaging with a new peer.

Limitations and Future Directions

Several considerations should be noted when interpreting the current findings. First, while we interpret affiliative language use as reflecting children's underlying social motivation, the CAL dictionary was designed to capture affiliative words and phrases but does not *directly* measure children's affiliative intentions. Therefore, we cannot confirm that higher affiliative language use *always* reflects a desire to form social connections, as other factors, such as personal or situational goals, may also drive this type of language use. However, this limitation highlights many avenues for future research. For instance, studies could directly assess children's social motivations using brief self-reports (e.g., "How much did you want to make a new friend?") and relate them to children's affiliative language. This could help clarify whether the CAL dictionary-based scores align with children's own perspectives on their social motivations.

Additionally, experimental designs could manipulate social or task contexts to examine how affiliative language changes in response to specific motivations, providing a more nuanced understanding of the mechanisms driving social communication.

Second, this study was conducted in an online context, and results may differ in face-to-face interactions. Relatedly, interactions were relatively brief and involved same-age, same-sex peers. Although the CAL dictionary was applied to the present set of dyadic tasks, it was designed with the goal of capturing affiliative language more broadly across various types of tasks and social interactions. This study provides an initial test of the tool across affiliative and non-affiliative conversational contexts. Future studies should continue to examine affiliative language use across multiple interaction types, including longer interactions, and in group-based settings, to elucidate how context shapes affiliative behaviour and to further evaluate the flexibility and generalizability of the CAL dictionary across different kinds of social interactions.

Additionally, our sample was rather homogeneous, with the majority of children being White, relatively high SES families, which may limit generalizability to more diverse populations. This is important to consider given that culture can shape both the use and meaning of affiliative language. For instance, individualist and collectivist cultures differ in how much value is placed on connection and group harmony as a general cultural orientation (Markus & Kitayama, 1991), which could influence how frequently affiliative language is used, independent of any specific social context. There may also be linguistic and normative differences in how affiliation is verbally expressed across cultures, raising questions about whether the same set of words and phrases would adequately capture affiliative language use in other populations. The age range was also restricted to 9-12 years, which leaves us with questions regarding how affiliative language is used in younger children and late adolescent populations. Given the

sample we used to validate the dictionary, it is still unclear whether the same words and categories will capture affiliative language use in more culturally, linguistically, or developmentally diverse populations. Future research should consider testing the robustness of the dictionary across various groups and consider adapting or expanding the word list to ensure cultural and developmental relevance.

Finally, a limitation to this dictionary-based approach is that it simplifies complex conversations and therefore cannot capture subtleties and nuance in conversations such as tone, irony and sarcasm, or nonverbal communication. Future research should build on this work by incorporating additional cues, such as vocal tone, gestures, or facial expressions, to provide a more comprehensive picture of how children express affiliation.

Conclusion

The CAL dictionary provides a valid and context-sensitive tool for assessing children's affiliative language in dyadic interactions. It captures affiliative language independent of overall talkativeness or general language ability, and may reflect children's motivations to connect with others, with Self-Focused affiliative language showing a particularly strong link to positive peer impressions. These findings support the use of the CAL dictionary in future research examining how children signal social motivation across different social contexts, developmental stages, and individual differences, offering a more precise way to examine the subtle dynamics of children's social communication.

Chapter Three:

It's Not How Much You Say: Shyness, Verbal Communication, and the Development of Peer Relationships Across Time

A version of this paper is under review:

English, S. D., Sosa-Hernandez, L., Poole, K. L., & Henderson, H. A. (2026b). It's Not How Much You Say: Shyness, Verbal Communication, and the Development of Peer Relationships Across Time. *Translational Issues in Psychological Science*. (Under review).

The ability to form and maintain high quality social relationships is fundamental for children's socioemotional development and overall well-being (Hartup, 1996). These relationships become increasingly important during middle childhood and adolescence as children begin to spend more time with their peers and rely less on adult guidance to navigate social interactions (Rubin et al., 2006, 2015). During this developmental period, children rely more on verbal communication than shared play to support their social interactions, and the way children converse with others, particularly during initial social interactions, sets the tone for whether a deeper relationship will be formed (e.g., Blum-Kulka & Snow, 2004; Hartup, 1996; see also Sunnafrank & Ramirez, 2004). However, these interactions do not come easily for all children, as important individual differences (e.g., temperament, social skills, communication style) contribute to how children navigate novel social situations. The present study uses a longitudinal dyadic approach to examine how temperamental shyness shapes the quantity and quality of children's verbal communication across the early stages of a developing peer relationship, and whether these patterns predict meaningful social outcomes.

Individual Differences in Temperamental Shyness

Shyness is a temperamental trait characterized by wariness in response to social novelty and fear of negative social evaluation (Kagan et al., 1988). More specifically, shyness is characterized by an approach-avoidance motivational conflict, such that shy children often simultaneously experience both a desire to connect with others (high approach motivation) and a

desire to avoid social situations due to fear of negative evaluation or rejection (high avoidance motivation; Asendorpf, 1990; Cheek & Buss, 1981). In other words, while shy children often *want* to affiliate with others, their preoccupation with being negatively perceived and possibly rejected prevents them from doing so. This conflict is particularly pronounced in new social situations, such as initial interactions with unfamiliar peers, where the perceived threat of negative evaluation is heightened (e.g., Coplan & Armer, 2007; Rubin et al., 2009).

During peer interactions, this approach-avoidance motivational conflict manifests in observable behavioural patterns. Notably, shy children talk less and produce fewer verbal utterances compared to their less shy peers (Asendorpf & Meier, 1993; Crozier & Badawood, 2009). More broadly, shyness and social withdrawal are associated with real social consequences, including peer rejection and lower quality friendships over time (Rubin et al., 2009; Wojslawowicz Bowker et al., 2006). However, speaking less during social interactions does not necessarily indicate a lack of social motivation or interest in connecting with peers. In fact, shy children often report wanting to interact with others and value peer relationships, suggesting that their reduced verbal participation may reflect the avoidance aspect of their competing motivations, not social disinterest (Asendorpf, 1993; Coplan et al., 2004). Moreover, not all shy children experience the same negative social outcomes, as there is considerable variability in how shy children are perceived by peers, and in their ability to form and maintain friendships (Rubin et al., 2009; Booth-LaForce & Oxford, 2008). In other words, shyness alone may not determine interaction outcomes. For example, in a study of unfamiliar peer dyads, shyness was associated with fewer verbal contributions but was unrelated to collaborative task success, suggesting that shy children may compensate by using other communicative strategies (e.g., Sosa-Hernandez et al., 2023). This raises an important question: if amount of speaking

alone does not fully explain shy children's social experiences, what aspects of their communication matter for determining social outcomes? Indeed, research suggests that communication skills may buffer against the social consequences of shyness, such that *how* children communicate may matter just as much as how *much* they speak (e.g., Cheung & Elliott, 2017; Coplan & Weeks, 2009; Zhu et al., 2019). The *content* of children's speech, not just the quantity, may therefore be a key mechanism through which shy children navigate the tension between wanting to connect while simultaneously fearing rejection.

Using Affiliative Language as a Strategy for Social Engagement

Shy children may strategically use certain types of language to both express their desire for social connection *and* to regulate the anxiety and heightened arousal that characterizes novel social interactions, despite speaking less overall. Such strategies may be particularly useful because they allow for social engagement while minimizing the risk of negative evaluation – offering a low-stakes way to signal their desire to connect that does not require prolonged or sustained verbal participation (Asendorpf, 1990). One type of language that may be particularly important for signalling social connection is affiliative language, which functions to build and maintain social connections and includes statements of support, agreement, and elaboration on a social partner's previous comments (e.g., “we”, “let's”, “I like...”, “that's nice”, “me too”; Leaper & Smith, 2004). Subtle conversational dynamics – including both timing and content – have been shown to signal social connection between interaction partners. For example, faster response times between social partners have been associated with greater perceived social connection in adults (Templeton et al., 2022), and greater perceived social engagement in children (Wilson et al., 2024). Beyond timing, emerging evidence suggests that children's use of affiliative language is associated with positive social outcomes, including greater peer-reported

liking, higher perceived social engagement, and increased prosocial behaviour during an initial interaction (English et al., 2026a). Notably, this work found that the proportion of self-focused affiliative language (e.g., “I like...”, “My favourite...”) was specifically associated with these outcomes, suggesting that self-disclosure during social interactions may be an especially effective strategy for fostering social connection.

Considering Dyadic Context and The Role of Time

While individual differences in temperamental shyness can influence children’s communication patterns, social interactions are inherently dyadic in nature – shaped by both the characteristics and behaviour of both social partners (Hinde, 1979). Therefore, children’s language use during peer interactions is shaped not only by their own traits and motivations, but also those of their interaction partner. One child’s shyness may elicit certain responses from their conversational partner. For example, when interacting with a shy peer who speaks less or appears withdrawn, children may adjust their own communication to facilitate the interaction. Research by Wilson and colleagues (2024) showed that when interacting with a shy partner, children responded more quickly, offering greater conversational support. Whether partner shyness similarly shapes the content or quality of children’s speech, including how they use affiliative language, remains unknown. Understanding these partner effects is essential for capturing the full dynamics of peer interactions.

While initial interactions with unfamiliar peers may be particularly challenging for shy children, peer relationships develop over time. As children become more familiar with their social partner, novelty diminishes, which could potentially reduce the approach-avoidance conflict that shy children experience, consistent with evidence suggesting that shyness-related behavioural patterns differ across familiar and unfamiliar social contexts (e.g., Hassan &

Schmidt, 2023). Yet, it remains unclear whether the communicative patterns shy children adopt during an initial interaction persist as familiarity increases, or whether they shift as the anxiety associated with novelty fades. Understanding how these dynamics unfold over time can provide insight into how shy children's strategic language use may contribute to the development of high-quality peer relationships. Critically, understanding whether these shyness-related communication patterns have meaningful social consequences remains an important question. The present study uses a longitudinal dyadic approach to examine how temperamental shyness shapes the quantity and quality of children's verbal communication as peer relationships develop in real time. We also ask whether these patterns carry meaningful consequences for how children are perceived by others, including their social partner.

Research Aims

This study builds on preliminary work examining how children's use of affiliative language relates to various social outcomes during peer interactions (English et al., 2026a) by addressing several important gaps. First, while previous research has focused on initial interactions and established friendships independently, it remains unclear whether these patterns persist or change as children become more familiar with one another over time. The present study therefore examined verbal reticence and affiliative language use longitudinally across three interactions with the same peer, capturing how these patterns unfold across early stages of a developing peer relationship. Additionally, the role of individual differences in shaping these patterns has yet to be examined. Temperamental shyness, characterized by an approach-avoidance motivational conflict, may be a particularly important factor influencing how children use affiliative language during peer interactions.

Further, since children's social interactions occur within a dyadic context, shyness is also likely to elicit certain responses from conversational partners. For example, as noted above, a shy child may elicit greater support or conversational scaffolding from their interaction partner (e.g., Wilson et al., 2024). Accordingly, we considered how children's verbal communication – including both how much they speak, as well as their affiliative language use – may be shaped by their own shyness *and* the shyness of their interaction partner, providing a more comprehensive account of social dynamics that unfold during peer interactions over time.

Finally, given the growing evidence that positive aspects of verbal communication (e.g., greater affiliative language use, faster reaction times) during peer interactions are associated with positive social outcomes including perceived engagement and relationship quality (e.g., English et al., 2026a; Wilson et al., 2024; see also Templeton et al., 2022), this study examined whether shyness-related differences in verbal participation longitudinally predicted how children were perceived by outside observers and how much they were liked by their own interaction partner. This allowed us to move beyond simply describing communication patterns to understanding their relational consequences across the developing peer relationship. We hypothesized that:

(H1): Children's own temperamental shyness would be negatively associated with how much a child spoke across all three sessions, such that children higher in shyness would speak fewer words overall at each timepoint.

(H2): Children's own temperamental shyness would be positively associated with the proportional use of affiliative language (i.e., relative to the child's total word count) across all three sessions, such that shy children would use a greater proportion of affiliative language despite speaking less overall, compared to their less shy peers.

(H3): A child's partner's shyness would be positively associated with the amount the child speaks overall, as well as their proportional use of affiliative language, across all three sessions, reflecting the use of affiliative communication as a strategy for supporting or facilitating the interaction when interacting with a shy peer.

(H4): Children's word count and affiliative language use would longitudinally mediate the association between shyness and social outcomes at T3, such that shyness-related differences in verbal participation and communication style across all three sessions would account for differences in perceived social engagement and peer liking over time.

Method

Participants and Study Design

Participants included a Canadian community sample, with the majority of families residing in Southwestern Ontario. The final sample included 186 9- to 12-year-old children (108 girls; $M_{\text{age}} = 10.72$ years, $SD_{\text{age}} = 1.09$) and their families who were recruited through an established lab database, various social media platforms (e.g., Twitter, Kijiji) and local community events. Parent reports of children's ethnic backgrounds indicated the majority of children were White (75.7%), followed by mixed ethnicity (8.8%), South Asian (6.6%), Chinese (2.8%), Black (1.7%), West Asian (1.7%), Korean (1.1%), Latin American (1.1%), and Arab, (0.6%). Household income was in CAD dollars and had the following distribution: under \$25,000 (2.8%), \$25,000–\$49,999 (6.2%), \$50,000–\$74,999 (8.4%), \$75,000–\$99,999 (14.6%), \$100,000–\$149,999 (33.7%), and > \$150,000 (34.3%). Reports of parental education indicated most parents were highly educated, with 92.3% earning a college or graduate degree, 2.2% earning high school/secondary school diplomas, and 5.6% completing other forms of training (e.g., partial college training).

The study took place online via Zoom and consisted of three sessions, each separated by approximately two weeks. As part of the larger project, children and their parents completed a battery of questionnaires regarding the child's temperament, emotion regulation, and social skills. Children completed both individual and dyadic tasks. The first Zoom session took approximately 90 minutes to complete, and families were compensated with a \$20.00 gift card. Subsequent sessions took approximately 60 minutes to complete, and families were compensated with a \$15.00 gift card. Parental consent and child assent were obtained at the beginning of each session, and all procedures were approved by the University of Waterloo Research Ethics Committee. Data collection occurred between 2021 and 2022. Inclusion criteria required children to be English-speaking with access to a computer and internet. Children born prematurely or with complications or diagnosed autism spectrum disorder were excluded. Measures of interest for the current study are described below.

For the dyadic portion of the visit, children were randomly paired with an unfamiliar sex-matched peer within six months of age. The two children joined a shared Zoom meeting. After a brief introduction, children were instructed to “get to know each other” for five minutes, with no additional instructions (Usher et al., 2015). During this time, research assistants turned their cameras and microphones off to limit distractions and simulate leaving the children alone in a laboratory setting.

Measures

Shyness

Children completed the *Child Shyness Questionnaire* (CSQ; Crozier, 1995) is a 26-item self-report questionnaire assessing behavioural, affective, and physiological indicators of children's shyness in both novel and familiar contexts (e.g., “I find it hard to talk to someone I

don't know"). Children are asked to respond "No", "Sometimes", or "Yes" to each item (scored as 0, 1, and 2, respectively). Item scores are summed to obtain a total score, with higher scores indicating higher levels of child shyness. The CSQ demonstrated good internal consistency in the current sample ($\alpha = .87$). Parents completed the *Early Adolescent Temperament Questionnaire-Revised* (EATQ-R; Ellis & Rothbart, 2001), a 62-item measure that assesses numerous dimensions of children's temperament. Parents rated how true each statement was of their child using a 5-point Likert scale ranging from 1 (*Almost always untrue of your child*) to 5 (*Almost always true of your child*). Of particular interest was the shyness subscale, which includes 5 items pertaining to children's responses to social novelty and challenges (e.g., "Feels shy about meeting new people"). Item scores are averaged, with higher scores indicating higher levels of shyness. The shyness subscale demonstrated good internal consistency in the current sample ($\alpha = .90$). Given child-reported CSQ scores and parent-reported EATQ-R scores were positively associated, $r = .46$, $p < .001$, scores were standardized and averaged to create a composite shyness score used in all subsequent analyses.

Observed Social Engagement

Using a coding scheme adapted from Usher et al., 2018, trained research assistants provided ratings of each participant's global *Openness*, *Social Ease*, and *Conversational Efficacy* during the "get to know you" (GTKY) task. Openness ratings ranged from 1 (*Completely closed off from interaction*) to 5 (*Completely open to interaction*). Primary indicators included eye contact and body posture (ICC = .76). Social Ease ratings ranged from 1 (*Completely uncomfortable in the interaction*) to 5 (*Completely comfortable in the interaction*). Primary indicators included positive affect (e.g., smiling, nodding, excited tone of voice) and negative affect (e.g., gaze aversion, stuttering, fidgeting; ICC = .74). Conversational Efficacy ratings

ranged from 1 (*Poor conversational efficacy*) to 5 (*Excellent conversational efficacy*). Primary indicators were related to conversational content and skills (e.g., responding appropriately to partner, not interrupting; ICC = .71). Of interest for the current study were social engagement scores at T3. The three behaviours were highly correlated ($r_s = .73 - .78$; $p_s < .001$) and thus a *Total Social Engagement* score was created by summing the three behaviours.

Peer Liking

Children's overall impressions of their social partner and the interaction were assessed using a subset of three items from the *Perceptions and Metaperceptions Questionnaire* (PMQ; adapted from Usher et al., 2018). Each item was rated on a 5-point scale ranging from 1 (*Not at all*) to 5 (*The most*). Items included: "How much do you like [name of social partner]?", "How much do you want to continue a friendship with [name of social partner] outside the lab?", and "How well did your interaction with [name of social partner] go overall?". Items were highly correlated ($r_s = .68$ to $.79$), and an average Peer Liking score was created ($\alpha = .88$). Of interest for the current study were Peer Liking scores at T3.

Receptive Vocabulary

The *Picture Vocabulary Test* (PVT; Gershon et al., 2013) – administered using the NIH Cognitive Battery – provides a measure of children's receptive vocabulary. Children completed a series of trials² in which they were presented with an audio clip of a single word and viewed four images. On each trial, they were asked to select the image that most closely matched the meaning of the word. Each correct response is scored as 1 point. The raw score is then converted into an Uncorrected Standard Score, which compares the child's performance to a nationally

² The PVT uses an adaptive, staircase procedure where the number of items and their difficulty adjust based on the child's performance. The test ends when the child reaches a ceiling (a set number of incorrect responses) or a basal (a set number of correct responses).

representative normative sample, controlling for age, sex, or other demographic factors. The Uncorrected Standard Score uses a normative mean of 100 and a standard deviation of 15, with higher scores indicating better performance. Scores typically range from approximately 55 to 145, depending on the child's performance.

Verbal Communication Patterns

Children's total amount of talking and affiliative language was assessed using the Child Affiliative Language (CAL) dictionary, a validated LIWC-based dictionary designed to capture affiliative communication within children's dyadic interactions (English et al., 2026a; Pennebaker et al., 2015). The CAL dictionary quantifies words and phrases that reflect the desire to connect with others, yielding proportion scores for Total affiliative language as well as two mutually exclusion subcategories: Self-Focused affiliative language (e.g., describing oneself or one's experiences, preferences, etc.) and Other-Focused affiliative language (e.g., asking questions of, responding to, or affirming a social partner). Children's video-recorded conversations were transcribed and separated by speaker. Individual transcripts were analyzed using LIWC and affiliative language was quantified as the proportion of affiliative words relative to each child's total word count. Proportion scores were calculated separately for Total affiliative language and for the Self-Focused and Other-Focused subcategories. Higher scores reflect greater use of affiliative language during the interaction.

Data Analyses Plan

The following analyses examined associations between temperamental shyness and children's verbal communication patterns across three sessions. Children who did not speak during the interactions were retained, as this was considered a meaningful observation rather than missing data. Fourteen participants (7.5%) had missing data on the predictor variable of

shyness. Welch's t -test indicated that missingness was unrelated to language variables, child characteristics (e.g., age, sex), and social outcome variables at any timepoint ($ps > .05$), suggesting data were missing completely at random (MCAR). Full information maximum likelihood (FIML) estimation was used to handle missing data across both predictor and outcome variables, allowing us to retain the full sample of 186 children.

To examine the longitudinal associations between shyness and children's verbal communication patterns, longitudinal Structural Equation Modeling (SEM) were estimated using the lavaan package (Rosseel, 2012) in R (version 4.5.1; R Core Team, 2025). Separate models were estimated for each language outcome (i.e., total word count, Total affiliative language, Self-Focused affiliative language, and Other-Focused affiliative language) to examine how each was related to both a child's own shyness and their partner's shyness (Kenny et al., 2006). Each model included: (1) autoregressive paths representing stability in the language outcome across time ($T1 \rightarrow T2$, $T2 \rightarrow T3$), (2) the association between a child's own shyness and their own affiliative language use at each timepoint, and (3) the association between a child's partner's shyness and the child's own affiliative language use at each timepoint. To account for the non-independence of data, cluster-robust standard errors were estimated by specifying the dyad as the clustering unit.

Model fit was evaluated using multiple indices including chi-square test statistic (χ^2), Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR; Hu & Bentler, 1999). Examination of modification indices consistently indicated that a correlated residual between T1 and T3 improved model fit across all outcomes. This correlation was added to capture stable individual differences in behaviour that persist across the full interaction, beyond what is explained by

autoregressive effects, shyness, and sex. As this specification resulted in just-identified, fully saturated models ($df = 0$), traditional fit indices could not be meaningfully evaluated and are not reported for the SEM models.

To examine the relational consequences of shyness-related verbal communication patterns, a series of longitudinal autoregressive mediation models were estimated (Cole & Maxwell, 2003; Selig & Preacher, 2009). These models tested whether word count longitudinally mediated the association between shyness and social outcomes across the three sessions. Specifically, we estimated a time-specific indirect effect representing the pathway from shyness through word count at T1, through its autoregressive continuity at T2 and T3, to each social outcome at T3 (Selig & Preacher, 2009). Two social outcomes were examined, representing different perspectives on the developing peer relationship: observer-rated social engagement (individual level) and partner-reported liking (interpersonal level). Bootstrap confidence intervals (1000 samples) were used to test the significance of indirect effects. Additionally, although preliminary correlations showed some associations between affiliative language and social outcomes (see below), these were not consistent across timepoints or affiliative language types. Therefore, affiliative language variables were not pursued as mediators.

Results

Descriptive Statistics and Preliminary Analyses

Descriptive statistics and correlations for all study variables are presented in Table 5 and Table 6, respectively. Independent samples *t*-tests revealed that girls were significantly more shy than boys ($M = -.16$ vs. $.12$), $t(177) = -2.19$, $p = .015$. Children's total word count in the 5-minute unstructured GTKY task varied widely, with boys tending to talk more than girls during the first interaction ($M = 234$ vs. 192 words), $t(184) = 2.46$, $p = .015$, but not at T2 or T3 ($ps > .05$). Sex

was not significantly associated with any of the affiliative language variables at any timepoint (all $ps > .05$). Given the association between sex and shyness, all subsequent models included sex as a covariate. Age was significantly and positively associated with word count at all three timepoints ($rs = .156 - .179$; all $ps < .05$), but was not associated shyness ($r = .015, p = .837$), and only associated with Other-Focused affiliative language at T2 ($r = .154, p = .042$). Receptive vocabulary (PVT) was significantly and negatively associated correlated with shyness ($r = -.171, p = .032$) and positively associated with word count at T3 ($r = .171, p = .035$). Given these associations, both age and PVT were included as covariates in the word count model only.

Table 5

Descriptive Statistics for All Study Variables

Variable	N	M	SD	Min	Max
Sex	186	—	—	—	—
Age	186	10.72	1.09	9.01	12.98
Shyness (Actor)	179	0.00	0.86	-1.55	2.20
Shyness (Partner)	179	0.00	0.86	-1.55	2.20
WC T1	186	209.24	116.62	0.00	453.00
WC T2	176	216.74	123.65	0.00	602.00
WC T3	172	204.49	122.50	0.00	613.00
Total T1	186	23.14	8.12	0.00	44.73
Total T2	176	20.87	6.63	0.00	42.11
Total T3	172	20.82	8.32	0.00	66.67
Self T1	186	10.57	4.52	0.00	21.59
Self T2	176	9.24	4.05	0.00	22.61
Self T3	172	9.27	4.23	0.00	23.08
Other T1	186	12.57	6.78	0.00	38.46
Other T2	176	11.62	5.75	0.00	34.19
Other T3	171	11.61	8.09	0.00	66.67
Social Engagement T3	170	10.12	2.72	3.00	15.00
Peer Liking T3	170	3.80	0.88	1.00	5.00
Receptive Vocabulary	162	87.56	8.08	65.00	123.00

Note. M = mean; SD = standard deviation. WC = word count; Total = Total affiliative language (%); Self = Self-Focused affiliative language (%); Other = Other-Focused affiliative language (%).

Table 6*Correlations Among Study Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Sex	—																		
2. Age	.06	—																	
3. Shyness (Actor)	.16*	.02	—																
4. Shyness (Partner)	.16*	.08	-.19*	—															
5. WC T1	-.18*	.16*	-.27**	-.08	—														
6. WC T2	-.06	.17*	-.30**	-.06	.65**	—													
7. WC T3	.05	.18*	-.23**	-.03	.67**	.70**	—												
8. Total T1	.04	-.11	.16*	-.01	-.21**	-.20**	-.24**	—											
9. Total T2	.08	.14	.09	-.02	-.27**	-.30**	-.24**	.20**	—										
10. Total T3	-.05	.03	.12	.02	-.20**	-.18*	-.29**	.18*	.26**	—									
11. Self T1	.07	-.12	.15*	-.09	.11	.03	.01	.55**	-.10	.07	—								
12. Self T2	.11	.02	.18*	-.09	-.05	.02	-.02	.14	.51**	-.05	.21**	—							
13. Self T3	.06	-.14	.04	-.01	.03	.08	.02	.01	.12	.30**	.24**	.26**	—						
14. Other T1	.01	-.05	.09	.05	-.32**	-.25**	-.29**	.83**	.31**	.17*	-.01	.03	-.15	—					
15. Other T2	.02	.15*	-.02	.04	-.27**	-.36**	-.25**	.13	.80**	.32**	-.27**	-.12	-.05	.34**	—				
16. Other T3	-.09	.10	.10	.03	-.23**	-.24**	-.32**	.18*	.19*	.87**	-.05	-.21**	-.23**	.25**	.35**	—			
17. Social Engagement T3	.02	.23**	-.17*	-.18*	.43**	.47**	.64**	-.16*	-.09	-.10	-.05	-.00	.08	-.15*	-.10	-.17*	—		
18. Partner Liking T3	.15*	-.09	.02	-.04	-.00	.08	.10	.09	.03	.04	.06	.14	-.01	.06	-.07	.03	.14	—	
19. Receptive Vocabulary	-.07	.41**	-.17*	.02	.10	.14	.17*	-.13	.06	.03	-.13	-.02	-.15	-.07	.08	.11	.20*	.10	—

Note. WC = word count; Total = Total affiliative language (%); Self = Self-Focused affiliative language (%); Other = Other-Focused affiliative language (%).

* $p < .05$. ** $p < .01$.

Longitudinal SEM Models

Full model results are presented in Figure 3 for total word count (Panel A), Total affiliative language (Panel B), Self-Focused language (Panel C), and Other-Focused affiliative language (Panel D).

Total Word Count

Word count showed strong temporal stability. Age was positively associated with word count at T1 only ($\beta = .19, p = .020$), such that older children spoke more words during the initial interaction, but not at T2 or T3 ($ps > .05$). Consistent with our hypothesis, a child's own shyness was negatively associated with word count at T1, such that children higher in shyness spoke significantly fewer words during their first interaction with an unfamiliar peer. This negative effect weakened but remained significant at T2 and was no longer significant by T3. Partner shyness was marginally negatively associated with a child's word count at T1 only ($p = .056$), such that children with a shy partner spoke less during the initially interaction. This effect was no longer significant at T2 or T3 ($ps > .05$). PVT did not independently predict word count at any timepoint ($ps > .05$). The correlated residual between T1 and T3 was positive and significant, indicating stable differences in how much children spoke across time.

Total Affiliative Language

Total affiliative language use showed moderate temporal stability. Consistent with our hypothesis, a child's own shyness was positively associated with their overall affiliative language use during the initial interaction. However, this effect was not significant at T2 or T3. Partner shyness was not significantly associated with a child's Total affiliative language use at any timepoint (all $ps > .05$). Sex showed a marginal effect at T3 only, with boys using more affiliative language overall than girls. The correlated residual between T1 and T3 was not

significant, suggesting less stable individual differences in how children use affiliative language compared to how much they speak overall.

Self-Focused Affiliative Language

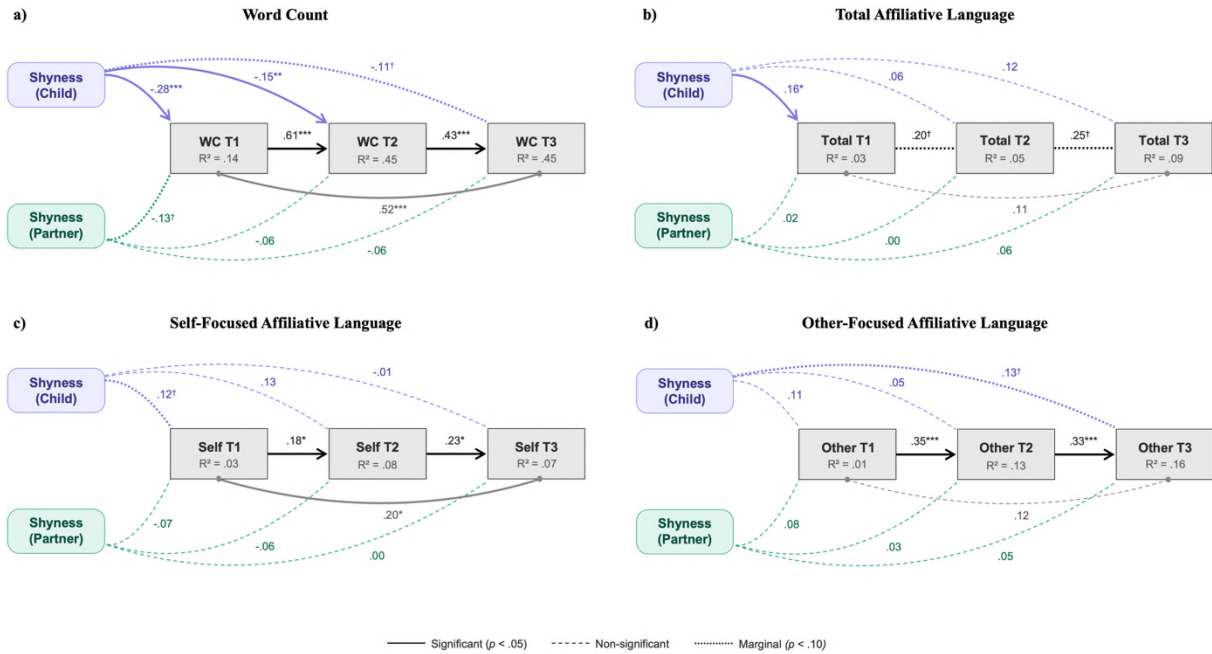
Self-Focused affiliative language use showed moderate temporal stability. Contrary to our hypothesis, a child's own shyness was only marginally associated with their use of Self-Focused affiliative language during the initial interaction ($p = .09$). This effect was not significant at T2 or T3 ($ps > .05$). Partner shyness was not significantly associated with a child's Self-Focused affiliative language use at any timepoint (all $ps > .05$). The correlated residual between T1 and T3 was positive and significant, suggesting stable individual differences in children's Self-Focused affiliative language use.

Other-Focused Affiliative Language

Other-Focused affiliative language showed moderate temporal stability. A child's own shyness was not associated with Other-Focused affiliative language at T1 or T2 but showed a marginal positive association at T3 ($p = .067$), suggesting that shyness may be weakly related to communication strategies using Other-Focused affiliative language as children become more familiar with each other. Partner shyness was not significantly associated with a child's Other-Focused affiliative language use at any timepoint (all $ps > .05$). Sex showed a marginal effect at T3 only, with boys using more Other-Focused affiliative language than girls. The correlated residual between T1 and T3 was not significant, suggesting less stable individual differences in Other-Focused affiliative language compared to Self-Focused affiliative language.

Figure 3

Longitudinal Structural Equation Models of Shyness and Verbal Communication Patterns Across Three Peer Interaction Sessions



Note. Panel A depicts the word count model. Panels B, C, and D depict Total, Self-Focused, and Other-Focused affiliative language models, respectively. Standardized coefficients are presented on each path. Solid arrows indicate significant pathways; dashed lines indicate non-significant pathways; dotted lines indicate marginal effects. Covariates were included in the models but are omitted for simplicity.

† $p < .1$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Longitudinal Mediation Models

Given its consistent associations with both shyness and social outcomes, word count was examined as the longitudinal mediator. Models were estimated for observer-rated social engagement and peer-reported liking.

Word Count and Observers' Ratings of Social Engagement

Model fit was good ($\chi^2 = 9.60$, $df = 5$, $p = .087$, $CFI = .987$, $RMSEA = .070$, $SRMR = .027$). Shyness was significantly negatively associated with social engagement. This effect was

fully mediated by word count. No significant direct effect remained indicating full mediation (see Figure 4a). In other words, children higher in shyness talked consistently less across sessions, and this reduction in verbal participation accounted for their lower observer-rated social engagement scores. The model explained 41% of the variance in social engagement.

Word Count and Peer Liking

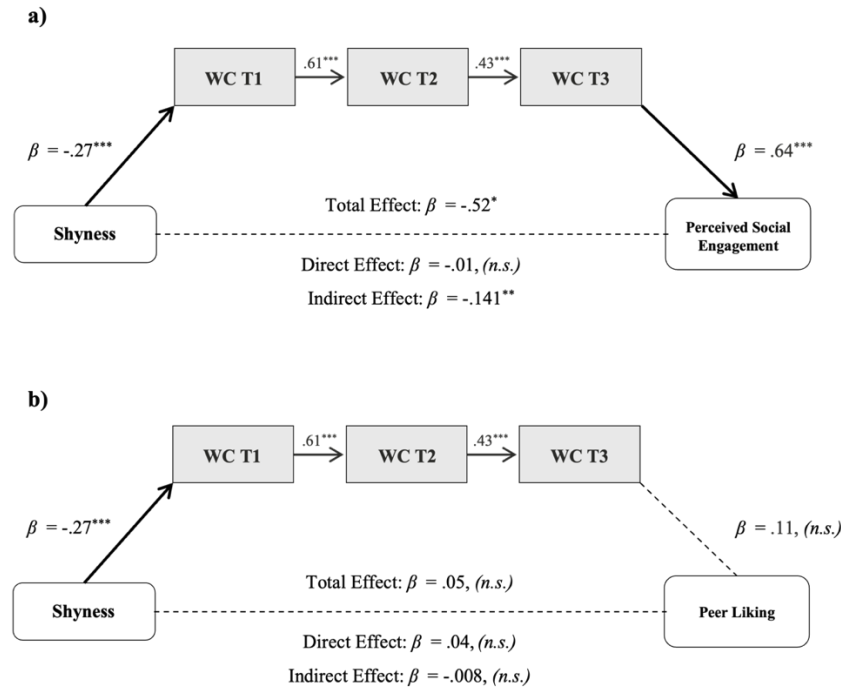
Model fit was good ($\chi^2 = 6.59$, $df = 5$, $p = .253$, $CFI = .994$, $RMSEA = .041$, $SRMR = .027$). Neither word count nor shyness predicted peer-reported liking, and the indirect effect through word count was not statistically significant (see Figure 4b). This pattern suggests that despite being perceived as less engaged by a naïve observer, children higher in shyness were liked by their partners just as much as those who were less shy, regardless of how much they spoke. The model explained only 1% of the variance in peer liking.

Discussion

The present study examined how temperamental shyness shapes children's communication across the early stages of relationship formation with a peer, and whether their language use has meaningful consequences for social outcomes. Using a longitudinal dyadic approach, findings revealed that shyness was consistently associated with reduced verbal participation, and that shy children – despite talking less – used more affiliative language during their initial interaction, suggesting a compensatory communicative strategy associated with the novelty of meeting a new peer. Additionally, shyness influenced how children were perceived by outside observers through reduced speaking during the interaction. Critically, this perception did not reflect the children's experience of the actual relationship, as shy children were liked just as much as their less shy peers.

Figure 4

Word Count as a Longitudinal Autoregressive Mediator of Shyness and T3 Social Outcomes



Note. Panel A depicts the mediation model with T3 observer-rated social engagement as the outcome. Panel B depicts the model with T3 peer-reported liking as the outcome. Standardized coefficients are presented. Solid arrows indicate significant paths; dashed lines indicate non-significant paths.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Shyness and Verbal Communication Across Time

Consistent with our expectations, shy children talked less across all three sessions, with the strongest effects emerging at T1 and attenuating over time. This likely reflects the avoidance component of shyness, whereby fear of negative evaluation inhibits verbal communication, particularly in the novel and potentially threatening context of a first meeting an unfamiliar peer (Asendorpf, 1990). The attenuation of shyness effects on how much children spoke over time suggests that as novelty diminishes and the social situation becomes more familiar, the avoidance motivation also diminishes. This is consistent with theoretical accounts suggesting that shyness

is most strongly associated with social novelty, and that familiarity with a social partner may serve as a buffer against the approach-avoidance conflict that characterizes shyness (Rubin et al., 2009). Word count also showed strong temporal stability across sessions, suggesting that while shyness effects attenuate, children's relative verbal participation patterns remain consistent across sessions. Moreover, partner shyness showed a marginal negative association with word count at T1 only ($p = .056$), suggesting that children whose partners were higher in shyness may have also talked less during the initial interaction. This finding was not expected given the results of Wilson et al. (2024), who found that children responded more quickly to shy partners. It is possible that partner shyness influences more implicit aspects of communication, such as response timing, emotional expressions, or vocal tone, rather than word count per se.

Affiliative Language as a Compensatory Strategy

Shyness was positively associated with the proportion of Total affiliative language use at T1, but not at T2 or T3. The T1-only pattern for Total affiliative language is consistent with the interpretation that affiliative language may function as a compensatory strategy specifically tied to the novelty and anxiety of an initial peer encounter. As familiarity increased across sessions, the need for this compensatory strategy may have diminished alongside the approach-avoidance conflict itself – shy children may have felt less compelled to signal social warmth once the relationship was more established.

Notably, shyness was not associated with Self-Focused affiliative language at any timepoint. However, Self-Focused affiliative language – which involves self-disclosure (e.g., "I like...", "My favourite...") – may feel particularly risky for shy children who are preoccupied with negative evaluation, leading them to avoid this strategy despite its potential benefits. In contrast, Other-Focused strategies such as questions and affirmations may feel safer, allowing

shy children to signal social interest and warmth without the vulnerability associated with self-disclosure. This is consistent with the marginal positive association between shyness and Other-Focused affiliative language at T3, suggesting that as familiarity increases and the relationship becomes more established, shy children may shift toward other-oriented strategies as a means of maintaining the connection they've built. Whether this pattern continues to strengthen over additional interactions or extends to established friendships is an important question for future research.

Additionally, affiliative language showed weaker temporal stability than word count, suggesting that children's use of affiliative language may be more flexible and context-dependent than their overall verbal participation. This lower stability may reflect responsiveness to partner behaviour or situational factors that vary across sessions – consistent with the idea that affiliative language is a dynamic communicative strategy rather than a stable trait-like pattern.

Shyness, Verbal Communication, and Social Outcomes

The mediation findings are perhaps the most practically significant contribution of the present study. Word count longitudinally mediated the association between shyness and observer-rated social engagement such that children higher in shyness talked less, and this reduced talking accounted for outside observers perceiving their interactions as less engaged. Critically, however, shyness did not affect how much children liked each other. Peer-reported liking was not predicted by shyness or word count, suggesting that shy children were liked just as much by their peers regardless of how much they talked (Coplan et al., 2007). This pattern points to a meaningful discrepancy between how shy children's peer relationships appear to outside observers and how those relationships are actually experienced by children themselves. Outside observers may use verbal participation as a proxy for social engagement and relationship quality,

potentially misreading shy children's quietness as disinterest or disconnection. This has real practical consequences; adults who rely on verbal participation as a marker of social competence risk not only misreading the quality of shy children's relationships but potentially encouraging shy children to talk more as a solution, when this may not be necessary for forming high-quality peer connections.

Moreover, if word count – rather than affiliative language – is what drives outsider perceptions, then what role is affiliative language serving in shy children's peer interactions? We propose that affiliative language may function not only as an interpersonal strategy but also as an *intrapersonal* or self-regulatory one. For shy children, social novelty often triggers negative affect and heightened arousal that motivates reparative social behaviour (Baumeister & Leary, 1995; Eisenberger, 2012). From this perspective, shy children's greater use of affiliative language during initial peer interactions may reflect an attempt to manage the aversive arousal associated with social novelty, consistent with broader frameworks that suggest interpersonal behaviour can serve regulatory rather than purely relational functions (e.g., Zaki & Williams, 2013). Future work should directly examine whether physiological arousal during a social threat paradigm predicts affiliative language use in a subsequent peer interaction.

Implications for Understanding and Supporting Shy Children

The findings of the current study have meaningful implications for how shy children's peer relationships are understood and supported. Adults – whether parents, teachers, or practitioners – may unconsciously underestimate the quality of shy children's relationships by using verbal participation as the primary indicator of social engagement. Yet, the present findings suggest that speaking less does not necessarily reflect a lack of connection, as shy children were liked just as much as their less shy peers. If shy children are forming peer connections despite

talking less, an important question is then what other behaviours may be fostering that connection – such as non-verbal communication, active listening, or other implicit social behaviours that signal warmth and interest in ways that are not captured by verbal output alone? Thus, interventions that target anxiety reduction and exposure to low-pressure opportunities for social engagement – particularly during initial peer encounters – may be more effective than social skills training focused on encouraging children to talk more. Additionally, the observer bias finding highlights the importance of examining social outcomes from multiple perspectives. Observer ratings and child-reported outcomes told fundamentally different stories in the present study, highlighting the risk of relying on a single informant when assessing shy children's peer relationships. Future research should routinely incorporate multiple perspectives – including self-report, partner-report, and observer ratings – to capture the full picture of shy children's social experiences.

Limitations and Future Directions

The present study has several notable strengths. The use of a longitudinal SEM framework across three naturalistic dyadic interactions, with social outcomes assessed from multiple perspectives, represents a methodological strength that extends beyond prior cross-sectional and single-session work in this area. This design is particularly well-suited for capturing the dynamics of relationship experience and their psychosocial consequences as they unfold across time. Nonetheless, several important limitations should be noted. First, while the models used did account for non-independence of the dyad through cluster-robust standard errors, a fully specified Actor-Partner Interdependence Model (APIM) framework would allow for formal equality constraints across dyad members and simultaneous modelling of both children's outcomes (Kenny et al., 2006). Similarly, the mediation models focused on child-

level pathways only. While this decision was supported by the non-significant partner effects in the SEM models, future research should examine these mediation pathways using full dyadic mediation approaches (e.g., Ledermann et al., 2011). Second, the sample was predominantly White and middle-to-upper SES. Future research should prioritize more diverse and underrepresented samples to ensure findings are more broadly generalizable. Third, the dictionary-based approach to measuring affiliative language, while validated (English et al., 2026a), captures explicit verbal content and may miss more implicit or non-verbal forms of affiliation, such as tone, gesture, or facial expression.

The present findings open several important avenues for future research. In particular, the regulatory interpretation of affiliative language proposed here – that shy children use affiliative language to manage social stress rather than primarily to build relationships – warrants direct empirical examination. Specifically, whether physiological arousal in socially threatening contexts predicts affiliative language use in subsequent peer interactions is an important open question. Relatedly, examining how social exclusion impacts shy children’s affiliative language use may shed further light on the regulatory function of affiliative language and its role in the ability to regulate following threat.

Conclusion

Taken together, these findings suggest that shy children’s quietness tells only part of the story. Despite talking less, shy children were liked just as much by their peers. Moreover, the communicative strategies they use may serve important regulatory functions that have gone largely unrecognized. Understanding these nuances has the potential to meaningfully shift how shy children are perceived and supported as they navigate their complex social worlds.

Chapter Four:

Social Stress Speaks: How Social Exclusion Shapes Youth Affiliative Language Use

Social connection is a fundamental human need that motivates much of our behaviour across the lifespan (Baumeister & Leary, 1995; Fiske, 2010). One specific set of behaviours driven by this need are *affiliative behaviours* – verbal and non-verbal acts that promote positive social engagement and signal one’s desire to connect with others (Leroy et al., 2010; Depue et al., 2005). While humans express their social motivations in many different forms (e.g., positive affective displays, physical touch, shared laughter), they also have the unique ability to explicitly communicate their social motivations through spoken language. Using *affiliative language*, which is characterized by words and short phrases that convey warmth, personal connection, and genuine interest in one’s social partner (Leaper & Smith, 2004), becomes an increasingly important strategy for building and maintaining social relationships as children develop (compared to play-based activities; McElwain et al., 2016; Levin & Rubin, 1983; Göncü, 1993; Rubin et al., 2006). For example, a child may ask a peer questions to learn more about them (e.g., “What games do you like?”), share personal information to invite reciprocal self-disclosure (e.g., “I like soccer”), or offer affirming responses to signal interest and engagement (e.g., “That’s so cool!”).

Importantly, affiliative language varies as a function of who an individual is interacting with and within the broader social context of the interaction, reflecting the shifting social motivations that drive its use. Social exclusion is one context that may be particularly salient in shaping affiliative language use, yet little is known about how exclusion influences spontaneous affiliative language use (i.e., language that functions explicitly to signal social connection) and whether the association between exclusion and affiliative language differs as a function of age. This is a particularly important gap given that adolescence is characterized by increasing

importance placed on peer relationships and heightened sensitivity to social-contextual cues – factors that suggest the way adolescents use language may be especially sensitive to the social circumstances in which interactions take place, including experiences of exclusion (Crone & Fuligni, 2020; Foulkes & Blakemore, 2016). The present study seeks to address this gap by examining how experiences of social exclusion shape subsequent affiliative language use in children and adolescents, and whether age moderates this association.

Theoretical Framing: The Need to Belong

The need to belong is a fundamental human motivation to form and maintain meaningful, positive social connections, and provides an important theoretical foundation for understanding why affiliative behaviour occurs and why it varies across contexts. According to Baumeister and Leary (1995), the need to belong is not simply a preference for regular social contact, but a genuine psychological need. That is, humans require regular, positive interactions with others, and failure to satisfy this need results in real psychological distress. Importantly, the need to belong is thought to be universal and present across the lifespan – from infancy, humans actively seek out social contact, engage in behaviours that sustain positive interactions, and show distress when social bonds are withdrawn or threatened (Over, 2016; Bowlby, 1969).

Importantly, the need to belong framework suggests that threats to belonging do not *just* induce feelings of distress, but they also motivate behaviour. When belonging is threatened, individuals are motivated to restore their sense of connection, and affiliative behaviours – such as behavioural mimicry (Vacaru et al., 2020) and donating resources to others (Carter-Sowell et al., 2008) – function as a key restorative strategy for doing so. Social exclusion represents one of the most direct threats to belonging, and as such, it is a particularly powerful context for eliciting affiliative responses. The present study draws on the need to belong as a theoretical lens for

understanding why exclusion may potentiate affiliative behaviour, and why this association may be especially pronounced during adolescence – a developmental period characterized by heightened sensitivity to social belonging and peer relationships (e.g., Foulkes & Blackmore, 2016).

Social Exclusion and Affiliative Behaviour

Affiliative behaviour is shaped by both personal characteristics, as well as the social situations we find ourselves in, and varies considerably across individuals and social contexts (Depue et al., 2005; Leroy et al., 2010). Even within a single individual, how affiliative one is can shift depending on who they are interacting with (e.g., friend vs. stranger), the nature of the relationship (e.g., personal vs. professional), and the broader interpersonal goals of the interaction (e.g., making dinner plans vs. giving feedback on one's job performance).

Importantly, this variability is not arbitrary; it reflects in part the degree to which the need to belong feels fulfilled or threatened at any given moment (Baumeister & Leary, 1995). Children may use affiliative behaviours to initiate a conversation with a new peer, to sustain closeness in a developing relationship, to repair a fractured relationship, or to protect against rejection or exclusion. Moreover, as children develop, language becomes an increasingly central way in which these motivations are expressed, allowing them to signal the desire for connection, invite reciprocal engagement, and navigate the social demands of new and existing relationships (Levin & Rubin, 1983; Rubin et al., 2006). Thus, while affiliative behaviour takes many forms, the present study focuses specifically on using affiliative language as an index of social motivation.

Social exclusion represents one of the most direct threats to belonging, and one of the most commonly used paradigms to investigate its effects is Cyberball – a virtual ball-tossing game in which participants are excluded by the other (simulated) players. Despite its simplicity,

the paradigm has been remarkably effective at eliciting genuine feelings of exclusion and threatening fundamental social needs – including belonging, self-esteem, meaningful existence, and control – across a wide range of ages and populations, with effects generalizing across variations in how the task is administered (Hartgerink et al., 2015). These effects have been demonstrated not only in adults, but in children and adolescents as well. For instance, Abrams et al. (2011) found that Cyberball-induced ostracism threatened all four primary needs (belonging, self-esteem, meaning, control) and lowered mood in 8- to 9-year-olds and 13-to-14-year-olds as much as it did in adults. Importantly, the experience of social exclusion is not only felt emotionally – it also produces measurable physiological responses. Social threats, more broadly, have been shown to elicit significant physiological reactions, including elevated cortisol and prolonged recovery times (Dickerson & Kemeny, 2004). Moreover, research has shown that children's heart rate reactivity increases in response to social stress, and that this physiological response is sensitive to social cues in the environment (e.g., Poole et al., 2023), suggesting that exclusion does not only trigger subjective feelings of distress, but a broader stress response with real physiological consequences.

An additional finding that is consistent across the literature is that exclusion potentiates affiliative behaviour in subsequent social interactions, and that this responding appears to function as a global restorative strategy. That is, rather than targeting only those who excluded them, excluded individuals show increased social motivation toward novel, unrelated social partners, suggesting that exclusion triggers a general affiliative drive aimed at restoring a sense of belonging (e.g., Maner et al., 2007; Over & Carpenter, 2009b). Much of the evidence for this pattern has centered on imitation – an unconscious behaviour that signals connection and shared understanding – as the primary index of affiliative responding. Across studies, children primed

with or exposed to social exclusion were shown to imitate a subsequent model's actions more closely than those in inclusion or control conditions (e.g., Over & Carpenter, 2009b; Watson-Jones et al., 2016; de Klerk et al., 2020). Additionally, the degree to which exclusion potentiates imitation appears to depend on the social context in which it occurs. Watson-Jones and colleagues (2016) found that children who were ostracized by in-group members showed higher-fidelity imitation of a subsequent model, while those ostracized by out-group members did not, suggesting that imitation functions specifically as a re-inclusion strategy within a valued social group. Importantly, this finding is not at odds with the broader pattern of affiliative responding toward novel partners; rather, it suggests that while exclusion activates a general affiliative drive, the *intensity* of that responding may be amplified when threat comes from within one's own social group.

However, despite the breadth of this evidence, previous work has focused almost exclusively on imitation and overt prosocial behaviour, with very little attention paid to whether exclusion shapes affiliative responding in the linguistic domain. Hopkins and Branigan (2020) provided some of the first direct evidence that it does, showing that 7- to 12-year-old children who experienced exclusion were significantly more likely to align with a subsequent partner's lexical choices compared to children who experienced inclusion. This effect suggests that exclusion may selectively shape language use in ways that are socially meaningful, rather than reflecting a broader, domain-general shift in language production. This points to affiliative language as a promising but underexplored index of social motivation.

Underlying this affiliative responding may be a motivational process driven by an affective experience that is elicited by social threat. In other words, exclusion does not merely signal that one has been left out; it triggers a cascade of negative affect – discomfort, anxiety, and

heightened sensitivity to cues of potential rejection (Pickett et al., 2004) – as well as measurable changes in physiological arousal, activating regulatory systems oriented toward restoring a sense of connection, which motivates reparative action. From this perspective, using affiliative language following exclusion may be better understood as a form of social stress regulation; an attempt to restore a sense of belonging and reduce the aversive arousal that the threat to belonging produces (Baumeister & Leary, 1995; Eisenberger, 2012; Williams, 2007; Hudd & Moscovitch, 2020; Hudd & Moscovitch, 2022). Spontaneous affiliative language use may be a particularly sensitive index of this process precisely because it is less deliberate and controlled than overt prosocial behaviour, capturing not only intentional social acts, but the subtler ways that social stress shapes how youth re-establish social connection. The present study builds on this theoretical framework by examining spontaneous affiliative language use as an index of social motivation following experiences of exclusion, and by investigating perceived physiological arousal as a potential index of the affective stress response that may underlie this process.

Developmental Context: Adolescence

Adolescence is a particularly important developmental period for understanding how social exclusion shapes affiliative behaviour. During this period, peer relationships become increasingly central to identity development, and the social consequences of exclusion are particularly impactful (Foulkes & Blakemore, 2016). Adolescents are more sensitive than both younger children and adults to signs of potential exclusion and react more strongly when it occurs (Somerville, 2013; Abrams et al., 2011). Additionally, peer evaluation and social motivations are thought to be especially strong during this period – forming and maintaining peer relationships takes on a significance during adolescence that is simply not as strong during other

points across development (Guroglu, 2022). Consistent with this, adolescents display more prosocial behaviour with peers compared to younger children (Guroglu et al., 2014), suggesting that the heightened social motivation of adolescence translates into meaningful differences in social behaviour.

Underlying this heightened social sensitivity is a broader developmental shift from rule-based to context-sensitive social behaviour during adolescence (Crone & Fuligni, 2020). Whereas young children tend to rely on rigid, internalized rules when deciding how to behave prosocially (e.g., sharing because sharing is good, regardless of the specific situation), adolescents become increasingly attuned to the social context itself, weighing factors like the nature of their relationship with a potential social partner, the broader social context, including what feels socially appropriate before deciding how to behave and respond. In the context of social exclusion, this shift is particularly meaningful: since adolescents are more likely than younger children to read social cues and strategically modulate their behaviour in response to them, they may be especially likely to use affiliative language as a context-sensitive restorative strategy following exclusion.

Despite this rationale, the developmental trajectory of affiliative responding following exclusion remains poorly understood. What evidence does exist suggests that the association between exclusion and affiliative behaviour is not straightforward and may shift meaningfully across development depending on the age of the child, the nature of the affiliative behaviour in question, and the social context in which exclusion occurs (e.g., Abrams et al., 2011; Watson-Jones et al., 2016). Whether comparable developmental differences exist across middle childhood and adolescence, and whether these patterns extend to the linguistic domain specifically, remains largely unexplored. The present study addresses this gap by examining

affiliative language use in childhood and adolescence, providing insight into how the developmental foundations of affiliative responding to social exclusion evolve across this critical developmental period.

Research Aims

This study aimed to examine the effects of social exclusion on children and adolescents' affiliative language use. Grounded in the fundamental need to belong (Baumeister & Leary, 1995), the overarching goal was to investigate whether experiences of social exclusion potentiate general verbal output and affiliative language as a strategy for restoring social connection, and whether age moderates this association. Given that social motivations are particularly strong during adolescence, and that adolescents are more sensitive to social contextual cues than younger children, I examined whether affiliative language use varied as a function of both social context (inclusion vs. exclusion) and age, providing insight into the contextual and developmental foundations of youths' affiliative language use. Additionally, building on findings from Chapter 3, which suggested that affiliative language may serve as a regulatory function in social interactions, I examined perceived physiological reactivity to the Cyberball task as an index of a social stress response. I hypothesized that:

(H1): Children and adolescents who experience social exclusion will speak more and use more affiliative language in a subsequent social interaction task compared to children who experience social inclusion.

(H2): Age will moderate the association between social exclusion and language use, such that older adolescents will speak more and use more affiliative language following social exclusion compared to younger children.

(H3): Children and adolescents in the exclusion condition will show greater increases in perceived physiological reactivity following the Cyberball task compared to those in the inclusion condition.

(H4): Children and adolescents who experience greater increases in physiologically reactivity to the Cyberball task will use more affiliative language in the subsequent social interaction task.

Method

Participants and Study Design

Participants included a Canadian community sample, with the majority of families residing in Southwestern, Ontario. Eight participants were excluded from analyses for the following reasons: technical difficulties ($n = 4$), ineligibility ($n = 2$), personal reasons (i.e., was not comfortable completing the Cyberball or social interaction task; $n = 1$), and data quality concerns ($n = 1$). The final sample included 152 9- to 16-year-old youth (79 girls; $M_{\text{age}} = 13.28$ years, $SD_{\text{age}} = 1.9$) who were recruited through an established lab database, social media platforms (e.g., Instagram) and local community events. Parent reports of children's ethnic backgrounds indicated most children were White (71.9%), followed by mixed ethnicity (11.64%), Black (4.8%), Chinese (4.1%), South Asian (3.4%), Latin American (2.1%), Eastern European (0.7%), West Asian (0.7%), and Arab, (0.7%). Household income was in CAD dollars and had the following distribution: under \$25,000 (1.4%), \$25,000–\$49,999 (2.9%), \$50,000–\$74,999 (15%), \$75,000–\$99,999 (5.7%), \$100,000–\$124,999 (13.6%), \$125,000–\$150,000 (14.3%) and $> \$150,000$ (47.1%). Reports of parental education indicated most parents were highly educated, with 95.9% earning a college, university, or graduate degree, 1.4% earning high

school/secondary school diplomas, and 2.8% completing other forms of training (e.g., partial college training).

The study took place online via Zoom, lasted approximately 60 minutes and children were compensated with a \$15.00 gift card for their participation. As part of the larger project, children and their parents completed a battery of questionnaires regarding the child's temperament and socioemotional skills. Parental consent and child assent were obtained at the beginning of each session, and all procedures were approved by the University of Waterloo Research Ethics Committee. Data collection occurred between 2025 and 2026. Inclusion criteria required children to be English-speaking with access to a computer and internet. Children born prematurely or with complications or a diagnosed autism spectrum disorder were excluded. Measures of interest for the current study are described below. Children first completed a series of individual tasks, including a battery of questionnaires assessing their thoughts, behaviours, and emotions and a computerized task assessing receptive vocabulary (i.e., Picture Vocabulary Test from the NIH toolbox Cognitive Battery; Gershon et al., 2013). Children also reported on their physiological arousal using the Perceived Physiological Arousal Questionnaire (6 items; Kallen, 2002) several times throughout the study.

After completing the individual questionnaires and assessments, children completed the Cyberball task – an online ball tossing game in which the participant plays with two (fictitious) unfamiliar others (Hopkins & Branigan, 2020; Williams et al., 2000; see Appendix C). To mimic real-world experiences of social inclusion and exclusion, the frequencies with which the participant receives tosses from the other “players” are preprogrammed. Participants were randomly assigned to one of two experimental conditions: an **Inclusion condition** or an **Exclusion condition**. In the Inclusion condition, all players received the ball at equal

frequencies³. In the Exclusion condition, participants received the ball *less frequently* than expected by chance. Specifically, tosses were preprogrammed such that the participant received the ball only 10% of the time (i.e., 3/30 tosses). Immediately following the Cyberball task, children reported on their perceived physiological arousal (Kallen, 2002), as well as their primary psychological needs using the Primary Needs Questionnaire – Child Report (PNQ-C; Zadro et al., 2013), and two additional questions regarding feelings of inclusion and exclusion (based on Williams et al., 2000; Dvir et al., 2019), as a manipulation check.

Next, participants completed the Social Affiliation Interaction Task (SAIT; Llerena et al., 2012; Blanchard et al., 2015), designed to elicit affiliative social responses through a simulated social interaction. At the beginning of the study, participants were made to believe that they would be meeting with another child who was also participating in the study (age- and sex-matched) to get to know them. However, following “tech issues” the other child was not able to join the call. Instead, the participant saw a still photo and listened to an audio clip of the “other child” describing their social relationships and activities they enjoy (see Appendix D). The participant then created an audio recording describing their own social relationships and activities that they were told would be shared back to the other child. To end the session, all participants completed a final round of Cyberball in the Inclusion condition.

Measures

Perceived Physiological Reactivity

The *Perceived Physiological Arousal Questionnaire* (adapted from Kallen, 2002) is a 6-item self-report measure assessing individuals’ perception of their own subjective physiological arousal, including sensations such as increased heart rate, sweating, and feeling short of breath.

³ Given the pseudo-random programming of the automated players, participants received the ball a minimum of 33.3% (10/30) and a maximum of 40% (12/30) of the throws.

Sample items include: “Does your body feel hot right now?” and “Do you feel your heart beating right now?” (see Appendix E). Children are asked to respond to each item using a 10-point scale ranging from 0 (*Not at all*) to 10 (*Very much*). Item scores are averaged, with higher scores indicating greater feelings of physiological arousal. The measure demonstrated good internal consistency in the current sample at baseline ($\alpha = .69$), post-Cyberball ($\alpha = .79$), and post-SAIT ($\alpha = .84$). Of primary interest in the current study was participants’ change in perceived physiological arousal from baseline to immediately following the Cyberball task, as an index of physiological reactivity to social stress. This change score was computed by subtracting baseline scores from post-Cyberball scores, such that positive values reflect greater increases in arousal.

Manipulation Check Questions

Two questions were used to assess the effectiveness of the Cyberball manipulation (based on Williams et al., 2000; Dvir et al., 2019). Children rated the degree to which they felt ignored or excluded, and the degree to which they felt noticed or included by other players, each on a scale from 0 (*Not at all*) to 10 (*Very much*).

Primary Needs Questionnaire

The *Primary Needs Questionnaire – Child Report* (PNQ-C; Zadro et al., 2013) is an 8-item self-report measure assessing children’s core psychological needs across four dimensions: Belonging, Control, Meaningful Existence, and Self-Esteem. Each dimension consists of two items rated on a scale from 0 (*Not at all*) to 10 (*Extremely*). Sample items include: “I felt like I was part of the group” and “I felt like no one would notice if I left the game” (reversed-scored). Item scores are averaged, with higher scores indicating greater need satisfaction for each respective dimension. Cronbach’s alpha values reported in the original validation paper ranged from acceptable to excellent across subscales ($\alpha = .60 - .80$; Zadro et al., 2013) and are

comparable to those found using the adult scale (Hawes et al., 2013). These estimates are used as the basis for interpreting scale reliability in the present study.

Receptive Vocabulary

The *Picture Vocabulary Test* (PVT; Gershon et al., 2013) provides a measure of children's receptive vocabulary. Children completed a series of trials⁴ in which they were presented with an audio clip of a single word and viewed four images. On each trial, they were asked to select the image that most closely matched the meaning of the word. Each correct response is scored as 1 point. The raw score is then converted into an Uncorrected Standard Score, which compares the child's performance to a nationally representative normative sample, controlling for age, sex, or other demographic factors. The Uncorrected Standard Score uses a normative mean of 100 and a standard deviation of 15, with higher scores indicating better performance. Scores typically range from approximately 55 to 145, depending on the child's performance. The PVT was administered using the NIH Cognitive Battery (Gershon et al., 2013).

Affiliative Language

Children's affiliative language use was assessed using the Child Affiliative Language (CAL) dictionary, a validated LIWC-based dictionary designed to capture affiliative communication within children's dyadic interactions (English et al., 2026a; Pennebaker et al., 2015). The CAL dictionary quantifies words and phrases that reflect the desire to connect with others, yielding proportion scores for Self-Focused affiliative language (e.g., describing oneself or one's experiences, preferences, etc.) and Other-Focused affiliative language (e.g., asking questions of, responding to, or affirming a social partner), which are summed to index Total

⁴ The PVT uses an adaptive, staircase procedure where the number of items and their difficulty adjust based on the child's performance. The test ends when the child reaches a ceiling (a set number of incorrect responses) or a basal (a set number of correct responses).

affiliative language. Children's video-recorded conversations were transcribed and analyzed using LIWC and affiliative language was quantified as the proportion of affiliative words relative to each child's total word count. Proportion scores were calculated separately for the Self-Focused and Other-Focused subcategories, as well as for Total affiliative language. Higher scores reflect greater use of affiliative language during the interaction.

Data Analyses Plan

Data from the social affiliative interaction task (SAIT) were used to examine the effects of condition and age on affiliative language use. Children who did not speak during the social interaction task were retained, as this was considered a meaningful observation rather than missing data. Little's MCAR test indicated that data were missing completely at random, $\chi^2(13) = 12.31, p = .502$. Five participants were missing data on age and sex due to incomplete parent questionnaires, and one participant was missing data on perceived physiology variables. Given the minimal missingness (< 4% total), listwise deletion was used.

For my analyses, I conducted a series of hierarchical multiple regressions. Age was treated as continuous; condition was dummy coded (0 = inclusion, 1 = exclusion). Regression assumptions were satisfied across all models, with no influential outliers identified (all Cook's $D < .07$), and no multicollinearity concerns (all VIFs < 5).

All analyses were conducted in R 4.5.1 (R Core Team, 2025).

Results

Descriptive Statistics and Preliminary Analyses

Descriptive statistics and correlations among all study variables are presented in Table 7. Condition groups were well-balanced, with 75 participants in the inclusion condition and 77 participants in the exclusion condition. As expected, participants in the exclusion condition

reported feeling significantly more ignored and excluded than those in the inclusion condition ($M = 7.16$ vs. 2.13), $t = -13.15$, $p < .001$, while participants in the inclusion condition reported feeling significantly more noticed and included than those in the exclusion condition ($M = 7.53$ vs. 1.56), $t = 14.94$, $p < .001$. Consistent with this, participants in the exclusion condition reported greater threat to their psychological needs following the Cyberball task than those in the inclusion condition, with excluded participants reporting higher scores on items reflecting feeling unwanted and lower scores on items reflecting belonging (all p 's $< .001$). Together, these findings indicate our Cyberball manipulation was effective.

Girls spoke significantly more than boys ($M = 187$ vs. 157), $t = -2.48$, $p = .014$, but did not differ on any of the affiliative language outcomes (all p 's $> .05$), nor on physiological change ($p > .05$). Older children spoke more overall, $r = .30$, $p < .001$, but used less Total ($r = -.21$, $p = .012$) and Self-Focused affiliative language ($r = -.24$, $p = .004$) than younger children. Age was not significantly associated with Other-Focused affiliative language or physiological change (p 's $> .05$). Physiological reactivity was positively associated with Self-Focused affiliative language use ($r = .18$, $p = .027$) but was not associated with any other language outcome (p 's $> .05$).

Effects of Condition and Age on Language Use

To examine the effects of condition and age on language use, a series of hierarchical multiple regressions were conducted for word count, Total affiliative language use, Self-Focused affiliative language use, and Other-Focused affiliative language use. Given the significant association between sex and word count, sex was included as a covariate in Step 1 of the word count model only. Condition and age were entered in Step 2, and the condition X age interaction was entered in Step 3. For all other outcomes, condition and age were entered in Step 1, and the condition X age interaction was entered in Step 2.

Table 7*Descriptive Statistics and Correlations Among Study Variables*

Variable	N	<i>M</i>	<i>SD</i>	Range	Correlations						
					1	2	3	4	5	6	7
1. Sex	147	—	—	—							
2. Age	147	13.28	1.90	9.02-16.93	-.03	—					
3. Word Count	152	172.65	74.10	17-371	.20*	.30**	—				
4. Total Affiliative Language	152	23.20	4.29	9.09-36.45	.10	-.21*	-.23**	—			
5. Self-Focused Affiliative Language	152	18.43	4.73	1.94-34.25	.07	-.24**	-.35**	.70**	—		
6. Other-Focused Affiliative Language	152	4.77	3.53	.00-17.76	.03	.07	.18*	.28**	-.49**	—	
7. Physiological reactivity	151	0.13	1.33	-5.83-5.33	.10	-.02	-.12	.12	.18*	-.10	—

Note. *M* = mean; *SD* = standard deviation. Proportions were multiplied by 100 to obtain a percentage. Sex was dummy coded (0 = boys, 1 = girls).

* $p < .05$; ** $p < .01$.

Word Count

Sex accounted for 4.1% of the variance in word count in Step 1, $R^2 = .041$, $F(1, 145) = 6.13$, $p = .014$. The addition of condition and age in Step 2 explained an additional 12.2% of the variance, $F(2, 143) = 10.30$, $p < .001$, with the overall model accounting for 16.2% of the variance in word count, $F(3, 143) = 9.22$, $p < .001$. Girls spoke significantly more than boys ($\beta = .215$, $p = .006$), and older children spoke significantly more than younger children ($\beta = .311$, $p < .001$). Youth in the exclusion condition spoke significantly less than those in the inclusion condition ($\beta = -.160$, $p = .038$). The addition of the condition X age interaction in Step 3 did not explain any additional variance, $\Delta R^2 < .001$, $\Delta F(1, 142) = 0.004$, $p = .950$.

Total Affiliative Language

Condition and age accounted for 5% of the variance in Total affiliative language use in Step 1, $R^2 = .050$, $F(2, 144) = 3.75$, $p = .026$. Contrary to our hypothesis, age was a significant

negative predictor, such that older youth used less Total affiliative language than younger youth ($\beta = -.208, p = .012$). Condition was not a significant predictor ($\beta = .085, p = .316$), and the addition of the condition X age interaction in Step 2 did not explain any additional variance, $\Delta R^2 = .016, \Delta F(1, 143) = 2.50, p = .116$.

Self-Focused Affiliative Language

Condition and age accounted for 6.6% of the variance in Self-Focused affiliative language use in Step 1, $R^2 = .066, F(2, 144) = 5.06, p = .008$. Age was a significant negative predictor, such that older youth used less Self-Focused affiliative language than younger youth ($\beta = -.232, p = .004$). Condition was not a significant predictor ($\beta = .094, p = .233$), and the addition of the condition X age interaction in Step 2 did not explain any additional variance, $\Delta R^2 = .006, \Delta F(1, 143) = 0.91, p = .341$.

Other-Focused Affiliative Language

Neither condition nor age significantly predicted Other-Focused affiliative language use in Step 1, $R^2 = .005, F(2, 144) = 0.40, p = .673$, and the addition of the condition X age interaction in Step 2 did not improve model fit, $\Delta R^2 = .003, \Delta F(1, 143) = 0.37, p = .544$.

Summary of Hierarchical Regression Findings

Taken together, across all language outcomes, condition did not significantly predict affiliative language use. However, condition did significantly predict word count, such that youth in the exclusion condition spoke less overall. Therefore, my first hypothesis was partially supported. The condition X age interaction was not significant across all models, providing no support for my second hypothesis. Notably, age was positively associated with word count, where older youth spoke more than younger children. However, in contrast to my hypothesis, age consistently and negatively predicted Total affiliative language, and Self-Focused affiliative

language, such that older youth used less affiliative language than younger youth, which was opposite of the hypothesized direction.

Physiological Reactivity, Exclusion, and Affiliative Language Use

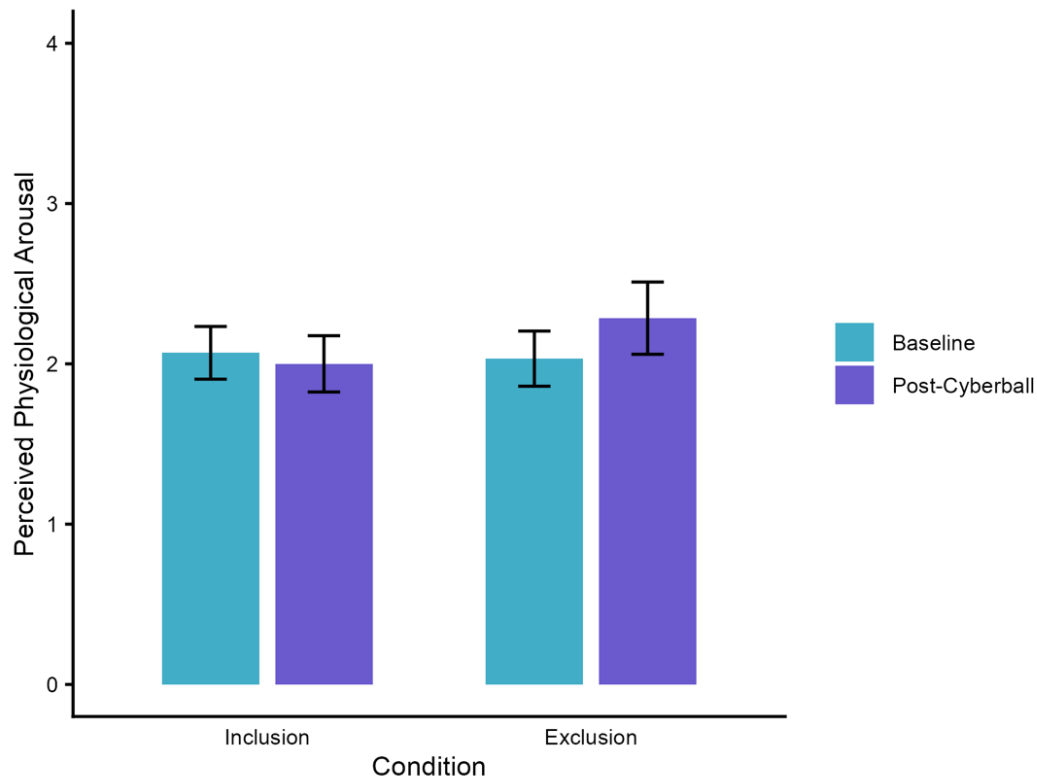
An independent-samples *t*-test was used to examine whether youth in the exclusion condition reported greater physiological reactivity following the Cyberball task than those in the inclusion condition. As depicted in Figure 5, youth in the exclusion condition showed a slight increase in perceived physiological arousal from baseline to post-Cyberball compared to those in the inclusion condition ($M = 0.32$ vs. -0.07). However, this difference did not reach the conventional threshold of significance, although it trended in the expected direction, $t(136.78) = -1.84, p = .068$. Thus, my third hypothesis was not supported.

To examine whether physiological reactivity to the Cyberball task predicted affiliative language use, a hierarchical regression was conducted with Self-Focused affiliative language as the outcome, based on preliminary analyses that indicated it was the only language variable associated with physiological reactivity. Condition and age were entered in Step 1, physiological reactivity in Step 2, and the age X physiological reactivity in Step 3.

Condition and age accounted for 6.2% of the variance in Self-Focused affiliative language use in Step 1, $R^2 = .062, F(2, 143) = 4.70, p = .011$. The addition of physiological reactivity in Step 2 explained an additional 3.2% of the variance, $F(1, 142) = 5.02, p < .027$, with the overall model accounting for 9.4% of the variance in Self-Focused affiliative language use, $F(3, 142) = 4.90, p = .003$. Greater physiological reactivity was associated with greater Self-

Figure 5

Mean-Level Differences in Perceived Physiological Arousal at Baseline and Post-Cyberball by Condition

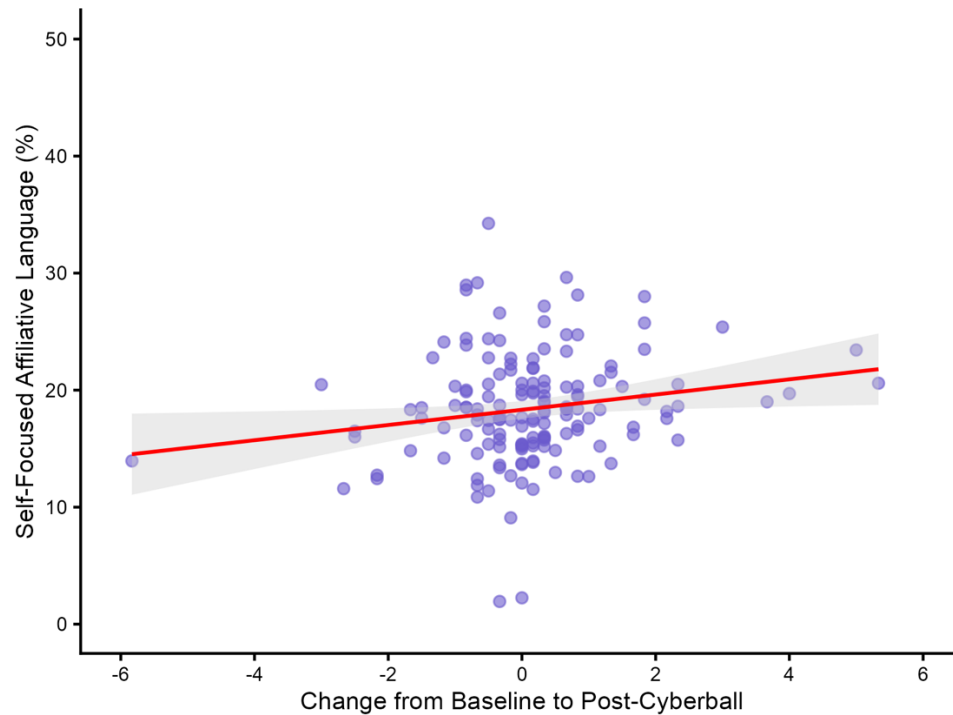


Note. Error bars represent standard errors. Effects are trend-level only as differences did not meet conventional thresholds for statistical significance.

Focused affiliative language use ($\beta = .181, p = .027$; see Figure 6), above and beyond the effects of condition and age. The addition of the age X physiological reactivity interaction in Step 3 did not explain any additional variance, $\Delta R^2 = .007, \Delta F(1, 141) = 1.03, p = .312$.

Figure 6

Associations Between Change in Physiological Arousal from Baseline to Post-Cyberball and Percentage of Self-Focused Affiliative Language Use



Note. Shaded region represents the 95% confidence interval around the regression line.

Discussion

The present study examined how experiences of social exclusion shape spontaneous affiliative language use in youth, and whether this association varies as a function of age. Using an experimental paradigm, we found that experiencing social exclusion significantly predicted less talking overall but did not relate to affiliative language use in a subsequent social interaction. Moreover, unexpectedly, I found that age was associated with affiliative language use in the opposite direction than what was predicted, with older youth using *less* affiliative language than younger youth. Finally, excluded youth tended to report greater physiological reactivity

following the Cyberball task ($p = .08$). Importantly, however, individual differences in physiological reactivity – regardless of condition – were associated with greater Self-Focused affiliative language use in the subsequent interaction. Taken together, these findings suggest that it may be the subjective affective experience following social stress, rather than the experience of exclusion per se, that shapes how youth use language to signal social connection.

Effects of Condition on Affiliative Language Use

Contrary to expectations, social exclusion did not significantly predict affiliative language use in the social interaction task. It is, however, worth noting that the Cyberball manipulation was highly effective: excluded youth reported feeling significantly more ignored and excluded than those in the inclusion condition, and the two groups significantly differed across all primary psychological need dimensions – including belonging, control, meaningful existence, and self-esteem – in the anticipated directions. Thus, the null effect of condition on affiliative language does not appear to reflect a failure of the manipulation itself; rather, the pathway from exclusion to affiliative language use is likely more complex than initially anticipated.

One possibility is that the social interaction task used in the present study – the Social Affiliation Interaction Task (SAIT; Llerena et al., 2012; Blanchard et al., 2015) – may not have been sufficiently sensitive to capture variability in affiliative language use following exclusion. In particular, the one-way nature of the interaction may have made it difficult for participants to use affiliative language naturally in the absence of a real conversation partner to ask questions of and to respond to. This structural feature of the task may have dampened variability in affiliative language use across conditions, making it difficult to detect any condition-based differences, even if they did exist. Notably, however, the mean proportion of affiliative language use

observed in the SAIT (Total: $M = .23$, $SD = .042$) was comparable to that observed during the unstructured get-to-know-you task in Chapters 2 and 3 (T1; Total: $M = .23$, $SD = .08$) despite the unreciprocated format, suggesting that the task *did* elicit a reasonable level of affiliative language typical of a naturalistic peer interaction. Future work would benefit from using paradigms that involve genuine back-and-forth social interactions – whether with a confederate or a peer – to provide a more ecologically valid context in which re-affiliation following exclusion could be observed. Manipulating additional features of the social context, such as group status of the excluders (i.e., in-group vs. out-group), may also help to amplify condition effects, consistent with evidence that exclusion by in-group members elicits stronger affiliative responding than exclusion by out-group members (Watson-Jones et al., 2016).

Interestingly, while condition did not predict affiliative language use, excluded youth did speak significantly less overall than those in the inclusion condition. This pattern of verbal reticence is more consistent with a withdrawal or avoidance response to social threat than the approach-oriented affiliative response that re-affiliation literature would predict (Williams, 2007; Maner et al., 2007). This is particularly notable given that, despite speaking less overall, excluded youth used proportionally similar amounts of affiliative language as included youth – suggesting that while their total verbal output was reduced, the affiliative quality of that they did say was maintained. This pattern is strikingly similar to previous work where during initial interactions, shy children speak significantly less than their less shy peers but use proportionally more affiliative language (Coplan & Weeks, 2009; English et al., 2026b). Together, these findings raise the possibility that verbal reticence and affiliative language use may function as complementary, rather than competing, responses to social threat – one reflecting the tendency to

withdraw in the face of social threat, and the other reflecting an underlying motivation to connect that persists despite it.

Age Effects on Affiliative Language

Interestingly, age was *negatively* associated with affiliative language use, such that older youth used less Total and Self-Focused affiliative language in the SAIT task than younger youth. This pattern held across conditions, and the condition X age interaction was not significant, suggesting that the effect of exclusion on affiliative language did not differ as a function of developmental stage. These findings are discordant with theoretical accounts suggesting that adolescents' heightened sensitivity to peer relationships, social evaluation, and belonging should amplify affiliative responding following exclusion (Foulkes & Blakemore, 2016; Guroglu, 2022).

One potential explanation for this unexpected finding may be that the same heightened sensitivity to social evaluation that was expected to amplify affiliative responding may have instead driven avoidance. Older adolescents are more sensitive than younger children to signs of potential rejection and social evaluation (Somerville, 2013; Abrams et al., 2011), and this sensitivity, in the context of recently experienced exclusion, may have activated a fear of negative evaluation, rather than approach-oriented social motivation. From this perspective, the lack of affiliative language use by older youth may not reflect a lack of social motivation, but rather a reluctance to engage in affiliative responding driven by concerns about how they might be perceived by a social partner. Disentangling these possibilities will require future work that more directly assesses adolescents' social motivations and concerns during social interactions, that uses paradigms better suited to capturing the nuanced ways that older youth express affiliation.

Physiological Reactivity and Affiliative Language Use

Although excluded youth showed a trend toward greater physiological reactivity following the Cyberball task relative to included youth, this difference did not reach conventional levels of significance. Given the moderate effect size ($d = .30$) and the fact that my sample size was slightly below the target I had originally planned, it is possible that this does indeed reflect a genuine effect that the current study was underpowered to reliably detect. Future work with larger samples should continue to examine whether exclusion elicits increased physiological reactivity in youth, and whether the magnitude of this response varies as a function of age or individual differences in social sensitivity (e.g., fear of negative evaluation).

Importantly, finding revealed that individual differences in physiological reactivity – regardless of condition – were uniquely associated with increased Self-Focused affiliative language use, above and beyond the effects of condition and age. This finding suggests that it is not the experience of exclusion per se, but the degree to which youth experience an aversive physiological stress response to social threat, that predicts subsequent affiliative language use. From a regulatory perspective, this is a meaningful distinction: it implies that affiliative language use following social stress may function less as a deliberate interpersonal strategy and more as a form of social stress regulation (i.e., an attempt to reduce negative feelings and restore a sense of connection following a threatening social experience; Baumeister & Leary, 1995; Eisenberger, 2012; Beckes & Coan, 2011). Consistent with this interpretation, the association was specific to Self-Focused affiliative language (i.e., sharing personal information, experiences, and opinions) rather than Other-Focused affiliative language, which is oriented toward one's social partner. This pattern suggests that it may be the self-disclosure dimension of affiliative language that is most directly activated by physiological social stress, perhaps because sharing information about

oneself is the most natural and spontaneous way of signalling openness and desire for connection with a new social partner (Collins & Miller, 1994).

Limitations and Future Directions

Several considerations should inform the interpretations of these findings. The most notable methodological limitation concerns the social interaction task itself. As noted above, the SAIT was originally developed for adult populations and involved a one-sided monologue format that may have constrained the natural expression of affiliative language, particularly Other-Focused forms such as question asking and responsiveness; the absence of a genuine social partner likely reduced the ecological validity of the interaction for youth. Future research should prioritize paradigms that involve real, reciprocal social interactions – whether with a live peer or via a confederate – to better capture the social affiliative dynamics that unfold in response to social exclusion.

A related limitation concerns the physiological measure used in the present study. Perceived physiological arousal is a self-report index of subjective bodily sensations and may not fully capture the physiological stress response with the same precision as objective measures. Additionally, it is important to note that physiological arousal was assessed immediately following the Cyberball task but also immediately *prior* to the SAIT. As a result, it is possible that the arousal captured at this timepoint reflected not only a response to exclusion, but also anticipatory arousal in response to the upcoming interaction with an unfamiliar peer. While it was not possible to administer two separate physiological assessments back-to-back given the design of the study, future work should consider incorporating timing buffers that allow for a cleaner separation of these two potential sources of physiological reactivity. Moreover, future work would benefit from incorporating objective physiological indices such as heart rate

variability or respiratory sinus arrhythmia, which would also allow for a more direct examination of the regulatory processes hypothesized to underlie the association between social stress and affiliative language use.

Additionally, the present study involved a single, brief exclusion experience of 30 ball tosses. While this was sufficient to elicit strong subjective feelings of exclusion, it is possible that more prolonged or repeated experiences of social exclusion, or experiences of exclusion by an in-group vs. out-group member, would elicit stronger or more consistent effects related to affiliative language use. Future work should consider examining how exclusion duration, intensity, as well as group status shape affiliative responding across development.

Finally, the present sample was also relatively homogenous, with the majority of children being White, relatively high SES families, which may be an important consideration given documented cultural differences in responses to social exclusion. For example, adult samples from individualist cultures have been shown to exhibit greater psychological and physiological reactivity to exclusion than those from collectivist cultures (Pfundmair et al., 2015), and adults in Western and Eastern cultures have been shown to differ in how they interpret exclusion, with Western samples framing exclusion as unfair and Eastern samples more often framing it as situationally constrained (e.g., Kimel et al., 2017). It is possible that these cultural differences could extend to affiliative language use as well. Moreover, it remains unclear whether these adult-based patterns would extend to children. Future research should consider examining affiliative language use following exclusion across culturally diverse samples to clarify these possibilities.

Conclusion

The present study provides novel evidence that spontaneous affiliative language use during youth social interactions is shaped not by the experience of social exclusion alone, but by the degree to which youth experience an aversive affective response to social stress. While condition did not directly predict affiliative language use, individual differences in physiological reactivity uniquely predicted Self-Focused affiliative language, suggesting that affiliative language may serve a regulatory function following threatening social experiences. These findings further elucidate our understanding of how social stress shapes youth social communication and highlight the importance of examining individual differences in social stress reactivity as a key driver of social behaviour. Future research should continue to investigate the conditions under which social exclusion potentiates affiliative language use, with particular attention to the social context, developmental stage, and the affective processes that together shape how youth signal their social motivation.

Chapter Five: General Discussion

Social connection is one of the most fundamental human experiences, shaping behaviour from the earliest moments of life. Despite the central role that verbal communication plays in how children build and maintain social relationships, relatively little is known about how and why children use language – and specifically, affiliative language – to express their social motivation. Critically, even less is known about what individual and contextual factors shape its use. Across three studies, I addressed these gaps by validating a novel measure of children’s affiliative language use, examining how trait-level differences in temperamental shyness shape communicative patterns across the early stages of a developing peer relationship, and experimentally examining how experiences of social exclusion influence affiliative language use and the affective processes that may underlie it. Together, these findings reveal that affiliative language is a sensitive, context-responsive index of children’s social motivation – one that is shaped by both traits of a child themselves, and the social situations they find themselves in.

Summary of Findings and Overview of Discussion

In Chapter 2, I introduced and validated the Child Affiliative Language (CAL) dictionary – a novel LIWC-based tool for quantifying children’s affiliative language use during naturalistic peer interactions. Critically, the CAL dictionary captured something meaningfully distinct from general talkativeness or receptive vocabulary ability. Children who used greater proportions of affiliative language – and in particular, Self-Focused affiliative language (i.e., words and phrases involving personal disclosure and sharing about oneself) – were rated as more socially engaged by outside observers, were liked more by their interaction partners, and engaged in more prosocial sharing. Importantly, these associations held independently of how much children spoke overall. Equally important, and interesting, was the demonstration that affiliative language

use is context-sensitive: children used significantly more affiliative language during an unstructured get-to-know-you task than during a goal-oriented brainstorming task, despite speaking a similar amount in both tasks. This pattern of findings established the CAL dictionary as a valid and sensitive measure of children's in-the-moment social motivation and provided the methodological foundation for the studies that followed.

Building on this foundation, Chapter 3 used a longitudinal dyadic approach to examine how temperamental shyness shapes children's verbal communication across three sessions with the same, previously unfamiliar, peer. Shyness, characterized by an approach-avoidance motivational conflict between wanting to connect but fearing negative evaluation or potential rejection, is a particularly useful lens for understanding how competing social motivations manifest in language use. Consistent with the avoidance component of shyness, children higher in shyness spoke significantly fewer words during their initial interaction. This effect was the strongest during the first interaction and attenuated as familiarity increased over time. Yet, the picture that emerged when the quality, rather than quantity, of speech was examined was much more nuanced. Despite speaking less, shy children used a greater proportion of Total affiliative language during their initial interaction – suggesting that when shy children do speak in new and unfamiliar contexts, they prioritize language that signals warmth and the desire to connect. This potential compensatory pattern was specific to the first session, consistent with the interpretation that affiliative language may function as a strategy that is tied to the novelty and anxiety of an initial peer encounter, rather than a stable communicative tendency. Further, the consequences of these communicative patterns were not consistent across perspectives: word count longitudinally mediated the association between shyness and observer-rated social engagement, such that shy children's verbal reticence led to outside observers to perceive their interactions as less engaged.

However, shyness did not predict how much children were liked by their own interaction partners, as shy children were liked just as much as their less shy peers, regardless of how much they spoke.

In Chapter 4, I shifted from examining trait-level to social-contextual motivations by using an experimental paradigm to directly examine whether experiences of social exclusion shape affiliative language use in children and adolescents. Using the Cyberball paradigm to induce feelings of social exclusion, I found that excluded youth spoke significantly less than those in the inclusion condition in a subsequent social interaction task – a pattern of verbal reticence more consistent with a withdrawal response to social threat than an approach-oriented, re-affiliative response. Additionally, and contrary to expectations, social exclusion did not significantly predict greater affiliative language use, despite the Cyberball manipulation being highly effective at threatening youths' core psychological needs. Age also emerged as an unexpected correlate of affiliative language use. Rather than older adolescents showing *greater* affiliative responding as theories emphasizing heightened social sensitivity would predict, older adolescents used *less* Total and Self-Focused affiliative language than younger children. Most notably, analyses revealed that individual differences in perceived physiological reactivity to the Cyberball task – regardless of condition – uniquely predicted greater Self-Focused affiliative language use in the subsequent interaction. This finding suggests that it may be the subjective affective experience of social stress, rather than the objective experience of exclusion itself, that shapes how youth use language to signal their social motivations.

Taken together, a consistent pattern emerged across all three studies: affiliative language, and Self-Focused affiliative language in particular, may function as a sensitive and dynamic index of children's social motivation that is shaped by both stable individual differences and

momentary social experiences. The discussion that follows expands on the theoretical implications of these findings.

Affiliative Language as an Indicator of Social Motivation

A significant contribution of this dissertation is the demonstration that affiliative language may reflect a distinct and meaningful index of children's social motivation – one that captures something qualitatively different from existing behavioural and trait-level measures. Across three studies, affiliative language was consistently sensitive to both individual differences and social-contextual demands in ways that general talkativeness was not, highlighting its use as a window into children's in-the-moment social motivations during peer interactions.

Part of what makes affiliative language particularly compelling as an index of social motivation is its relatively common and spontaneous nature. Unlike more overt prosocial behaviours – such as sharing, helping, or comforting others (Eisenberg & Fabes, 1998) – which have long been used to index social motivation in developmental research, affiliative language unfolds moment-to-moment during conversation, and during naturally-occurring, day-to-day interactions, with far less time for deliberation or strategic planning relative to standard laboratory tasks. Consider the sharing task used in Chapter 2, which is similar to many resource distribution tasks in the literature, where children make a deliberate, conscious decision about how many tickets to give their partner but do so in private (Benenson et al., 2007). In this situation, children may share resources out of compliance, social pressure, or a desire for approval rather than a genuine desire to connect. This exemplifies the point that it is very difficult to identify the motivations for these types of behaviours in the laboratory. Affiliative language, in contrast, is harder to enact without some degree of social engagement; asking a peer a question, sharing a personal anecdote, or offering an enthusiastic affirmation requires at least

momentary orientation toward another person. Of course, this does not mean that affiliative language is *always* reflective of strictly social motivation, as motivations can co-occur, but its moment-to-moment, conversational nature may make it less susceptible to social desirability and demand characteristics than more explicit behavioural measures, and arguably a more direct reflection of underlying motivational states in a given moment.

This spontaneous aspect of affiliative language also has important implications for how it is measured. The findings in Chapter 2 demonstrated that the CAL dictionary captured affiliative language use that was independent of how much children talked overall, reflecting the *quality* rather than mere quantity of children's social communication. This is an important distinction, as quality and quantity can be teased apart in theoretically meaningful ways, as highlighted by the findings in Chapter 3. Here, I found that shy children spoke significantly less than their less shy peers yet used a greater proportion of affiliative language during their initial interaction. Measures sensitive only to how *much* children spoke would have missed this meaningful pattern entirely.

A further point of distinction concerns the comparison between affiliative language and measures of linguistic alignment. Conversational alignment, for instance (i.e., the tendency for interaction partners to naturally and often unconsciously mirror one another's words, sentence structures, and semantic meanings), has received growing attention as an index of social connection (e.g., Howe et al., 2023; see also Giles & Coupland, 1991). However, alignment is primarily concerned with form (i.e., whether two people are speaking in structurally similar ways). In contrast, affiliative language, as measured using the CAL dictionary, is concerned with function. That is, whether what a child says is actively oriented toward building or sustaining connection, regardless of whether it mirrors structural aspects of their partner's language. Rather

than positioning these constructs as competing accounts of social communication, it may be most informative to view them as complementary: alignment captures the structural convergence between partners, while affiliative language captures the motivation aspect of what is being said. How these two dimensions might interact, and whether children who use more affiliative language might also show greater alignment (or vice versa) is discussed below.

Finally, across all three studies, Self-Focused affiliative language consistently emerged as the subcategory more strongly and consistently associated with positive social outcomes. In Chapter 2, it was Self-Focused, rather than Other-Focused affiliative language that was most strongly associated with peer-reported liking, observer-rated social engagement, and prosocial sharing. In Chapter 3, the potential regulatory interpretation of affiliative language stemmed from the specific use of Self-Focused affiliative language during initial interactions. And in Chapter 4, it was Self-Focused affiliative language that was uniquely predicted by physiological reactivity to social stress. Self-disclosure – such as sharing personal information, preferences, and experiences – may be the dimension of affiliative language that is most directly activated by social motivation, whether that motivation is approach-oriented, stress-driven, or potentially, both. This pattern has early developmental roots. O’Neill and colleagues (2009) found that even preschool-aged children spontaneously initiate peer conversations by referencing themselves and their own mental states – including preferences, feelings, and opinions – suggesting that self-referential language may be among the earliest and most natural strategies children use to establish common ground and connect with peers. The present findings extend this work into late childhood and early adolescence and connect it to a broader literature on self-disclosure in established relationships suggesting that sharing personal information is one of the most powerful drivers of perceived closeness and liking (Collins & Miller, 1994; Sprecher et al.,

2013). Together, these findings position self-disclosure not merely as a feature of close adult relationships, but as a communicative strategy with deep developmental roots that children draw on from early in life when motivated to connect with others.

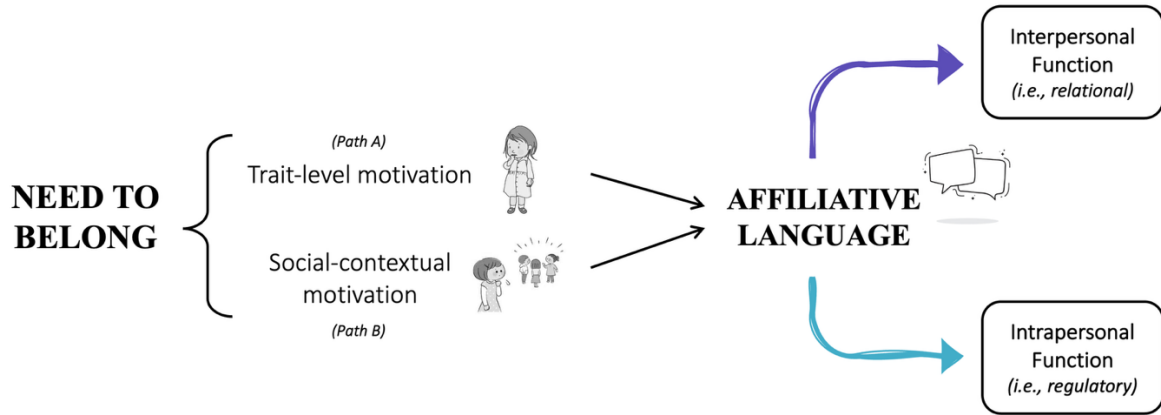
That said, the role of Self-Focused affiliative language is unlikely to be static over the course of a relationship. Recall that in Chapter 3, Other-Focused affiliative language showed a marginal positive association with shyness at the third session ($p < .10$) – suggesting that as a relationship develops and initial novelty fades, the balance between self-disclosure and other-oriented communication may shift. It is possible that Self-Focused language is most effective during the early stages of relationship formation, when establishing common ground is the primary goal. As familiarity increases, however, other-focused strategies may become increasingly important for maintaining connection. Whether the relative contributions between Self-Focused and Other-Focused affiliative language to positive social outcomes shift across the course of a developing relationship – and whether this trajectory is non-linear – is an important question for future research.

Two Pathways to Affiliative Language: Trait-Level and Social-Contextual Motivations

The conceptual model introduced in Chapter 1 proposed two distinct pathways through which the need to belong shapes children's affiliative language: one rooted in stable individual differences in social motivation, and one rooted in the immediate social context (see Figure 7). The three studies presented in this dissertation were designed to test these pathways from complementary angles, and together the findings offer a more complete picture of how each operates, and where the two converge.

Figure 7

Full Conceptual Model for Understanding the Multiple Motivations Underlying Children's Affiliative Language Use



Note. Path A reflects trait-level motivational influences; Path B reflects social-contextual motivational influences.

Path A, the trait-level pathway, was examined in Chapter 3 through the lens of temperamental shyness. Shyness is a particularly relevant individual difference as it is characterized by a motivational *conflict* rather than a motivational deficit. Shy children do not lack the desire to connect; rather, they often lack the ability to act on it without simultaneously navigating a competing avoidance motivation. This distinction matters theoretically and is easy to miss if shyness is treated as social disinterest rather than as a motivational conflict. Shyness should not simply suppress (i.e., result in less) affiliative language use – it should shape its use in a way that reflects the tension experienced between both the approach and avoidance aspects of this motivational conflict. This is what I found in Chapter 3. Despite speaking significantly less than their less shy peers, shy children used proportionally more affiliative language during their initial interactions. This suggests that when shy children did speak, they were more likely to do so in such ways that may signal their desire for connection. This pattern is consistent with the

idea that affiliative language may function as a low-stakes strategy for satisfying approach motivation while minimizing the risk of negative social outcomes; a way of signalling social motivation without requiring sustained or extensive verbal participation. Notably, the marginal association between shyness and Other-Focused affiliative language during the last interaction is also worth noting. As the relationship developed over time, some shy children appeared to gradually shift toward using more partner-oriented communication. This pattern is consistent with emerging evidence that suggests a subgroup of shy children show increasing other-oriented behaviour over time (e.g., social sharing; Poole et al., 2025). For some shy children, this shift may reflect not only growing comfort levels, but an almost effortful reach toward connection that only begins to emerge once the initial anxiety associated with social novelty subsides.

Path B, the social-contextual pathway, was first examined in Chapter 2, where I found children used significantly more affiliative language during a get-to-know-you task than a goal-directed brainstorming task. This provided initial evidence that affiliative language use shifts as a function of the social demands of the situation. Chapter 4 then provided a more direct, experimental test of this pathway through the lens of social exclusion. The logic here draws directly from the need to belong framework: when belonging is threatened, individuals are motivated to restore it, and affiliative behaviour functions as a key restorative strategy directed at *any* available social partner, not just those who excluded them (Baumeister & Leary, 1995; Maner et al., 2007). Social exclusion represents one of the most direct threats to belonging, and the Cyberball paradigm used in Chapter 4 was highly effective at eliciting genuine feelings of exclusion and threatening core psychological needs. Yet contrary to expectations, experiencing exclusion did not directly predict greater affiliative language use in the subsequent social interaction. This null finding was rather perplexing. The Cyberball manipulation was successful

– excluded youth reported feeling significantly more unwanted and ignored than those in the inclusion condition – which means that the absence of a condition effect on affiliative language was not due to a failed manipulation. Instead, it revealed something perhaps even more theoretically interesting. That is, the pathway from social threat to affiliative language use may be more complex than a simple exclusion-to-reaffiliation trajectory, and that individual differences in how children experience and respond to social threat may matter more than the threat in and of itself.

Interestingly, similar patterns emerge across both Chapter 3 and Chapter 4. In Chapter 3, shy children spoke significantly less than their peers, yet they used a greater proportion of affiliative language – particularly during their first meeting with an unfamiliar peer. In Chapter 4, excluded youth spoke significantly less than included youth in the subsequent interaction, yet maintained proportionally similar levels of affiliative language. In both cases, verbal reticence and elevated or maintained affiliative language use co-occurred under conditions of heightened social threat. Rather than reflecting competing responses, these patterns suggest that verbal reticence and affiliative language use may function as *complementary strategies* in the face of social threat – one reflecting the pull toward caution and self-protection, and the other reflecting the simultaneous pull toward social connection.

This is where the two pathways begin to converge in a surprising, but interesting, way. The most interesting finding of Chapter 4 was not the (lack of) condition effect, but the effect of individual differences in physiological reactivity. Children who showed greater increases in perceived arousal (e.g., heart rate, sweating, shortness of breath, etc.) following the Cyberball task used more Self-Focused affiliative language in the subsequent interaction, regardless of whether they had actually been excluded. This suggests that what drives affiliative language may

not be the objective experience of exclusion, but the subjective experience of social stress more broadly. Considering this alongside the shyness findings from Chapter 3 – where affiliative language was elevated specifically at the point of highest novelty-driven anxiety, and attenuated as familiarity reduced the threat – a larger, more coherent picture begins to emerge that encompasses both pathways: affiliative language use appears to be most strongly activated not by individual difference in temperament or social context alone, but by the degree to which a child is experiencing aversive arousal elicited by social threat.

This convergence has implications for how the need to belong framework is used and understood in the context of social communication. Baumeister and Leary (1995) proposed that threats to belonging motivate affiliative behaviour as a restorative strategy, and Williams' (2007) need-threat model elaborated on this further, positioning the aversive affective experience of exclusion as a central part of the mechanism through which threat activates reparative behaviour. The present findings are broadly consistent with this account and importantly, provide strong empirical grounding for a specific aspect of the theory that has largely been assumed rather than tested directly, particularly in children and adolescents, and in the domain of social communication. Across both chapters, it was not the objective social context alone – whether in the form of anxiety-provoking novelty associated with meeting an unfamiliar peer or experimentally induced exclusion – but the degree to which that context was registered as an aversive internal experience that most consistently predicted affiliative language use. In other words, the affective pathway that Baumeister and Leary (1995) and Williams (2007) described appears to be doing real motivational work – and affiliative language may be one of the most sensitive behavioural signatures of that process.

The Regulatory Function of Affiliative Language

The findings across Chapter 3 and Chapter 4 converge to suggest the possibility that affiliative language serves not only an interpersonal function – signalling one’s social motivation to a social partner – but also an intrapersonal, regulatory function. This potential distinction was introduced theoretically in Chapter 1, with the strongest empirical support coming from the physiological reactivity findings in Chapter 4: above and beyond the effects of condition and age, individual differences in perceived physiological reactivity to the Cyberball task uniquely predicted greater Self-Focused affiliative language use in the subsequent social interaction. Critically, this association emerged regardless of whether youth had actually been excluded, suggesting that it is not the experience of exclusion itself per se, but the degree to which a social threat activates an aversive internal state that shapes subsequent affiliative communication.

Findings from Chapter 3 are also consistent with this interpretation. Shy children used a greater proportion of affiliative language during their very first interaction – at which point novelty-driven anxiety was presumably the highest – but this effect attenuated across sessions as familiarity increased. If affiliative language were functioning solely as an interpersonal strategy to signal warmth and the desire to connect with a new peer, one might expect it to persist or even increase as the relationship developed and children felt more comfortable engaging, making efforts to maintain the relationship. Instead, the fact that affiliative language use actually decreased alongside the anticipated reduction in approach-avoidance motivational conflict suggests that at least part of its function may be tied to managing the aversive arousal that is elicited by novel social situations.

These patterns point toward a theoretical account in which the affective experience of social threat functions as a proximal motivator of affiliative language use – one that operates

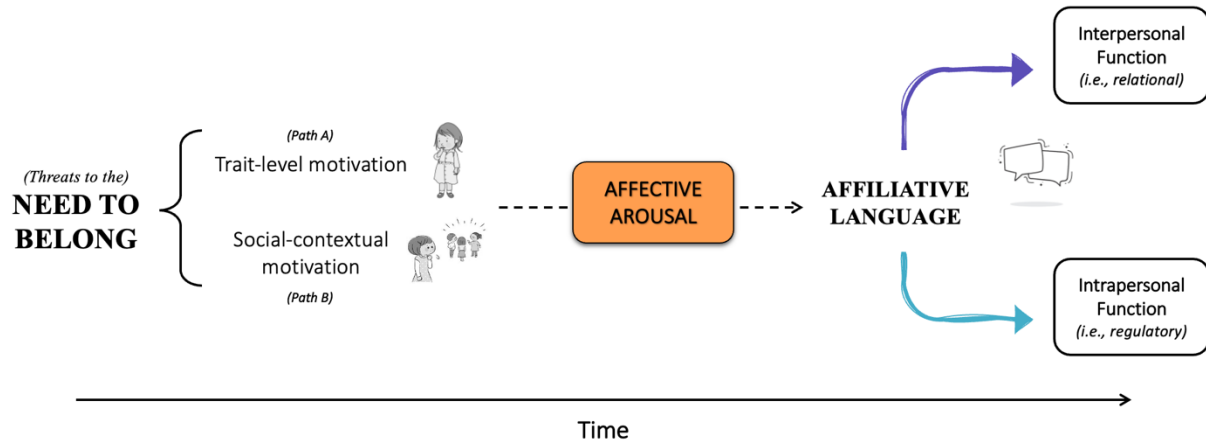
through both trait-level and social-contextual pathways. Zaki and Williams (2013) note a useful distinction between interpersonal emotion regulation strategies that are other-directed, aimed at changing a social partner's behaviour or emotional state, and those that are self-directed, aimed at managing one's own internal experience. Affiliative language may touch on both: in signalling warmth and openness for social connection to a partner, it simultaneously creates the conditions for felt connection that reduce the individual's own aversive arousal.

This regulatory interpretation also suggests a natural extension of the conceptual model first introduced in Chapter 1. The original model depicted two largely parallel pathways – trait-level and social-contextual – each independently leading to affiliative language use. The findings of the work presented in this dissertation suggest a necessary refinement: affective experience may function as a mediating mechanism within both pathways, linking social threat to affiliative language use through the aversive arousal it produces. Moreover, the attenuation of shyness effects across sessions in Chapter 3 raises the possibility that these dynamics are not static; the relative contributions of interpersonal (i.e., relational) and intrapersonal (i.e., regulatory) functions may shift as relationships develop and the novelty and/or threat of social situations diminishes (see Figure 8).

That said, it is important to acknowledge that the current data do not allow for a clean separation of inter- and intrapersonal functions. Affiliative language is, by definition, a social behaviour, as it is directed toward a social partner and invites reciprocal engagement. It is possible that the regulatory and relational functions may operate simultaneously, reinforcing one another in ways that are difficult to disentangle given the methods and measures used in the current studies. Whether these functions are separable, whether one precedes the other

Figure 8

Updated Conceptual Model for Understanding the Motivational and Affective Mechanisms Underlying Children's Affiliative Language Use



Note. Path A reflects trait-level motivational influences; Path B reflects social-contextual motivational influences. The dashed line indicates the pathway from threats to the need to belong to affiliative language use through affective arousal as a possible mediating mechanism. Affiliative language is hypothesized to serve both interpersonal (i.e., relational) and intrapersonal (i.e., regulatory) functions, which may operate simultaneously. The time arrow reflects the fact that the relative strength of these dynamics may shift as familiarity increases and social novelty decreases, both within and across interactions.

temporally within an interaction or over time, and whether they are differentially activated by different types of social threat are questions that future work should directly explore.

Developmental Considerations

An important aspect of this dissertation that warrants further consideration concerns development – specifically, how the strategies children use to express social motivation through language may meaningfully shift across childhood and adolescence. The age-related findings in Chapter 4 were somewhat unexpected. Rather than older adolescents showing greater increases in affiliative responding following exclusion, older youth used significantly *less* Total and Self-Focused affiliative language than younger children, and this pattern held across both inclusion and exclusion conditions. Initially, this finding seems to contradict theoretical accounts that

emphasize heightened peer sensitivity and social motivation during adolescence. Adolescents are thought to be more attuned to social cues, more motivated by peer relationships, and more likely to modulate their behaviour strategically in response to social contexts than younger children (Foulkes & Blakemore, 2016; Crone & Fuligni, 2020). So, this begs the question, why would they use *less* affiliative language in this context?

One possibility is that the same heightened social sensitivity that was expected to amplify affiliative responding may have instead activated a competing concern about how they would be perceived by a new social partner. Older adolescents are more attuned to signs of social evaluation than younger children (Somerville, 2013), and in the context of a social interaction immediately following exclusion, this sensitivity may have manifested as reluctance rather than openness to connect. From this perspective, the reduced affiliative language use of older youth may not reflect a lack of social motivation, but rather a fear of expressing it, particularly in the context of a social interaction immediately following an experience of rejection.

Another possibility concerns the nature of the social affiliative interaction task (SAIT) itself. As discussed in Chapter 4, the SAIT involved a one-sided monologue format that may have been mismatched with older adolescents' more reciprocal, context-sensitive interaction styles. Younger children may be more comfortable filling conversational space with self-referential content regardless of format, while older adolescents may require a genuine back-and-forth exchange to feel comfortable expressing social motivation naturally. If this is the case, the age finding may partly reflect a developmental shift not in social motivation, but in the form of the affiliative expression, with older youth relying on more subtle, implicit, or reciprocal signals of connection that the current paradigm was not able to capture. Relatedly, the CAL dictionary was developed and validated using a sample of 9- to 12-year-old children. It is possible that older

adolescents draw on unique words and phrases to signal social connection that may not be well-represented in the current dictionary. Future work should examine whether the CAL dictionary captures affiliative language equally across age groups, and whether expansion or adaptation of the word list is needed to accurately reflect the way older adolescents express social motivation through language.

It is also important to note what did *not* change with age. Across both Chapters 3 and 4, the basic pattern of verbal reticence under social threat – speaking less when the social situation felt threatening – was consistent regardless of age. What did differ was the affiliative quality of that speech. This suggests that the developmental story here is less about whether children and adolescents are motivated to connect, and more about how that motivation is expressed. As noted previously in this chapter, O'Neill and colleagues (2009) found that even preschool-aged children spontaneously initiate peer conversations through self-referential language – sharing preferences, opinions, and mental states as a way of establishing common ground. The present findings suggest that this tendency may persist through middle childhood but begin to taper off across adolescence. What remains unclear, however, is exactly when and why this shift occurs: at what point does self-disclosure begin to give way to other communicative strategies for initiating and maintaining social connection? What do those strategies look like? And does this shift reflect increasing social sophistication, heightened self-consciousness, or both? Further elucidating this developmental social communicative trajectory is an important open question, but one that the work presented here, with a relatively narrow age range, could not fully answer. Future work spanning early childhood, through late adolescence, and even into early adulthood would be needed to map the full developmental timeline of affiliative language use and the strategies children draw on to signal social connection at different points across development.

Methodological Contributions: Child Affiliative Language Dictionary

A foundational contribution of this dissertation is the development and validation of the Child Affiliative Language (CAL) dictionary – a novel, LIWC-based tool for capturing children’s affiliative language use during naturalistic peer interactions. Prior to this work, no validated measure existed for quantifying specific words and phrases children use to signal social connection during conversation. Existing approaches currently rely on either broad, trait-level assessments of affiliative tendencies, which cannot capture more momentary and nuanced variation in social communication, or on behavioural observation that coded the function of utterances manually – a time-intensive approach that limits use across large samples and multiple timepoints. The CAL dictionary addresses this gap by providing an efficient, reliable, and validated tool that can be applied systematically across different interaction contexts, developmental stages, and study designs. Critically, as demonstrated in Chapter 2, the dictionary captures something that existing measures do not – the *quality* of children’s social communication, independent of how *much* they talk, how socially skilled they are, or how strong their other linguistic abilities, such as receptive vocabulary, are.

One particularly important feature of the CAL dictionary is its sensitivity to context. Children used significantly more affiliative language during an unstructured get-to-know-you task than during a goal-oriented brainstorming task – despite speaking a similar amount (i.e., comparable word count) in both. This demonstrates that the measure is responsive to the social demands of the interaction, rather than simply reflecting stable individual differences in talkativeness or conversational style. This context-sensitivity is precisely what makes the CAL dictionary a useful tool for the kinds of questions I set out to answer in this dissertation, and for the broader field of developmental social communicative research. The studies in Chapters 3 and

4 applied the CAL dictionary across longitudinal and experimental designs to examine how affiliative language varies as a function of both individual differences and social context – demonstrating its flexibility as a measurement tool across diverse research questions and paradigms. That said, dictionary-based approaches are inherently limited in their sensitivity to the semantic context in which words are used. The present work represents an important first step toward a more comprehensive and nuanced approach to measuring how children use language to connect with others but will require the use of advanced methodologies – including computational approaches that are sensitive to *meaning* rather than word frequency alone.

Future Directions

The findings from the presented studies offer several interconnected lines of inquiry that, together, reflect a broader commitment to understanding children’s social communication as a dynamic, motivated, and multiply determined process.

Disentangling the Functions of Affiliative Language

The first critical question raised by this work is whether the inter- and intrapersonal functions of affiliative language can be empirically disentangled, and if one or the other is elicited more strongly under certain conditions. The current studies were not designed to directly test whether affiliative language effectively reduced physiological or emotional arousal – only that the perceived level of arousal predicted its use. An important next step would be to directly examine whether using affiliative language during a social interaction produces actual downstream reductions in stress. Critically, these potential reductions should be indexed by more objective physiological measures such as heart rate variability or respiratory sinus arrhythmia, which offer more precise windows into autonomic regulation than self-report indices of perceived arousal in the context of children’s social stress paradigms (e.g., Poole et al., 2023).

Additionally, pairing a social stress task induction with a subsequent *real* peer interaction – rather than a monologue-based task used in Chapter 4 – would also allow for examination of whether the regulatory benefits of affiliative language are contingent on reciprocal engagement from a social partner, or whether the act of expressing social warmth is sufficient in and of itself to reduce distress. This question is particularly worth pursuing given evidence that children’s physiological responses during social stress are sensitive to behavioural cues from their social partner (e.g., Poole et al., 2023) – suggesting that the regulatory function of affiliative language may partly depend on how it is received. This distinction maps directly onto the interpersonal vs. intrapersonal question: interpersonal, relational use implies the partner’s response matters, whereas a purely intrapersonal, regulatory account would predict arousal reduction regardless of whether there is a positive, reciprocal response from a social partner.

Conversational Alignment as a Window into Social Communication

While conversational alignment has received growing attention as an index of social connection in the broader literature (e.g., Howe et al., 2023), relatively little is known about how it develops across childhood and adolescence, or how it relates to other dimensions of social communication like affiliative language. Conversational alignment represents a theoretically distinct but conceptually related index of social motivation and connection. Recent work suggests that alignment may reflect a communicative skill rather than a stable trait or ability, raising important questions about what accounts for individual differences in alignment ability and how this capacity develops across childhood and adolescence (Nielsen et al., 2026). Affiliative language and conversational alignment likely operate simultaneously during social interactions. For instance, a child who engages in self-disclosure may elicit closer alignment from their partner, while greater alignment might encourage greater affiliative responding.

Importantly, the association between alignment and interaction quality use is likely bidirectional: alignment may both shape and be shaped by the quality of the interaction itself, such that children who align more effectively may experience higher quality interactions, while positive and engaging interactions may in turn foster greater alignment between social partners. An important methodological consideration for this work concerns how affiliative language is quantified. The present studies computed average proportion scores for each child across an entire interaction; and while this was a useful index, it cannot speak to how affiliative language and alignment unfold moment-to-moment within a conversation, or how these patterns shift as relationships develop across time. Future work examining these within-interaction trajectories would offer a more fine-grained picture of how affiliative language and alignment unfold together in real time. Understanding how affiliative language and alignment work together within this dynamic – and how they jointly shape social outcomes like closeness, engagement, and relationship quality across familiar and unfamiliar peer contexts – would advance our understanding of the communicative processes through which children build and maintain social connections.

New Approaches to Evaluating Children's Verbal Communication

The CAL dictionary represents a meaningful step forward in how children's social communication can be measures – but it also opens the door to asking questions that dictionary-based methods alone are not well-equipped to answer, as they are inherently limited in their sensitivity to semantic context. For instance, the same word(s) may function differently depending on tone, phrasing, and social context. Word embedding models and related computational approaches (e.g., Garg et al., 2018; Kjell et al., 2019), which are sensitive to the meaning and context of language rather than just the frequency of specific words, offer a

promising next step. If applied to children's naturalistic conversations, these approaches could reveal aspects of social communication that more traditional methods miss – like how the semantic content of a conversation shifts over time, or how closely two interaction partner's language converges at the level of meaning rather than just form. Taking it a step further, integrating computational approaches with multimodal data like vocal tone, prosody, and even facial expressions, would allow for an incredibly rich picture of the many ways children signal their desire to connect, well beyond what words alone can tell us.

Conclusion

Together, the three studies presented in this dissertation reveal that affiliative language is not simply a side effect of how talkative a child is or how socially skilled they are – it is a sensitive, dynamic index of social motivation that reflects both who a child is, and the social world they are navigating. By introducing a validated measure of children's affiliative language, examining how trait-level and social-contextual motivations shape its use, and beginning to uncover the affective processes that may underlie it, this work offers a new lens through which children's social communication can be understood. The findings point toward a new way of listening to and interpreting children's conversations – not just for how much they say, but for what their words reveal about their social motivations. In doing so, these findings lay the groundwork for a broader program of research into the motivated, context-sensitive, and multiply determined nature of children's social communication across development.

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Appendices

Appendix A

Total Affiliative Language

<u>Self-Focused Affiliative Language</u>		<u>Other-Focused Affiliative Language</u>	
have i	me	ah	you liked
i	me either	ahh	you live
i agree	me too	awesome	you love
i am	mine	aww	you loved
i believe	mine's	cool	you really like
i feel	mines	exciting	you really love
i have	my	fun	you should
i hope	my favorite	good	you think
i like	my favourite	great	you will
i liked	my name	mhm	you wish
i live	myself	mhmm	you would
i love	would i like	mm	you would like
i loved		mmm	you would love
i play		neat	you'd
i played		nice	you'd like
i really like		oh	you'd love
i really love		ohh	you'd really like
i think		ou	you'd really love
i will		same	you'll
i wish		sorry	you're
i would		super	you've
i would like		sure	your
i'd		sweet	your favorite
i'd like		thank you	your favourite
i'd love		thanks	your friend
i'll		uh huh	your friend's
i'm		woah	your friends
i've		wow	your name
		our name	ya
		ours	yeah
		us	yep

we	yes
we agree	yikes
we are	yup
we believe	do you
we feel	let's
we have	our
we hope	you
we know	you agree
we like	you are
we liked	you believe
we live	you feel
we love	you have
we loved	you hope
we think	you know
we will	you like
we wish	yours
we would	yourself
we'd	yourselves
we'll	
we're	
we've	
would we like	
would we love	
would you like	
would you love	

Appendix B

Sharing Task Instructions (based on Benenson et al., 2007)

Thank you for participating in our study!

In addition to receiving a \$15 gift card for your participation today, all children who participate in the study will have a chance to win an additional gift card once the study is complete. You have been given 10 tickets, each worth one entry into the draw for a \$25 gift card for Amazon. You can give any number of tickets to the other child you met today, and you get to keep the rest for yourself.

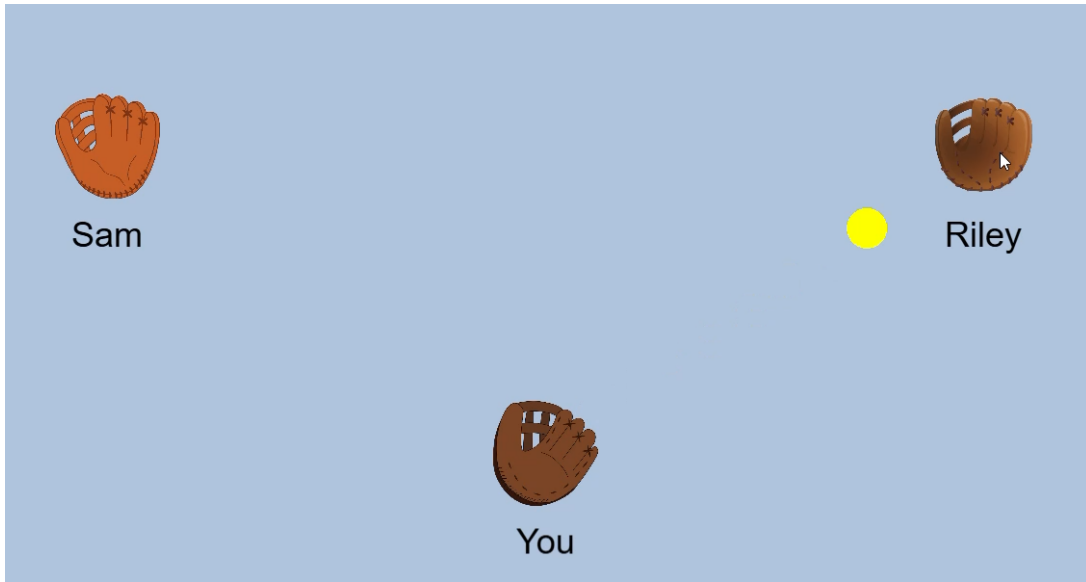
Your decision will be kept a secret and we will never tell the other child what you decided.

Please indicate how many tickets you would like to give the other child, ranging from 0 to 10 tickets.

0	1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Appendix C

Cyberball Task



Appendix D

Social Affiliation Interaction Task Script

(based on Llerena et al., 2012; Blanchard et al., 2015)

“Hi.

I'm Alex, and I live in Waterloo. I have two siblings – a younger brother and younger sister. What about you? Do you have any siblings?

My mom is a teacher, and my dad works at an office. Oh, and we have a dog named Lucy! Do you have any pets?

Um, we like to go camping a lot, in the summer. And skiing! That's my favourite thing to do in the winter.

Do you play any sports? I play soccer and hockey. I also like to read, and I like drawing. And I love board games.

My favourite subject in school is... probably science. What grade are you in? Do you have a favourite subject?

Other things I do... umm, well I like hanging out with my friends. Sometimes we go biking or we'll just like, hang out, you know? Watch movies or play games and things like that.

Umm... my birthday is in a few weeks and me and my friends are gonna do an Escape Room. I'm really excited about that. Have you done an Escape Room before? I haven't!

What else... my favourite colour is... I would say blue.

Do you have a favourite food? Mine is... probably pizza.

Umm, yeah. I guess that's it, I don't know what else!”

Appendix E

Perceived Physiological Arousal Questionnaire

(Adapted from Kallen, 2002)

Below are the ways that children's bodies feel sometimes. By choosing a number between 0 to 10, with 0 meaning not at all, and 10 meaning very much, please tell us how much each of the following statements is true for you right now.

Remember that there are no right or wrong answers, and it's okay to feel this way.

0	1	2	3	4	5	6	7	8	9	10
Not at all					Somewhat					Very much

- 1) Does your body feel hot right now?
- 2) Do you feel your heart beating right now?
- 3) Do you feel short of breath right now?
- 4) Do your cheeks feel warm right now?
- 5) Do you have a dry mouth right now?
- 6) Do you have butterflies in your tummy right now?