ABSTRACT

Title of Dissertation:	ATTACHMENT AND PEER AND ROMANTIC RELATIONSHIP FUNCTIONING: THE ROLE OF SOCIAL INFORMATION PROCESSING
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Perhaps the most central tenet of attachment theory is that individual differences in attachment quality relate to social functioning (Bowlby, 1969/82, 1973, 1980). Indeed, abundant research demonstrates that early insecurity toward caregivers relates to poor functioning in later peer and romantic relationships (Englund et al., 2011; McElwain et al., 2008), and individuals' attachment orientations relate to their concurrent functioning with peers and romantic partners (Collins et al, 2006; Groh et al., 2014). For decades, researchers have been trying to understand *why* these connections exist. The aim of this dissertation is to help answer this question with a collection of three empirical studies testing *social information processing* (SIP) as a mechanism through which attachment predicts individual differences in social functioning. The present studies focus on two critical components of SIP—expectations and attributions. Study 1 ($N = 2100$) examined the indirect effects of adolescents' attachment style dimensions on their acceptance by peers— assessed with sociometric peer ratings—through negative expectations of peers' behaviors. Findings revealed that adolescents with greater attachment anxiety (fears of rejection and

abandonment) and avoidance (discomfort with closeness) held negative expectations for how their peers would behave, and negative expectations in turn related to low acceptance by peers. Study 2 ($N = 347$) examined the role of attribution biases and friendship quality on pathways from early attachment to young adolescent romantic relationship quality. Longitudinal latent variable structural equation modeling analyses did not yield evidence for attribution biases or friendship quality as mediators on such pathways. Further, no direct links between early attachment to mothers and romantic relationship quality emerged. Findings did, however, show relations between early attachment to mothers and negative attribution biases about peers, as well as between friendship quality and romantic relationship quality. Study 3 ($N = 198$) examined a *causal* link between young adults' attachment and attribution biases using an experimental priming procedure. Security priming—temporarily boosting feelings of security—led participants to make fewer negative attributions about hypothetical romantic partners' transgressions. Participants with fewer negative attributions, in turn, reported that they would respond less negatively to the transgressions. Findings across the three studies provide support for SIP as a mechanism through which some conceptualizations of attachment (i.e., attachment style dimensions and temporary feelings of security) relate to social functioning, but findings do not support the theory that SIP explains longitudinal links between early attachment and later social functioning.

ATTACHMENT AND PEER AND ROMANTIC RELATIONSHIP
FUNCTIONING: THE ROLE OF SOCIAL INFORMATION PROCESSING

by

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Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2022

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Acknowledgements

I am deeply grateful to my adviser, Dr. Jude Cassidy, for shaping me into the scientist I am today through her support and mentorship; to my dissertation committee members for their guidance that has strengthened the work presented in this dissertation; to the past and present graduate students in the Maryland Child and Family Development Lab, Jackie Gross, Jessica Stern, Davis Straske, and Sayaka Awao, for their support and mentorship; to the research assistants for their excellent help; to the Graduate Writing Center for helping me develop as a writer; to my writing buddies for providing motivation and encouragement during our hours writing together on Zoom and for their excellent peer editing; and to the participants without whom this work would not be possible.

Finally, I would like to thank my family and friends for their invaluable moral support—especially my parents, Heather and Jeffrey Fitter, who served as amazing secure bases for me throughout graduate school.

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Chapter 1: General Introduction

Perhaps the most central tenet of attachment theory is that individual differences in attachment relate to social functioning (Bowlby, 1969/82, 1973, 1980). Indeed, abundant research provides support for this claim. Longitudinal research suggests that early insecurity toward caregivers relates to poor functioning in later peer (Groh et al., 2014; Schneider et al., 2010) and romantic (Englund et al., 2011; Roisman et al., 2005) relationships. Additionally, cross-sectional research demonstrates that individuals' attachment orientations relate to their concurrent functioning with peers (Groh et al., 2014; Khan et al., 2020) and romantic partners (Feeney, 2016; Mikulincer, 2006). For decades, researchers have been trying to understand *why* these connections exist (Booth-La Force & Groh, 2018; Fraley & Roisman, 2019; Simpson et al., 2014).

Attachment researchers have examined a multitude of mechanisms to explain connections between attachment and social functioning, such as emotion regulation (Contreras et al., 2000), empathy (Shaver et al., 2016), and conflict management skills (Mikulincer, 2006). An additional proposed mechanism is social information processing (SIP)—the way individuals remember, perceive, hold expectations, and make attributions about their social world (Crick & Dodge, 1994; Dykas & Cassidy, 2011; Lemerise & Arsenio, 2000). Researchers have suggested that attachment relates to a wide variety of SIP components, such as social attention allocation (Dewitte & De Houwer, 2008), subjective perceptions of social situations (Overall et al., 2015), biased memories of social interactions (Dykas et al., 2014; Miller et al., 1999), attributions about social partners' behaviors (Collins et al., 2006; Dwyer et al., 2010; Zajac et al., 2020), and expectations of others (Liu, 2008). Further, research has demonstrated that negative SIP can

relate to negative outcomes in peer (Dwyer et al., 2010) and romantic (Collins et al., 2006) relationships. Although research broadly suggests that SIP could be a mechanism through which attachment relates to poor social outcomes, many questions about this process remain open.

This collection of papers examines open questions about SIP as a mechanism through which insecure attachment relates to negative social outcomes throughout the lifespan. The present studies focus on two critical components of SIP—expectations and attributions. I begin this general introduction with a succinct overview of links between attachment and these two components of SIP. Next, I describe evidence of how negative expectations and attributions relate to social functioning. Finally, I describe a series of studies examining the roles of expectations and attributions in explaining links between attachment and social functioning.

Attachment and Social Information Processing

Although SIP is multifaceted, core contributors to all components of SIP are thought to be what Bowlby (1969/1982, 1973, 1980) called internal working models (IWMs). According to attachment theory, IWMs contain individuals' beliefs about themselves and others stemming from experiences with close relationship partners (Bowlby, 1969/82, 1973; 1980; Mikulincer & Shaver, 2007). When an individual's close relationship partners are insensitive and rejecting toward them, the individual develops negative IWMs—beliefs that others cannot be trusted and that they themselves are not worthy of care. As such, it is theoretically expected and empirically documented (Dykas & Cassidy, 2011) that such negative IWMs, also conceptualized as insecure attachment, cast a negative lens on ambiguous social information.

IWMs contain script-like components for how others are likely to behave (Bowlby, 1973; Waters & Waters, 2006). Such script-like components guide expectations about what will occur in the social world. Indeed, empirical work demonstrates that IWMs predict expectations of

social partners' behaviors. Some work demonstrates that secure attachment predicts more positive expectations of individuals' romantic partners' (Baldwin et al., 1993; Baldwin et al., 1995) and close friends' (You & Malley-Morrison, 2000) behaviors. Research on expectations of unknown social partners, however, is limited (see Liu et al, 2008, for one study). Further, a series of *experimental* studies indicated that a causal link may exist; priming young adults by temporarily activating a secure mental representation of attachment led participants to endorse more positive expectations of nonspecific others' trustworthiness and dependability (Carnelley & Rowe, 2007; Rowe & Carnelley, 2003).

In addition to script-like components of how situations will unfold, IWMs encompass beliefs about other people. When a person holds negative beliefs about others, it can make a benign behavior (such as an accidental collision from a peer on the playground) seem aggressive. This person may believe a stable negative trait (e.g., the peer is a mean person) caused the behavior, and that the peer intended to harm them. A tendency to interpret the cause of others' behaviors through such a lens is referred to as a *negative attribution bias.*

Much empirical evidence supports the notion that insecure attachment to parents relates to negative attribution biases about peers (e.g., Cassidy et al., 1996; Suess et al., 1992). For example, one longitudinal study found that infants' disorganized attachment predicted hostile attribution biases at age eight (Zajac et al., 2020), and another found that 3-year-olds' insecure attachment to mothers predicted their hostile attribution biases at ages four and seven (Raikes & Thompson, 2008). Studies of adolescents also indicate that insecure attachment to parents relates to negative attribution biases about peers (Dwyer et al., 2010; Simons et al., 2001).

A separate body of work shows that adults' attachment style dimensions, namely attachment anxiety (fears of abandonment and rejection by relationship partners and

preoccupation with relationships) and attachment-related avoidance (discomfort with emotional closeness with relationship partners and with relying on them for support; Brennan et al., 1998), relate to negative attributions about their own romantic partners (e.g., Collins et al., 2006; Hazelwood, 2012). For example, one study (Hazelwood, 2012) found that women with high levels of either attachment anxiety or attachment avoidance endorsed more negative reasons for their partners' behaviors. However, negative attributions about one's own partner may reflect accurate assessments of a partner's negative characteristics or behavior, and not a negative attribution *bias*—a general tendency to make negative attributions. Therefore, more research is necessary to determine whether attachment relates to negative attribution biases in romantic relationships.

Social Information Processing and Social Outcomes

Social information processing is particularly interesting to researchers because of the role it may play in self-fulfilling prophecies and harmful developmental cascades. Regarding self-fulfilling prophecies, negative expectations could contribute to behaviors that elicit reactions from social partners that reinforce negative expectations (Bowlby, 1969/82; Loeb et al., 2016). For instance, in a study of young adolescents, participants read vignettes about ambiguous negative situations with unfamiliar peers and were asked how they expected the peer to respond. In late adolescence, these same participants were observed interacting with a close friend. Young adolescents with greater negative expectations of others showed submissive behavior with friends in late adolescence, and submissive behaviors in turn related to later self-reported poor social functioning (Loeb et al., 2016).

Even stronger evidence for the role of expectations in predicting social functioning emerges from experimental research. One creative study of children demonstrated a causal effect

of expectations on children's social behaviors. Children first briefly met a group of unfamiliar peers. Next, a randomly selected half of the participants were given a message aimed at inducing positive expectations of peer acceptance. The children who were led to believe they would be accepted were better liked by the peers and displayed more social competence compared to other participants in a later play session (Rabiner & Cole, 1989).

In addition to negative expectations driving self-fulfilling prophecies, negative attribution biases can drive negative cascades. Negative attributions can inform hostile behaviors that elicit negative reactions from social partners. Negative reactions then contribute further to negative beliefs about others, which can lead to increases in negative attributions over time. Finally, increases in negative attributions can contribute to poor experiences with future social partners (see Lansford et al., 2011, for empirical evidence of such a cascade).

Indeed, empirical research demonstrates that negative attribution biases relate to poor social functioning. More specifically, research has linked children's and adolescents' negative attribution biases about peers to problems such as negative peer relations (McElwain et al., 2008; Spencer et al., 2013) and aggression (see Martinelli et al., 2018, for a review). Relatedly, research has linked adults' negative attributions about their partners to problems such as low relationship satisfaction (see Bradbury & Fincham, 1990, for a review; Karney & Bradbury, 2000), poor communication (Pearce & Halford, 2008), and hostility (Collins et al., 2006). Further, one experimental study showed a causal effect of negative attributions about romantic partners on feelings of anger and physiological dysregulation (Mikulincer, 1998).

In sum, research indicates that SIP components could mediate links between attachment and social functioning, yet many questions about exactly how this process occurs remain open. With the following collection of studies, I aim to contribute to a goal I argue is critical to

developmental science: understanding the role of SIP in paths between attachment and social outcomes that can, in turn, inform clinical work to promote changes in SIP that protect individuals' relationships throughout the lifespan.

The Present Collection of Work

The present collection of work includes a literature review and three empirical studies examining the mediating role of social information processing in links between attachment and social outcomes throughout the lifespan.

The literature review, titled "Attributions about Peers' and Romantic Partners' Behaviors: The Role of Attachment," presents a theoretical overview of IWMs and attributional processes, a comprehensive overview of the state of the empirical literature on links between attachment and attributions throughout the lifespan, and future directions for such research.

Empirical paper 1, titled "Links Between Adolescents' Attachment and Peer Acceptance: The Role of Negative Expectations," examined the role of adolescents' (eleventh graders') negative expectations for peers' behaviors in explaining links between adolescents' attachment style dimensions (attachment anxiety and attachment-related avoidance) and their acceptance by peers. Data for this paper come from a larger study from Dr. Jude Cassidy's lab (Dykas et al., 2008) on attachment and social relations.

Empirical paper 2, titled "Developmental Pathways From Early Attachment to Adolescent Romantic Relationship Functioning: The Roles of Social Information Processing and Friendship Quality," examined the mediating effects of negative attribution biases and friendship quality on links between early insecure attachment to mothers (12 months, 24 months, and 36 months) and young adolescents' (sixth graders' and 15-year-olds') romantic relationship quality, as well as the enduring direct effects of early attachment to mothers on young adolescents'

romantic relationship quality. Data for this paper come from the National Institute of Child Health and Human Development's (NICHD) Study of Early Childcare and Youth Development (SECCYD)—a longitudinal study conducted at 10 study sites across the United States following children from birth to age 15 (NICHD Early Child Care Research Network, 1997, 2001).

Empirical paper 3, titled "Attachment, Attribution Biases, and Responses to Romantic Partners' Behaviors: An Experimental Mediation Analysis," examined a *causal* link between attachment and attribution biases in young adults by testing whether security priming related to fewer negative attributions when evaluating hypothetical future romantic partners' transgressions, as well as whether fewer negative attribution biases, in turn, were associated with less negative self-reported and implicit responses to the transgressions.

Chapter 2: Attributions About Peers' and Romantic Partners' Behaviors: The Role of Attachment

The social world contains an abundance of ambiguity. The question of *why* social partners engage in certain behaviors often remains open. Regardless, it is essential for individuals to somehow interpret others' behaviors and decide how to respond in order to facilitate social interactions. Social information processing (SIP) theory states that individuals enter social situations with a repertoire of past experiences and draw on such experiences when interpreting social cues and deciding how to respond (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). Complementary to SIP theory is *attachment theory* (Bowlby, 1969/82, 1973, 1980, 1988). Attachment theory states that past experiences in close relationships (e.g., with caregivers, close friends, and romantic partners) guide internal working models (IWMs)— dynamic mental representations containing knowledge and beliefs about other people and about oneself. IWMs, in turn, guide the processing of social information and behaviors with social partners (Dykas & Cassidy, 2011).

One key task involved in interpreting ambiguous social information that developmental and social scientists have been interested in for decades (e.g., Dodge et al., 1986; Fincham & Bradbury, 1992) is making *attributions*. Attributions are appraisals of the causes of social partners' behaviors (Crick & Dodge, 1994), and they are particularly interesting to researchers because of the role they may play in harmful cascades. Negative or hostile attributions about social partners' behaviors can inform hostile behaviors that elicit negative reactions from social partners. Negative reactions then contribute further to the negative repertoire of past experiences, which can lead to increases in negative attributions over time. Finally, increases in negative

attributions can contribute to poor experiences with future social partners (see Lansford et al., 2011, for empirical evidence of such a cascade).

The potential cascading effects make it critical to answer questions about *why* individuals make negative attributions. Indeed, researchers are making progress understanding the antecedents of negative attributions. A promising and growing body of attachment research has examined links between negative IWMs—also conceptualized as insecure attachment—and negative attributions. Our aim in this review is to describe the current state of the field's knowledge on the connection between insecure attachment and negative attributions. We begin by describing the construct of internal working models, their functionality, how they are typically measured, and why they may play a critical role in individuals' attributional processes. Next, we describe the current conceptualization of attributions on a theoretical level, how they are typically measured, and why they are critical to study. Next, we provide a comprehensive overview of the state of the empirical literature on links between attachment and attributions. Following the examination of empirical work, we discuss limitations of past research and open questions. Finally, we discuss clinical applications.

Attachment and Attributions: A Theoretical Overview

Internal Working Models

To understand *why* attachment may have an influence on attributional processes, it is important to understand internal working models. IWMs are perhaps the most central concept in attachment theory (Bowlby, 1969/1982, 1973, 1980, 1988) and have strong implications for social, emotional, and even physiological functioning (Bretherton & Munholland, 2016; Cassidy et al., 2014). IWMs are dynamic mental representations that contain knowledge and beliefs about others, oneself, and the world generally. They are developed through experiences; habitual

interaction patterns teach individuals how attachment figures and other social partners are likely to behave and, in turn, how worthy they themselves are of care and kindness. IWMs are script-like in nature. They are built on a foundation of if-then contingencies for how situations will unfold. These script components match individuals' lived experiences in similar situations (Bretherton, 1985). For example, a child who has habitually experienced rejection from caregivers in times of need will form an IWM that contains if-then contingencies such as, if I signal distress, then I will be ignored and I will feel worse. IWMs operate on both conscious and non-conscious levels and begin to develop as early as 12 months old (Main et al., 1985). IWMs can be broadly conceptualized as secure or insecure. Secure IWMs of others generally consist of beliefs that others are reliable, kind, and trustworthy. As such, they often correspond with IWMs of oneself as worthy of care. Insecure IWMs are characterized by distrust of others, expectations of rejection, and corresponding IWMs of oneself as unworthy of care and kindness.

Humans evolved to form experience-based secure or insecure internal working models because they serve a critical survival function; easily accessible knowledge on the likely outcomes of threatening and distressing situations guides quick decision making about who to approach and who to avoid when danger arises (Bowlby, 1969/82; Bretherton & Munholland, 2016). These easily accessible partially nonconscious models allow individuals to expend minimal time and cognitive resources when making decisions. Even in non-threatening situations, IWMs guide behaviors and predictions about social partners' behaviors. Such guidance can be beneficial in an ambiguous social world with a sea of behavioral options; it allows individuals to develop strategies for how to behave in service of attachment goals. For instance, when a child has a secure IWM (perhaps based on a secure attachment to a mother) the child may reach out to the mother when in distress, and then the distress can be alleviated

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through sensitive care. Further, if an individual has an insecure IWM of one caregiver and a secure IWM of another, that individual will know which caregiver to reach out to in times of need.

Although IWMs exist because they guide adaptive survival strategies, IWMs can also hinder social functioning. Insecure IWMs can backfire when they generalize to affect thoughts and beliefs about individuals not yet known (Bowlby, 1988). For example, an IWM of a caregiver as untrustworthy can generalize to become an IWM of *others* as untrustworthy. When IWMs generalize across contexts and relationships, individuals may rely on automatic schematic processing of social partners' behaviors in lieu of carefully considering social cues. This may happen regardless of whether the new social partner's behavior is similar to that of the initial social partner that contributed to the insecure IWM.

In addition to generalization, IWMs can also hinder social functioning through their inherent stability (Bowlby, 1973). IWMs have inertia, such that certain processes prevent IWMs from changing. More specifically, insecure individuals often use schematic processing to attend selectively to information that aligns with the negative beliefs held in their IWMs (Dykas & Cassidy, 2011). These attentional tendencies and negative beliefs can evoke behaviors from social partners that align with the insecure IWMs (Bowlby, 1969/82; Bretherton & Munholland, 2016). Thus, IWMs can perpetuate and worsen the problems in existing close relationships. The negative relationship dynamics evoked from negative IWMs can lead negative IWMs to persist over time. Schematic processing driven by IWMs often occurs on a nonconscious level, making it particularly challenging to change IWMs even when experiences change. It is, however, important to note that it is possible for new experiences to cause insecure IWMs to become more

secure, and vice versa (Vaughn, Egeland, Sroufe, & Waters, 1979; Weinfield, Sroufe, & Egeland, 2000).

Although IWMs exist on a representational level, researchers have spent decades developing measures to capture their inner workings (e.g., Ainsworth et al., 1978; Brennan et al., 1998; Cassidy & Woodhouse, 2003; Kerns et al., 2001; Waters & Rodrigues-Doolabh, 2001; Waters & Waters, 2006). At the broadest level, individuals with secure IWMs are classified as being secure with respect to attachment, although security is conceptualized in many different ways throughout the lifespan (Solomon & George, 2008). In childhood, attachment patterns appear to be tied to specific relationships. For instance, it is common for children to be securely attached to their mothers and insecurely attached to their fathers. Measures such as the infant and preschool Strange Situation Procedure (SSP; Ainsworth et al., 1978; Cassidy & Marvin, 1992) classify infants into one of four attachment patterns: secure, insecure-resistant, insecure avoidant, and insecure-disorganized.

Secure children are able to use their caregivers as secure bases and safe havens during the SSP; they seek comfort from their caregivers when distressed, derive comfort from the interactions, and successfully return to exploration. These behaviors are thought to reflect an IWM of the caregiver as available and responsive in times of need, due to past experiences of sensitive care. Insecure children, however, are not able to successfully use their caregivers as secure bases. Insecure-resistant children amplify their distress during the SSP, are not easily comforted by their caregivers, and exhibit limited exploration. An insecure-resistant child often has an IWM of the caregiver as unpredictable, due to past experiences of inconsistency from that caregiver. Insecure-avoidant children do not seek out their caregivers and may suppress feelings of distress during the SSP. This behavior reflects an IWM of a caregiver as unavailable and

unresponsive, based on repeated experiences of rejection by that caregiver. Finally, children who are classified as disorganized vacillate between approach and avoidance behavior during the SSP and engage in anomalous behaviors. These behaviors often reflect an IWM of the caregiver as frightening, often driven by experiences of abuse or frightening behaviors by the caregiver (Ainsworth et al., 1978; Belsky & Fearon, 2008).

In adolescence and adulthood, individual differences in attachment are most frequently conceptualized as being due to a characteristic of the person, although relationship-specific attachment patterns do still exist. This change in conceptualization reflects increases in individuals' cognitive capacities to integrate IWMs across different close relationships to create a generalized IWM of the nature of close relationships (Allen & Tan 2016). The most common conceptualizations are *state of mind with regard to attachment* and *attachment style*. State of mind with regard to attachment is measured through a semi-structured interview asking adults and adolescents to reflect on their childhood experiences (Adult Attachment Interview; AAI; George et al., 1996; Hesse, 2008). Individuals with a secure state of mind can comfortably and coherently discuss positive and negative attachment-related experiences and speak in ways that highlight the importance of close relationships. On the other hand, individuals with insecure states of mind are often preoccupied with the pain of the past and become dysregulated when discussing attachment-related childhood events (preoccupied state of mind), dismiss the importance of close relationships and distance themselves from the pain of the past (dismissing state of mind), or speak in ways that are disjointed or illogical when asked to reflect on attachment related experiences (unresolved state of mind).

Another conceptualization of attachment in adolescents and adults is *attachment style dimensions*. Attachment style dimensions reflect individuals' thoughts, feelings, and behaviors in

close relationships (Brennan et al., 1998). There are two dimensions of attachment insecurity:

attachment anxiety (intense desire for closeness, preoccupation with close relationships, and

fears of rejection and abandonment) and attachment-related avoidance (discomfort with

closeness and with relying on relationship partners for support). Individuals with low anxiety and

avoidance scores are viewed as having a secure attachment style. Although many

conceptualizations of attachment exist, they are all reflections of the inner workings of

individuals' IWM of attachment.

Internal working models are the lenses through which individuals process social

information (Dykas & Cassidy, 2011). Secure IWMs contribute to a positive outlook when

interpreting social information, and insecure IWMs contribute to a negative outlook. When

IWMs generalize, they affect SIP in new relationships that did not shape the initial secure or

insecure IWM. When IWMs stay stable, they can affect SIP within the relationship that did

shape the IWM. In both cases, SIP is not always accurate. This inaccuracy is problematic, as SIP

affects the way individuals feel about and respond to social situations. Therefore, negative SIP

can have serious implications for poor interpersonal functioning (Crick & Dodge, 1994;

Lemerise & Arsenio, 2000).

Attributions

The SIP component on which this review will focus is making attributions; that is,

appraising the causes of social partners' behaviors (Nasby et al., 1980). Developmental and

social psychologists have conceptualized attributions in various ways. Developmental

psychologists studying children and adolescents' attributions about peers focus on a construct

referred to as *hostile attribution bias*–a tendency to attribute a peer's behavior to negative and

hostile intentions (Crick & Dodge, 1994; Nasby et al., 1980). Hostile attribution biases are

assessed through vignette-based measures comprised of stories about peer provocations wherein the intentions of the peer are ambiguous (e.g., a child bumping into another child's block tower and knocking it over; Dodge et al., 1986). Children and adolescents are presented with scenarios, and researchers then ask them about the intentions of the peers in the scenarios. Stimuli can include videos (e.g., Dodge et al., 1986), written stories, or spoken stories (e.g., Raikes & Thompson, 2008), and answers can be open-ended and coded (e.g., McElwain et al., 2008; Raikes & Thompson, 2008), or forced-choice (Simons et al., 2001). Researchers score participants on the extent to which they interpret the peers' behaviors as benign and accidental or hostile and intentional (e.g., Dodge et al., 1986; Raikes & Thompson, 2008). Attributions measured in this way allow researchers to capture participants' true biases, because participants cannot draw on previous experiences with the unknown hypothetical peer when making attributions.

Social psychologists studying adults' attributions about romantic partners focus on a broad set of attribution types, such as globality attributions (beliefs that a partner's behavior affects many aspects of the relationship), stability attributions (beliefs that a partner's behavior is not going to change), attributions of an internal locus of control (beliefs that the behavior reflects something dispositional about the partner), and blameworthiness (beliefs that the partner should be blamed for their behavior). Although early research on attributions in romantic relationships lacked coherence due to the various conceptualizations of attributions (see Bradbury et al., 1990 , for a review), there is now a widely used standardized measure: the Relationship Attributions Measure (RAM; Fincham & Bradbury, 1992). The RAM is a self-report measure that asks participants to read vignettes about their own partners engaging in various hypothetical behaviors. For each vignette, participants answer six questions about why their partners might

have behaved as they did. Each question reflects a different dimension of attributions. The six questions yield two indices: causal attributions (internal locus of control, stability, globality), and responsibility attributions (blameworthiness, motivation for the behavior, and the extent to which the behavior was intentional). Some researchers examine causal attributions and responsibility attributions as separate outcomes (e.g., Sümer & Cozzarelli, 2004; Whisman & Allan, 1996). Oftentimes, however, researchers reduce the dimensions into one general negative attributions index (e.g., Gallo & Smith, 2001; Hazelwood, 2012; Pearce & Halford, 2008).

Research measuring attributions in this way is somewhat limited in its ability to capture participants' true attribution biases. This is because (in contrast to the literature on children and adolescents' attributions about peers) participants are making attributions about known social partners, and these attributions could reflect an experience-based accurate assessment of that partner's likely intentions. This assessment could be based on the partner's characteristics and previous behaviors, rather than being based on an individuals' tendency to make negative attributions (i.e., an attribution bias). Therefore, attributions in this line of work may reflect an attribution bias, a specific partner's characteristics, or a combination of both. Thus, it is difficult to disentangle attribution biases from the partners' characteristics and behaviors when attributions are measured in this way. Still, although it is possible that research using the RAM is not necessarily measuring attribution biases, it is nonetheless measuring attributions. Thus, such research does give us some insight into what may be occurring with individuals' attributional tendencies and is critical to discuss when examining links between attachment and SIP in romantic relationships.

Early developmental and social attributions researchers had strong interests in studying the topic because they anticipated that negative attributions would be precursors to negative

behaviors (Berley & Jacobsen, 1984; Crick & Dodge, 1994; Fincham, 1985). Indeed, evidence supports this notion. Research has linked children and adolescents' hostile attribution biases about peers to problems such as negative peer relations (McElwain et al., 2008; Spencer et al., 2013) and aggression (see Martinelli et al., 2018, for a review). Relatedly, research has linked adults' negative attributions about their partners to problems such as low relationship satisfaction (see Bradbury & Fincham, 1990, for a review; Karney & Bradbury, 2000), poor communication (Pearce & Halford, 2008) and hostility (Collins et al., 2006). Further, one experimental study showed a causal effect of hostile attributions about romantic partners on feelings of anger and physiological dysregulation (Mikulincer, 1998). The potential consequences of negative attributions for peer and romantic relationship functioning make it crucial to examine their antecedents. In the following two-part section, we provide a comprehensive review of the literature linking negative attributions to what theory claims to be a key antecedent: insecure attachment. The first part includes a discussion of research on links between attachment and children's and adolescents' attributions about peers. The second part includes a discussion of research linking attachment to adolescents' and adults' attributions about romantic partners.

Empirical Review: Links Between Attachment and Attributions

We conducted an extensive literature search for empirical research examining links between attachment and attributions using the PubMed, PsycINFO, and Google Scholar databases. We identified additional papers through hand-searching. We identified 12 studies examining links between children and adolescents' attachment and attributions about peers, and 16 studies examining links between adolescents' and adults' attachment and attributions about romantic partners. We did not limit our search to a specific conceptualization of attachment, instead we included studies of a wide variety of attachment conceptualizations, such as specific

attachment classifications (i.e., secure, resistant, avoidant, disorganized) towards specific parents, continuous measures of security with specific parents, and attachment style. We included studies measuring attribution *biases* regarding unknown social partners, as well as studies measuring attributions about known social partners.

Attributions About Peers

Children's Attachment and Attributions About Peers

Longitudinal research indicates that insecure attachment as young as infancy can predict children's later negative attribution biases about peers. One particularly notable study examined longitudinal links between infant and children's attachment at 1, 2, and 3 years old and their hostile attribution biases at 4 years old and in first grade (Raikes & Thompson, 2008) in a sample of over 1000 children at 10 study sites across the United States (National Institute of Child Health and Human Development (NICHD) Study of Early Childcare and Youth Development (SECCYD); NICHD Early Child Care Research Network, 1997, 2001). Children were presented with cartoon drawings of social situations depicting a negative event wherein a peer's intent was ambiguous, such as a peer knocking over a child's block tower. Children were then asked about the intentions of the peer, and attributions were coded as negative or non-negative. Children with an avoidant attachment to their mothers at age 3 made more negative attributions at 4 years old than did children with a secure attachment to their mothers. Additionally, children with a resistant attachment to their mothers at age 3 made more negative attributions in first grade than did children who were securely attached to their mothers.

Surprisingly, the researchers found no links among attachment classifications at ages 1 and 2 and negative attributions at 4 years old or in first grade, although it is important to note that researchers examined attachment at all three ages in the same statistical model. The moderate

stability of attachment classifications across all three ages in that sample (see Groh et al., 2014) may have created multicollinearity problems that prevented researchers from detecting significant effects. The potential multicollinearity problems make it all the more interesting that attachment in 3-year-olds showed a unique effect on negative attribution biases above and beyond attachment at other ages. However, one unpublished dissertation study in the SECCYD did not find any differences between secure and insecure 3-year-olds' negative attribution biases in third grade (Kim, 2009). Another study in the SECCYD found only an indirect link between attachment at 3 years old and negative attribution biases, such that 3-year-olds' security (measured as a continuous score of the extent to which a child was securely attached to their mother) predicted open emotional communication with their mothers in a lab problem solving task, which in turn predicted fewer negative attributions about unknown peers in first grade (McElwain et al., 2008).

One study of children who were at high risk for maltreatment examined differences in attributional processes between children with organized attachments (i.e., resistant, avoidant, secure) and children with disorganized attachments. Researchers found that infants who were classified as disorganized in the Strange Situation had hostile attribution biases at age eight. Surprisingly, no group differences emerged between secure and insecure (resistant, avoidant, or disorganized) children (Zajac et al., 2020). Another study (Suess et al., 1992) found links between children's attachment at 12 and 18 months and their hostile attribution biases. Children who were securely attached to their mothers attributed more negative intentions to cartoon characters showing violence towards another child than avoidantly attached children. Interestingly, there were no group differences between children with a secure or an avoidant attachment to their fathers. No resistant children were included in the analytic sample.

Two longitudinal studies found null results regarding children's attachment and their attribution biases. In one study, children participated in the Strange Situation at 12 months, and an attributions assessment in second grade (Ziv et al., 2004). Participants watched videos of a child trying to play with peers. In each video, the peers would respond in one of three different ways. One video included a hostile response, one a non-hostile response, and finally an ambiguous response. Children were asked if the peers were being "mean or not mean" and accuracy was coded. No differences in accuracy emerged; however, it is possible that accuracy might not reflect a hostile attribution bias. For example, perhaps secure children answered inaccurately such that they did not attribute the hostile peers' behavior to mean intentions. Therefore, this null result should be interpreted cautiously. Another study (Cassidy et al., 1996, Study 1) found no longitudinal differences between children's attachment classifications to their mothers at 12 and 18 months and their negative attributions about stories of peer provocations at preschool age.

Three cross-sectional studies found links between children's attachment and attribution biases. In a follow up study by Cassidy and colleagues (1996; Study 2), findings revealed that kindergarteners and first graders who were securely attached to their mothers were less likely to attribute negative intent to a peer compared to their insecure counterparts. Further, negative attributions explained an indirect link between insecure attachment and children's fewer reciprocated friendships. Although the majority of research on children's attachment and attribution biases was conducted in the United States, one study was conducted in Northern Italy (Zaccagnino et al., 2013). Four- to seven-year-olds completed a doll vignette-based measure of attachment representations. Children with disorganized representations attributed negative intent to peers in hypothetical stories, whereas avoidant, resistant, and secure representations did not

relate to hostile attribution biases. Moreover, one study of five- to nine-year-old children found that higher levels of attachment security measured from the Separation Anxiety Test (SAT; Hansburg, 1972) related to positive attributions. It is important to note, however, that attribution ratings were collapsed across vignettes about unknown peers, parents, and teachers (Clark & Symons, 2009).

Adolescents' Attachment and Attributions About Peers

Three cross-sectional studies examined adolescents' attachment and their attributions about peers. One study (Zimmerman, 1999) examined how sixteen-year-olds' state of mind with regard to attachment related to their attributional processes. Researchers told adolescents five hypothetical stories about peer rejection (e.g., not being invited to a nonspecific friend's birthday party). Adolescents were then asked an open-ended question about how they would explain the situation. Attribution flexibility was determined by whether the subject reported just one or multiple reasons for the peer's behavior in the situation. Attachment was assessed with the Adult Attachment Interview Q-sort (George et al., 1985; Kobak, 1993) to yield continuous scores for secure, dismissing, and preoccupied attachment state of mind dimensions. Security related positively to flexible attributions, and dismissing attachment related negatively to flexible attributions. Flexible attributions may not necessarily reflect hostile attribution biases; however, it is logically sound that an adolescent who is able to generate alternative explanations for behaviors may be open to appraising peers' behaviors as non-hostile.

Two studies examined sixth-graders' attachment to both mothers and fathers as separate predictors of negative attributions. Simons and colleagues (2001) found that insecurity with mothers (but not fathers) predicted negative attribution biases towards unknown peers. In contrast, Dwyer and colleagues (2010) found that insecurity towards fathers (but not mothers) for

girls (but not boys) predicted greater negative attributions about specific close friends in ambiguous scenarios. It is important to note that attributions about specific close friends may not truly reflect an attribution *bias*, because the adolescent may be making a well-informed attribution based on experiences with that friend.

Attributions about Romantic Partners

We now transition to discussing links between attachment and attributions about *romantic partners.* Most of the research on such links focuses on adulthood, however, some studies are of adolescents. It is important to note that most of the studies about attributions in romantic relationships ask participants who are in relationships to make attributions about *their own* romantic partner. Therefore, as mentioned previously, it is unclear whether momentary negative attributions reflect an attribution bias—a tendency to make negative attributions—or characteristics and past behaviors of the specific partner, although it is likely that attribution biases are at least one component of attributions of one's own partner. Thus, these studies still provide supporting evidence in favor of the relation between attachment and biased attributional processes and are important to discuss.

Adolescents' Attachment and Attributions About Romantic Partners

One unpublished thesis (Fitter, 2020) did examine attribution *biases* about romantic partners in young adolescents. Eighth graders read vignettes depicting scenarios of ambiguous partner transgressions that could occur in relationships (e.g., "you texted this person that you were feeling upset and this person didn't answer you all day"). Participants were asked to imagine that someone they may date in the future was engaging in the behavior in the vignette. Then, participants were asked to rate the likelihood of several reasons for the behavior in the situation, some negative (e.g., "this person doesn't care enough about me or my feelings") and

some benign (e.g., "this person did not have their phone on them"). Participants also rated their attachment anxiety and avoidance toward their mothers and fathers.

Researchers found that attachment avoidance averaged across both parents predicted negative attribution biases, and insecurity averaged across anxiety and avoidance towards mothers and towards fathers related to adolescents' negative attribution biases. None of the specific dimensions for specific parents (e.g., anxiety towards fathers) predicted negative attribution biases. Interestingly, negative attribution biases explained indirect links between insecure attachment and negative self-reported forecasted responses to the behaviors depicted in the vignettes. Yet it is important to note that adolescents who reported being in relationships at the time of data collection (a small proportion of the sample) were not excluded from the study. Even though participants were asked to imagine a hypothetical partner, it is possible that those in relationships were imagining their own partner. The authors cautiously still interpret this as an attribution *bias* due to the large proportion of the sample that were not in relationships and the instructions to imagine a hypothetical future partner.

The one other study of adolescent attachment and attributions about romantic partners asked participants about their own romantic partners (Margolese et al., 2005). Attachment was measured with the Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991). Sixteen-to nineteen-year-old participants were asked to rate the extent to which paragraphs describing secure, dismissing, preoccupied, and fearful attachment described their relationship with their partner. The authors conceptualized attachment as the extent to which individuals have negative working models of their partner (calculated by subtracting scores for fearful and preoccupied attachment to their partner from scores on avoidant and secure attachment to their partner) and negative models of themselves regarding their partner (calculated by subtracting scores for

avoidant and secure attachment to their partner from scores for fearful and preoccupied attachment to their partner). Next, participants were asked to imagine that they were in stressful events with their partners and were asked to make attributions about their partners' behaviors during the stressful event. Researchers found that adolescents' negative working models of their partners and of themselves both predicted negative attributions. Interestingly, negative attributions mediated links between negative working models of the self and depressive symptoms.

Adults' Attachment and Attributions About Romantic Partners

Some research on links between attachment and adults' attributions about romantic partners contains mixed samples of participants that are and are not in current relationships, some contain only participants in relationships, and some include couples and examine both actor effects (relations between individuals' *own attachment* and their *own attributions*) and partner effects (relations between individuals' *own attachment* and their *partners'* attributions).

Four studies examined links between attachment and attributions in mixed samples of dating and non-dating participants. All four of these studies involved college students. For instance, one study (Collins, 1996, Study 1) examined a sample wherein about half of participants were in relationships. Although some participants were already in relationships, all were asked to imagine a hypothetical future dating partner was engaging in a potentially negative behavior (e.g., "imagine your partner left you standing alone at a party where you didn't know anyone"). Participants had the opportunity to provide free responses of their explanations for their partners' imagined behaviors, and they completed the widely used self-report measure of attributions for partners' transgressions (Relationship Attributions Measure; RAM; Fincham & Bradbury, 1992). Secure participants (relative to those who were avoidant or preoccupied)

reported free-response explanations that reflected confidence in the relationship and responses that did not portray the partner as rejecting (i.e., more positive attributions for the behavior). Security also related to more benign self-reported attributions on the RAM.

A follow up study (Collins et al., 1996, Study 2) examined only participants who were in relationships and asked them to imagine situations with their own romantic partner. Preoccupied attachment (relative to avoidant or secure attachment) predicted greater negative attributions on the RAM; however, no attachment differences were found in free-response attributions. Overall, the results for participants imagining their own partner were not as strong as those for participants imagining a future partner. Although the strength of effects differed between the two studies, the interpretability of this difference is clouded because more than half of the participants in Study 1 were in current relationships. Thus, even though participants were asked to make attributions about future partners, it could have been difficult for some participants to disentangle cognitions about their actual partners from those about imagined future partners.

In one creative study of college students (Mikulincer, 1998), participants read vignettes about negative interactions between romantic partners. Participants also received background information on the partner, the relationship, and the context of the interaction. The researchers experimentally manipulated the background information to portray the partners' actions in the scenarios as hostile, ambiguous, or non-hostile, and then they asked participants to report on the partners' intentions. The authors found a main effect of attachment insecurities, such that across all scenarios, anxious and avoidant participants made more negative attributions than secure participants. When examining interactions between attachment dimensions and scenario types, they found that there were no attachment differences in the extent to which participants made hostile attributions about the partner in the hostile condition. In the ambiguous condition,

however, both anxious and avoidant participants reported more hostile intentions than did secure participants. In the non-hostile condition, the avoidant participants attributed more hostile intent to the imagined partners relative to the secure and anxious participants. Given that participants were imagining scenarios with unknown partners and the background context was described, we interpret this study as measuring attribution *biases*, not participants' partners' characteristics or behaviors.

Another study of a mixed sample of participants in and not in relationships (Pereg & Mikulincer, 2004) found that college students' attachment anxiety (but not avoidance) predicted globality and stability attributions about a hypothetical partner who did something negative. One study of a mixed relationship status sample of college students (Feeney, 2004) found null results. Neither attachment anxiety nor avoidance predicted intentionality attributions for events wherein their partners or previous partners hurt their feelings.

Five studies examined links between attachment and attributions in samples of participants who were all in relationships at the time of data collection. One study (Collins et al., 2006) used the RAM vignettes and original vignettes to examine links among college students' attachment anxiety and avoidance, attributions, and emotional and behavioral reactions to partners' transgressions. In Study 1, participants rated how much they endorsed benign and negative reasons for partners' negative behaviors (e.g., "imagine your partner didn't comfort you when you were feeling down"). Researchers also asked participants how distressed they would be in response to the event, and how they would respond. Findings revealed that anxiety (but not avoidance) predicted negative attributions, and negative attributions explained indirect effects of attachment anxiety on negative self-reported responses to the behaviors and on greater feelings of distress in response to the events. It is interesting to note that half were asked to imagine their

partner and half were asked to imagine a hypothetical partner. Similar data patterns emerged for both groups, so the groups were pooled together in the final analyses. The lack of group differences was perhaps due to participants drawing on actual experiences with their current partners, even when asked about hypothetical partners. In a second study, Collins and colleagues (2006) examined vignettes about positive behaviors (e.g., "your partner brought you dinner when you were sick"). Authors found that avoidance predicted fewer positive attributions (e.g., "my partner is a caring person") for their partners' positive behaviors. This data pattern held for anxiety as well, but only for participants with low relationship satisfaction.

One longitudinal study examined attachment, attributions, and forgiveness using the RAM (Kimmes & Durtschi, 2016). They found that attachment anxiety and avoidance predicted negative attributions seven weeks later. Further, negative attributions at the second timepoint mediated links between initial attachment insecurities and low forgiveness for their partners' transgressions fourteen weeks later.

A cross-sectional follow up study (Kimmes et al., 2017) examined links between young adults' attachment anxiety and avoidance and their attributions about their own partners. They combined responsibility and causal attributions from the RAM to create a single benign attributions factor. Findings revealed a negative direct effect of both anxiety and avoidance on benign attributions. Interestingly, there was also an indirect effect of anxiety and avoidance on benign attributions through mindfulness, such that participants with attachment insecurities were less mindful, and lower mindfulness, in turn, related to less benign (i.e., more negative) attributions. Another cross-sectional study (Sümer & Cozzarelli, 2004) asked participants to make attributions about problems that were specific to their relationship. They found that negative working models of themselves in the RQ related to negative attributions. Negative

working models of their partner, however, did not. Further, negative attributions explained an indirect link between negative models of themselves and poor relationship satisfaction.

Some studies examined links between attachment and negative attributions in couples. One study of couples examined only actor effects. Hazelwood (2012) found that attachment anxiety and avoidance in both men and women predicted their negative RAM attributions. Negative attributions, in turn, predicted perceptions that the partner was not putting much effort into the relationship. The remainder of studies we review examine both actor and partner effects. For instance, one study (Whisman & Allan, 1996) found that men's own attachment anxiety (but not avoidance) was related to greater negative causal attributions on the RAM (e.g., endorsing that the cause was due to something about the partner and was not likely to change) and women's own attachment anxiety (but not avoidance) related to greater responsibility attributions (e.g., endorsing that the behavior was intentional). There were no partner effects of anxious or avoidant attachment on causal or responsibility attributions, such that one partner's insecurities did not relate to the other partner's attributions. Individuals' own negative attributions were related to their own reports of poor relationship adjustment, and men's low relationship adjustment related to women's greater responsibility attributions. Further, women's responsibility attributions predicted breakup six months later.

One study of couples examined negative attributions both about vignettes from the RAM and about their partners' behaviors in a lab conflict task. Findings revealed many actor and partner effects. Women's attachment anxiety related to their own attributions about the vignettes, and their partners' attributions during the conflict task. Men's attachment anxiety related only to their own negative attributions about the vignettes. Women's avoidance predicted their own negative attributions about the vignettes and about the behavior in the conflict task, but not their

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partners' attributions in either context. Finally, men's avoidance related to their partners' negative attributions about the vignettes (Pearce & Halford, 2008). Further, negative attributions mediated links between attachment insecurities and negative self-reported (but not observed) communication.

Gallo and Smith (2001) examined main effects of attachment on attributions, and the interactions between partners' attachment and their attributions in married couples. Husbands' attachment anxiety related to their wives' and their own negative attributions, and wives' anxious attachment predicted their husbands' negative attributions, but not their own. Husbands' attachment avoidance predicted only their own negative attributions, and wives' avoidance did not predict either their husbands' or their own negative attributions. There were interactions between wives' and husbands' attachment anxiety in predicting husbands' and wives' negative attributions. More specifically, the effects of husbands' and wives' anxiety on their partners' negative attributions was stronger when both the wives and husbands had high attachment anxiety. Further, husbands' negative attributions explained an indirect link between husbands' avoidance and their perceptions of support in the marriage.

Two studies examined actor and partner effects of attachment on attributions longitudinally. One study (Chandler & Lawrence, 2021) specifically examined spouses' attributions about the cause of intimate partner violence (IPV, e.g., "during an argument, your spouse pushes you.") Both husbands' and wives' initial avoidance predicted the average of their own internality and intentionality attributions about the IPV across the next seven years. Wives' higher intentionality attributions, in turn, related to their and their husbands' later psychological aggression. Anxious attachment didn't predict attributions. Kimmes and colleagues (2015) examined longitudinal actor and partner effects of attachment anxiety on an SIP composite

(spouses' negative attributions and negative expectations of each other). Both husbands' and wives' initial levels of attachment anxiety predicted their own negative SIP two years later. Further, negative SIP mediated actor effects of both wives' and husbands' attachment anxiety on their own relationship satisfaction one year later.

Summary

In summary, research consistently shows links between attachment and attributions that span across developmental stages. Further, longitudinal work consistently finds that these effects are enduring. For example, infant insecure attachment predicted negative attribution biases about peers at 5 (Suess et al., 1992) and 8 years old (Zajac et al., 2020), 3-year-olds' insecure attachment predicted negative attribution biases about peers in first grade (Raikes & Thompson, 2008), and adults' insecure attachment predicted negative attributions across the next seven years (Chandler & Lawrence, 2021). However, some longitudinal work does yield null results (e.g., Cassidy et al., 1996, Study 1; Ziv et al., 2004).

Although there are only a few published studies with *entirely* null results regarding attachment and attributions (e.g., Feeney, 2004), there are many studies that reveal only links for one or two specific types of insecure attachment, and the pattern of results is inconsistent. For example, some studies of children find links only for avoidance (Suess et al., 1992) some for only resistance (Raikes & Thompson, 2008) and some for only disorganization (Zaccagnino et al., 2013; Zajac et al., 2020). There is not a strong enough pattern in the child and adolescent attributions literature to have confidence in whether one specific attachment predictor has the strongest relation with negative attribution biases (relative to the others), or whether all relate to negative attribution biases similarly. In adults, the majority of studies find significant effects for both dimensions of insecurity (e.g., Hazelwood, 2012; Kimmes & Durtschi, 2016; Whisman &

Allan, 1996). Some studies of adults, however, find effects of only one dimension (Chandler & Lawrence, 2021, avoidance; Collins et al., 2006, anxiety). We cautiously interpret these findings as indicating that both anxiety and avoidance are predictors of negative attributions in adults.

Although attachment appears to consistently relate to negative attribution *biases* about peers, it is unclear whether attachment relates to negative attribution *biases* about romantic partners. Again, this is due to the methodological limitation of measuring attributions about one's own romantic partner, as opposed to those about a hypothetical person. A few studies do provide some evidence of an attribution *bias* in adult romantic relationships (i.e., Collins et al., 1996; Fitter, 2020; Mikulincer, 1998). Findings from studies that provide some evidence of a bias about romantic partners, consistent evidence that attachment links to attribution biases about peers, and strong subject matter theory (Bowlby, 1969/82, 1973, 1980, 1988) lead us to cautiously interpret that links do exist between attachment and attribution *biases* about romantic relationships. Yet more research with different methodologies is necessary to tease apart negative attribution biases from potentially accurate experience-based assessments of real partners' intentions.

Limitations, Gaps, and Open Questions

Decades of research and strong subject matter theory reveal a connection between attachment and attributional processes. There are, however, limitations to such research and many unanswered questions about the nature of this connection.

For instance, there has been no longitudinal work examining links between attachment and attributions that spans from childhood to adolescence or to adulthood. Longitudinal work is crucial for understanding developmental timing of when attachment exerts its effects on attributional processes. On the one hand, perhaps there is an enduring link of early attachment on

later attributional processes, such that early insecurity generates risk for a lifetime of negative attributions in both peer and romantic relationships. On the other hand, it is possible that early insecurity only affects attribution biases about peers early in life, and the continuation of negative attribution biases throughout the lifespan are dependent on later social experiences.

Longitudinal work on attachment and attributions has the potential to be incredibly useful in answering questions about *how* early attachment to caregivers contributes to attachment insecurity throughout the lifespan and to negative relationship outcomes. Research shows moderate stability of attachment insecurity across time (e.g., Groh et al., 2014) and links between insecurity with caregivers and poor-quality adult romantic relationships (Salvatore et al., 2011), yet many questions about mechanisms through which these connections occur remain open. It is possible that attribution biases could perpetuate negative relationship dynamics across time. Insecure children hold negative IWMs of caregivers that can generalize to affect global negative IWMs of others. Insecure IWMs, in turn, contribute to negative attribution biases that can guide negative behaviors in peer and romantic relationships throughout the lifespan. Negative behaviors can then lead to poor quality relationships with later attachment figures and perpetuate insecurity throughout the lifespan.

Attachment is measured and conceptualized inconsistently across studies about child and adolescent attachment and attribution biases about peers. Some studies utilize continuous measures of security with specific parents (e.g., Dwyer et al., 2010), some examine differences across the four insecure classifications (e.g., Raikes & Thompson), and some dichotomize attachment and compare organized children to disorganized children, and secure children to insecure children (Zajac et al., 2020). More consistency in how attachment is conceptualized and measured across studies about attachment and children and adolescents' attributions would help

the field compare findings across studies and draw general conclusions. More specifically, consistency of measurement across multiple large samples could help researchers determine which types of insecure attachment in children and adolescents predict attribution biases about peers.

Further, although it is traditional to use categorical measures of attachment, categorizing variables truncates variance and limits researchers' ability to detect statistical effects. Utilizing continuous attachment measures (e.g., the Attachment Q-set [AQS; Waters & Deane, 1985], continuous dimensions of attachment patterns in the strange situation [Richters et al., 1988; Van Ijzendoorn & Kroonenberg, 1990], the Kerns Security Scale [Kerns et al., 2001]) would capture maximum variability and allow researchers more power to detect statistical effects.

Measures of attachment and attributions are fairly consistent in the literature regarding adults' attributions about romantic partners. There is, however, a methodological limitation that should be addressed in future research. Future research should examine attributions about *hypothetical* romantic partners in adults and adolescents who are *not in relationships*. If participants do not know the people they are making attributions about, they must rely on their attributional tendencies (as opposed to lived experiences) when deciding on the intent of others' behaviors. Only then can researchers more precisely examine the links between attachment and biased attributional processes.

It is important for future research to further emphasize the role of context when examining links between attachment and attributions. For example, in Zajac and colleagues' (2020) high-risk sample, there was a surprising finding that attribution biases didn't differ between secure and insecure children. Children with a disorganized attachment, however, had more negative attribution biases than children with any of the three organized attachments. This

surprising finding may reflect that hostile attributions are so adaptive in high-risk environments, that typical variations in attachment security have no effect, whereas more extreme variations in attachment security (i.e., disorganization) do. It is possible that sensitive parenting in high-risk environments involves teaching children vigilance towards the negative intentions of others in service of protecting them from threat (Dunbar et al., 2017). In this case, even caregivers who behave in ways that foster attachment security could contribute to their children's hostile attribution biases. Additional research on attachment and attributions in high-risk samples is necessary to test this theory and understand how such links may differ across contexts.

Another gap is that the majority of literature on attachment to parents and children's attributions examines only mother-child attachment. The three studies that specifically examined father-child and father-adolescent relationships revealed conflicting findings; two revealed no effects of attachment to fathers on attributions about peers (Simons et al., 2001; Suess et al., 1992), whereas one study of adolescents revealed that only girls' but not boys' insecure attachment to their fathers related to negative attributions about peers (Dwyer et al., 2010). The field would benefit from more research on the role of attachment to fathers on attributional processes to expand upon this work and resolve conflicting findings.

Although much research suggests that insecure working models of parents may be generalizing to affect biased cognitions about peers, the field could benefit from more research on how insecure working models generalize across additional relational domains. For instance, questions remain open about how insecure attachment to best friends predicts attributions about romantic partners and how adolescents' insecure attachment to early romantic partners predicts adults' negative attributions about their later romantic partners. Further, little is known about how insecure attachment to parents relates to adolescents' attributions about romantic partners

(see Fitter, 2020, for one study), an important process to understand given adolescence is a sensitive period for social development (Blakemore & Mills, 2014) and poor relationship dynamics in adolescence can set in motion negative cascades that affect later relationship functioning.

Often, researchers examine attributions as a mediator of links between insecure attachment and negative outcomes, such as depression (Margolese et al., 2005), low friendship quality (Chen et al., 2019), and poor relationship satisfaction (Sumer & Cozzarelli, 2004). More research, however, is needed on what mediators explain links between attachment and attributions (see Kimmes et al., 2017, for one study), such as emotion regulation deficits, poor peer relations, or negative experiences in romantic relationships.

Although subject matter theory suggests that there is a causal link between insecure attachment and negative attributions about peers and romantic partners (Bowlby, 1969/82, 1973, 1980, 1988; Crick & Dodge, 1994; Dykas & Cassidy, 2011), the field lacks studies that warrant this causal interpretation. Solutions to this problem include utilizing experimental security priming (Gillath & Karantzas, 2019) and causal inference methods (Pearl, 2010). Researchers could utilize security priming—temporarily activating a secure mental representation—and vignette-based attribution bias measures to determine whether feelings of security could reduce negative attributions. Further, researchers could utilize graphical causal modeling from a causal inference framework (Pearl, 2010) to identify causal effects as best as possible within the constraints of observed variables. Non-experimental causal inference methods are growing in popularity, and are already widely used in the fields of sociology and economics (see Grosz et al., 2020, for further explanation of causal inference methods in non-experimental studies).

Additionally, more research on developmental changes in links between attachment and attributions is needed. In particular, future work could consider the effects of puberty on adolescents' attributional processes. Research in humans and animals has suggested that the onset of puberty could open a sensitive period for adolescents' cognitive and emotional development (Laube et al., 2020). Increases in sex hormones relate to the maturation of neural structures related to cognitive control (Laube et al., 2020). Such maturation could enhance adolescents' cognitive flexibility, such that adolescents are able to consider both hostile and benign intentions of social partners and make attributions more carefully than children can. On the other hand, research demonstrates that puberty relates to increases in emotional reactivity (Silk et al., 2009; Spear, 2009) and structural changes in neural regions involved in emotion regulation (Goddings et al., 2014), possibly contributing to adolescents relying on emotion-driven primary appraisals to make attributions about social partners behaviors. Such emotion-driven processing could occur in lieu of careful consideration of both benign and hostile intentions. It is possible that security could mitigate the negative effects and enhance the positive effects of puberty onset on attributions. Future research could help determine how pubertal changes and security work together to affect attributional processes, and whether the onset of puberty is a particularly important time to implement attachment-based interventions.

Finally, as is the case when drawing conclusions about any body of work, it is crucial to consider the file drawer problem—null findings going unpublished, thus inflating the collective type 1 error across published studies (Rosenthal, 1979). It is impossible to rule out the possibility that the seemingly well-replicated links between attachment and attributions are less consistent than they appear in published literature.

Clinical Implications

Fortunately, making attributions is a malleable cognitive process that clinicians can work to change, as indicated by the multitude of studies wherein therapy changes negative attributions. For example, researchers developed a successful cognitive behavioral therapy (CBT) protocol for families at high risk for child abuse (Bugental et al., 2002; Bugental & Schwartz, 2009). The therapy was aimed at changing parents' negative attributions by countering misattributions in reading children's cues. For example, therapists would counter cognitions that children are crying with hostile intent or crying because they are angry with their parents. Clinicians would help parents generate causal attributions for their children's behavior until the parent came up with a benign cause. This intervention significantly reduced negative parenting behaviors such as child neglect, physical abuse, and non-abusive corporal punishment. The program's success indicates that attributions are indeed malleable, and that there may be a causal effect of changing attributions on changing negative behaviors.

Attribution-based interventions exist for romantic relationships as well. For example, one group of researchers (Hrapczynski et al., 2012) examined a protocol to reduce negative attributions in adult couples. This therapy used re-attribution techniques to counter individuals' negative attributions about their partners' behaviors. For example, if someone made an attribution that their partner was behaving a certain way because of a stable negative trait, the therapist would counter this negative attribution by reminding the participant of moments of variability in the partner's behavior. They would then ask the person to think of some alternate explanations for the behavior. This therapy was indeed effective in decreasing negative attributions. Decreases in negative attributions from pre to post treatment related to pre-post treatment improvements in relationship satisfaction and communication (Hrapczynski et al., 2012). This program's success provides further evidence that attributions are a worthy

intervention target; it suggests that attributional processes are malleable and that changing attributions can help change negative behaviors in relationships.

In addition, repeated security priming interventions may be useful in reducing negative attributions. For instance, research has indicated that repeated security priming is effective in improving self-esteem and decreasing attachment anxiety (Carnelley & Rowe, 2007). It is possible that it could also be effective at improving attributional processes, although it is important to work towards establishing a causal link between attachment and attributions before clinicians can have confidence that security priming would be effective in targeting negative attributions. The success of previous programs aimed at reducing negative attributions (e.g., Bugental et al., 2002) coupled with consistent evidence that attachment is linked to attributional processes (e.g., Hazelwood, 2012; Raikes & Thompson, 2008) suggests that attribution-based therapies could be particularly effective for those with insecure attachments. Further understanding of attachment processes behind negative attributions (e.g., understanding *which* types of insecurity are most strongly associated with negative attributions, understanding what factors *mediate* links between attachment and negative attributions) could help refine attribution-based interventions for insecure individuals.

Conclusion

Navigating the social world can be difficult, especially when entering new social situations with pre-existing negative socio-cognitive biases about others. Such negative biases can contribute to self-fulfilling prophecies wherein SIP elicits negative interactions with social partners (see E. Loeb et al., 2016, for evidence of SIP-related self-fulfilling prophecies in adolescence) and developmental cascades wherein negative SIP worsens social relations over time (see Lansford et al., 2011, for evidence in children). Negative attributions could be a

particularly harmful aspect of SIP for social functioning (Crick & Dodge, 1994; Fincham & Bradbury, 1992). Improving our understanding of antecedents and consequences of negative attributions from an attachment perspective can guide clinicians in eliminating self-fulfilling prophecies and negative cascades in order to promote positive social functioning across the lifespan.

Chapter 3: Links Between Adolescents' Attachment and Peer Acceptance: The Role of Negative Expectations

Abstract

Considerable research has linked insecure attachment to poor peer relations and indicated that negatively biased social information processing (SIP) could be a mechanism explaining this link. The present study examined one underexplored element of SIP as a potential mechanism: negative expectations of peers' behaviors. 2100 eleventh-grade students (61.2% female, *Mage* = 16.55, *SD* = 0.64) completed self-report measures of attachment style and expectations and received sociometric ratings from peers. Findings revealed that insecure adolescents held negative expectations for how peers would treat them, and negative expectations explained indirect links between insecure attachment styles and low peer-reported acceptance. Results highlight the importance of considering expectations when evaluating why insecure attachment predicts poor peer relations. Self-fulfilling prophecies and clinical implications are discussed.

Introduction

Abundant research indicates that insecure attachment—lack of confidence in the supportive responsiveness of close relationship partners and lack of comfort relying on them—relates to poor social functioning with peers (Groh et al., 2014; Khan et al., 2020; Pallini et al., 2014). Yet, questions about why such a connection exists still remain. Researchers have proposed a variety of mechanisms to explain this link, such as emotion regulation (Contreras et al., 2000), empathy (Shaver et al., 2016), and social information processing (SIP; Dykas & Cassidy, 2011; Simons et al., 2001). The majority of empirical work examining the role of SIP concentrates on negative attributions—tendencies to attribute social partners' ambiguous behaviors to negative intentions or characteristics (e.g., Dwyer et al., 2010; Simons et al., 2001). There is, however, one potentially crucial element of SIP that is neglected in research examining pathways from attachment to peer relations: *negative expectations*.

Longitudinal work demonstrates that expectations, particularly in adolescence, have downstream consequences for individuals' social well-being (Loeb et al., 2016; Loeb et al., 2018). Findings may reflect adolescents' negative expectations leading to negative behaviors and eliciting negative reactions from peers. Such negative reactions could worsen expectations and contribute to a cascade of negative peer relations throughout the lifespan. The essential role that peers play in fostering adolescent well-being (Parker et al., 2006; Rubin et al., 2006a; Rudolph et al., 2020) makes it important to study information-processing components that put adolescents at risk for poor peer relations. The present study examines the role of adolescents' negative expectations for peers' behaviors toward them in explaining links between adolescents' attachment style (attachment anxiety and attachment-related avoidance) and their acceptance by peers.

Attachment and Expectations

Expectations about others' social behaviors are perhaps the least studied component of SIP. SIP refers to the cognitive processes through which adolescents make sense of their social worlds, such as memory, attention, attributions, and expectations (Dykas & Cassidy, 2011). Although SIP is multifaceted, core contributors to all its components are thought to be what Bowlby (1969/1982, 1980) defined as internal working models (IWM). According to attachment theory, IWMs contain individuals' beliefs about themselves and others stemming from experiences with close relationship partners (Bowlby, 1969/82,1980; Mikulincer & Shaver, 2016). When an individual's close relationship partners are insensitive and rejecting towards them, the individual develops negative IWMs—beliefs that others cannot be trusted and that they themselves are not worthy of care. As such, it is theoretically expected and empirically documented (Dykas & Cassidy, 2011) that such negative IWMs, also conceptualized as insecure attachment, cast a negative shadow on ambiguous social information. More specifically, much research focuses on links between attachment insecurity and a variety of SIP components such as individuals' attention allocation in social situations (Dewitte & De Houwer, 2008), subjective perceptions of social situations (Overall et al., 2015), attributions about social partners' actions (Collins et al., 2006; Dwyer et al., 2010; Zajac et al., 2020), and biased memories of social interactions (Dykas et al., 2014; Miller et al., 1999).

The few extant studies of attachment and negative expectations of others' behaviors examine processes in adulthood and early adolescence. One study revealed that adults with a secure attachment style had more positive self-reported and implicit expectations regarding their own romantic partners compared to their insecure counterparts (Baldwin et al., 1993); A follow-up study found converging evidence regarding relationship-specific attachment, such that adults had

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positive expectations of relationship partners to whom they were securely attached and negative expectations of relationship partners to whom they were insecurely attached (Baldwin et al., 1996). Similarly, in another study, young adults with a secure attachment style reported more positive expectations of close friends (You & Malley-Morrison, 2000). Although such studies of adults provide convincing evidence that insecurity is somehow linked to negative expectations, they all contain one limitation that merits attention: They examine expectations of *known* social partners, as opposed to *unknown*. Thus, negative *expectations* in such studies are confounded by the negative *interactions* that insecurely attached individuals may have already experienced in these close relationships (Feeney, 2016) and are using to make logical predictions about future experiences in these relationships. Therefore, it is unclear whether it is the expectations or the experiences that are reflected in measurements.

A few studies concerning attachment and expectations do not suffer from this limitation. A series of *experimental* studies revealed that priming young adults by temporarily activating a secure mental representation of attachment led participants to endorse more positive expectations of nonspecific others' trustworthiness and dependability (Carnelley & Rowe, 2007; Rowe & Carnelley, 2003). Further, one study found that early adolescents in Taiwan who were insecurely attached to their fathers (for both boys and girls) and mothers (for boys only) reported negative expectations when responding to vignettes about unknown peers in ambiguous situations (Liu, 2008). One particularly compelling study examined relations between attachment representations of parents and a physiological correlate of expectations (White et al., 2021). Researchers determined that preschoolers' more positive representations of parents related to their greater cardiac slowing (typically associated with *unexpected* rejection) when rejected during a lab-based exclusion paradigm (Cyberball; Williams et al., 2000).

Although little research to date has examined the link between attachment and expectations (especially those regarding nonspecific others' behaviors) *directly*, findings from related research underscore the possibility of such a link. In the following section, we consider three social-cognitive constructs that substantially reflect expectations: rejection sensitivity, negative attributions, and secure base scripts. The presence of links between attachment and such constructs offer support for the hypothesis that attachment may link to expectations.

First, *rejection sensitivity* (RS) is characterized by tendencies to expect rejection (Downey & Feldman, 1996). Given that insecure attachment reflects negative beliefs about others (e.g., as rejecting) and about oneself (e.g., as a person others would want to reject), it is unsurprising that empirical work reveals links between attachment insecurity and rejection sensitivity. For example, one study found that young adolescents who were insecurely attached to their mothers experienced high levels of rejection sensitivity (Natarajan et al., 2011), and another revealed that young adults' insecurity was related to their earlier levels of rejection sensitivity (Hafen et al., 2014).

A second related construct is *negative attributions* about the intentions and characteristics of others, which are thought to drive expectations of social partners' behaviors (Nasby, 1980). Indeed, attributions of another person's intent are linked to expectations about that person's behavior as early as infancy (Woodward, 1998), and continue into adulthood (Stephanou, 2012). A large body of literature indicates that insecurely attached individuals make negative attributions (e.g., Dwyer et al., 2010; Raikes & Thompson, 2008; Zajac et al., 2020).

A third related construct is *secure base scripts*—schemas of how *attachment-related* events will unfold, particularly when an individual is in distress (Bretherton, 1985, 1987; Waters & Waters, 2006). High secure base script knowledge is defined by the expectation of receiving

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sensitive responses from close relationship partners in times of distress; those who lack such

expectations may instead have negative expectations of how others would generally behave.

Indeed, a body of literature indicates that insecurely attached individuals have low secure base

script knowledge (Dykas et al., 2006; Mikulincer et al., 2009).

In sum, a combination of direct and indirect correlational and experimental findings suggest

that attachment may predict negative expectations. It is critical to understand what predicts

negative expectations because of their negative consequences.

Expectations and Peer Relations

Longitudinal work suggests that negative expectations have downstream consequences

for social functioning. One notable series of longitudinal studies highlights the role of negative

expectations in predicting subsequent peer relations (Loeb et al., 2016; Loeb et al., 2018). In a

study of young adolescents, participants read vignettes about ambiguous negative situations with

unfamiliar peers and were asked how they expected the peer to respond. In late adolescence,

these same participants were observed interacting with a close friend. Participants with greater

negative expectations of others experienced increases in submissive behavior with friends

throughout adolescence. In turn, submissiveness with friends in late adolescence mediated the

link between negative expectations in early adolescence and self-reported poor social functioning

in early adulthood (Loeb et al., 2016). A follow-up study revealed that young adolescents with

greater negative expectations were more likely to have friends and romantic partners with

negative characteristics in late adolescence. Specifically, negative expectations in young

adolescence predicted close friends' aggressive attitudes and romantic partners' displays of

hostility in a conflict task (Loeb et al., 2018). Another longitudinal study found that

preschoolers' greater cardiac slowing (an indicator of *unexpected* rejection) after being rejected

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in the lab-based social exclusion paradigm predicted fewer problems with peers at school age (White et al., 2021).

Even stronger evidence for the role of expectations in predicting social functioning emerges from experimental research. One creative study of children demonstrated a causal effect of expectations on children's social behaviors. Children first briefly met a group of unfamiliar peers. Next, a randomly selected half of the participants were given a message (that the peers enjoyed meeting them and were looking forward to playing with them again) aimed at inducing positive expectations of peer acceptance; the remaining participants received no such message. The children who had been led to believe they would to be accepted were better liked by the peers in a later play session and displayed more social competence when interacting with peers compared to other children (Rabiner & Cole, 1989). Relatedly, priming adults' positive expectations of others' supportive responses increases individuals' willingness to seek support from relationship partners in a stressful situation (Pierce & Lydon, 1998) —an important skill that fosters positive relationship functioning (Allen & Tan, 2016; Loeb et al., 2020).

In addition, findings from research on the social-cognitive constructs described above (RS, negative attributions, and secure base script knowledge) provide indirect evidence that negative expectations generate risk for poor peer relations. For example, RS predicts social withdrawal (London et al., 2007), aggression toward peers and romantic partners (Bondü & Krahé, 2015; Downey et al., 1998a; Downey et al., 2000), increases in loneliness (London et al., 2007), low friendship quality (McLachlan et al., 2010), negative behaviors in romantic relationships (Downey et al., 1998b; Hafen et al., 2014), and rejection from peers and romantic partners (Downey et al., 1998b; McLachlan et al., 2010). Additionally, hostile attribution biases are associated with a variety of peer relationship difficulties, such as aggressive behavior (see

Martinelli et al., 2018, for a review), rejection by peers (Lansford et al., 2011; Rah & Parke, 2008) and negative interactions with close friends (Chen et al., 2019). Further, low secure base script knowledge relates to lower social competence (Posada et al., 2019; Psouni et al., 2015) and greater externalizing behaviors (Fernandez et al., 2019; Waters et al., 2015).

Limitations to the Field's Understanding of Links Among Attachment, Expectations, and Peer Relations

Some notable gaps remain in the field's understanding of the possible pathway from insecure attachment to poor peer relations through negative expectations. First, no research, to our knowledge, directly examines expectations, a central component of SIP (Crick & Dodge, 1994; Dykas & Cassidy, 2011; Lemerise & Arsenio, 2000), as a mechanism on the pathway from attachment to peer relations. Second, there is limited research on relations between adolescents' negative expectations and the two insecure attachment *style* dimensions: attachment anxiety (characterized by preoccupation with relationships and fears of rejection) and attachment-related avoidance (characterized by discomfort with closeness and with relying on relationship partners for support). Instead, the majority of direct and indirect research on links between attachment and adolescents' expectations examines the predictive role of attachment to a *specific parent* (typically the mother). Given that attachment style reflects individuals' current thoughts and emotions about close relationships in general, it is probable that an adolescent's attachment style is more relevant than attachment to a specific parent to how adolescents expect nonspecific others to behave. Examining the roles of both attachment style dimensions, anxiety and avoidance, will allow for specific identification of differential associations with risk for adolescents' negative expectations. Moreover, there is limited research on how negative expectations relate to one important aspect of peer relations: acceptance by peers. It is crucial to

identify antecedents of peer acceptance because of the well-established negative consequences of low peer acceptance (Hymel et al., 2002). For instance, low peer acceptance links to greater risk of school dropout, committing crimes, psychopathology, low school engagement, and loneliness (Kingery et al., 2007; Parker & Asher, 1987).

Filling gaps in the field's understanding of relations among expectations, attachment style, and peer acceptance is particularly important within the window of *adolescence.* During adolescence, peers become important sources of emotional support and targets with whom to practice providing emotional support (Allen & Tan, 2016; Rubin et al., 2006a). Further, interactions and affiliations with peers facilitate adolescents' positive identity development (Ragelienė, 2016; Rubin et al., 2015). In sum, there is strong evidence that quality of relationships with peers in adolescence predicts later well-being (Allen & Tan, 2016; Parker et al., 2006; Rubin et al., 2006a; Rudolph et al., 2020).

The Present Study

The present study addresses the need to further examine negative expectations as a mechanism of the well-established pathway from attachment to peer relations (Pallini et al., 2014), not only for the purpose of contributing to attachment theory and SIP theory, but also because expectations are a *tangible intervention target* for cognitive behavioral therapies, in which negative expectations can be challenged. The present study addresses gaps in the literature on adolescence, an important period of social development. It examines adolescents' negative expectations about unknown peers' behaviors as a potential mechanism through which attachment anxiety and avoidance relate to low peer acceptance.

To address our aims, we conducted sociometric assessments in a large sample ($N = 2100$) of eleventh graders from high schools in the Washington, DC metropolitan area. We

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hypothesized that (a) adolescents' attachment insecurities (measured in terms of attachment anxiety and attachment-related avoidance) would relate to more negative expectations regarding unknown peers' behaviors, and (b) negative expectations would explain indirect links between attachment insecurities and low peer-reported sociometric acceptance, such that greater attachment insecurities would relate to more negative expectations, and negative expectations would in turn relate to lower peer acceptance. We utilized a measured variable structural equation modeling (SEM) approach to test our hypotheses. We selected vignette-based measures depicting ambiguous situations with unknown peers because such measures allow us to isolate and measure adolescents' expectations. Because our adolescent participants lacked pre-existing knowledge about the specific peer in question, their predictions cannot simply reflect past experiences with specific peers. Therefore, a prediction that the peer would behave negatively likely reflects a set of general negative expectations rather than memories of specific experiences with specific people.

Method

Participants

Participants were 2100 eleventh-grade students (Mage = 16.55, SD = 0.64, 61.2% identified as female)[1] enrolled in a larger study of adolescent attachment and social development (see Dykas et al., 2008). Adolescents were recruited from 8 public high schools in the Washington metropolitan area. The number of participants per school ranged from 11 to 488 (M = 263, SD = 169). The sample was racially diverse, with adolescent race as follows: 65.1% White, 15.3% Black of African American, 15% Asian, 4.5% Hispanic / Latinx. Less than 1% of

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[1] All demographics reflect percentages of adolescents who reported (n reported gender = 2071, n reported race = 2007, n reported parent marital status = 1779, n reported age = 1590).

adolescents *(n* = 1) endorsed "other." The majority of adolescents' parents were married

(75.7%).

Procedures

Data collection occurred in the spring of participants' eleventh-grade year. After

obtaining parental consent, adolescents completed questionnaire packets during two 50-minute

data collection sessions in their classrooms. During classroom visits, adolescents completed

questionnaires about their attachment style, expectations of peers, demographics, and measures

unrelated to the present study. In addition, adolescents completed a sociometric assessment of

participating classmates.

Measures

Attachment Style Dimensions

Adolescents completed the Experiences in Close Relationships scale (ECR; Brennan et

al., 1998), a 36-item self-report measure of the two dimensions of attachment style: attachment

anxiety and attachment-related avoidance. The anxiety dimension reflects individuals' fear of

rejection and abandonment by close relationship partners (18 items, e.g., "I worry about being

rejected or abandoned," "I worry that others won't care about me as much as I care about them");

the avoidance dimension reflects individuals' feelings of discomfort with intimacy in close

relationships and with relying on relationship partners for support (18 items, e.g., "I get

uncomfortable when someone wants to be very close to me," "I prefer not to show others how I

feel deep down"). Adolescents rated each item on a 7-point scale from 1 ("strongly disagree") to

7 ("strongly agree"). Following Brennan and colleagues (1998), some subscale items were

reverse scored (e.g., "I do not often worry about being abandoned," "I feel comfortable sharing

my private thoughts and feelings with others") so that higher scores reflect greater anxiety and

greater avoidance. Attachment anxiety and avoidance composite scores were calculated by averaging responses across subscale items. Excellent internal consistency was attained (anxiety ω = .90, avoidance, ω = .90).

Negative Expectations of Peers' Behaviors

Adolescents completed an adapted version of the Children's Expectations of Social Behavior Questionnaire – Peer version (CESBQ-P; Rudolph et al., 1995; adapted by Cassidy & Woodhouse, 1997) to assess their negative expectations regarding peers' behaviors. The questionnaire presents 15 vignettes about situations that may arise with peers (e.g., "You're feeling kind of upset about something that happened one morning at home and you decide to try and talk about it with a friend"). For each vignette, adolescents were presented with four possible outcomes and asked to select the statement that "best tells what the other teens might do if this really happened." The four responses reflected adolescents' expectations of comfort and support (e.g., "My friend might listen to my problem and try to make me feel better"; 1 point), neutral expectations ("My friend might say they were headed somewhere right now, but maybe we could talk later"; 2 points), expectations that peers would display indifference or avoidance of the situation (e.g., "My friend might just ignore me and walk away"; 3 points), or expectations of overt hostility and/or rejection ("My friend might tell me that I always seem to have problems and that I should stop bothering them"; 4 points). An index of negative expectations was calculated by summing points across all 15 items. Possible scores ranged from 15 (*low negative expectations of peers*) to 60 (*high negative expectations of peers*). The scale displayed good internal consistency (ω = .79).

Peer Acceptance

Adolescents' peer acceptance was assessed using a sociometric instrument created by Asher and Dodge (1986). Each adolescent received a randomly generated roster with the names of 75 eleventh graders in the adolescent's school that were also participating in the study (referred to here as "classmates"). Each adolescent's name appeared on at least 75 rosters. Rosters were nested within high schools, such that students had the opportunity to provide information only about their own classmates. Participants were asked to rate "the extent to which you like to be in activities with the following students'' for each classmate on a 5-point Likert-type scale ranging from 1 ("not a lot") to 5 ("a lot"). Participants did not rate classmates whom they did not know (i.e., participants could select "I do not know this person"). The mean number of ratings each participant received was 42.75 (*SD* 14.73, range 0 - 82). Peer acceptance scores were generated by calculating the mean of each adolescent's *classmates'* ratings of how much they like to be in activities with the adolescent in question and standardizing within the adolescents' school. Participants with more ratings had higher peer acceptance scores ($r = .21$, p < .001). This instrument has strong construct validity; previous research revealed that peer acceptance relates to reciprocated friendships, popularity, prosocial behavior, and less aggression (e.g., Schwartz et al., 2006; Wentzel & Caldwell, 1997).

Results

Missing Data and Descriptive Statistics

Missing item scores were handled as follows. When a participant responded to at least 50% of the items on a given scale (attachment anxiety, attachment avoidance, or negative expectations), participant mean imputation was utilized to compute that participant's scale score. Otherwise, the scale score was treated as missing. Simulations have demonstrated that participant mean imputation is a statistically sound technique when less than 10% of participants' scale

items are missing (Parent, 2013; Schafer & Graham, 2002). For each scale (across all participants that completed the scale) less than 2% of items were missing.

Full information maximum likelihood (FIML) was used to handle missing scale scores, following Mueller and Hancock (2010). Of the 2100 participants, 29 were missing gender, 93 were missing race, 656 were missing attachment anxiety, 653 were missing attachment avoidance, 1056 were missing negative expectations, and 220 were missing peer acceptance. [2]

Table 1.1 provides correlations among all major study variables and descriptive statistics. On average, boys had more negative expectations than girls (r_b = .24, p < .001), and were less socially accepted than girls (r_b = -.05, p = .02). Attachment anxiety and avoidance did not differ significantly between boys and girls (ps > .08). The majority of study variables were normally distributed (attachment anxiety, SE = 0.13, attachment avoidance, SE = 0.26, peer acceptance, SE = .26). Negative expectations were positively skewed (SE = 1.43), such that the majority of adolescents scored below the midpoint of the range of possible total scores. Because statistical conclusion validity was not a concern given that the linear model is robust to violations of normality with a large sample size (Pek et al., 2018), no transformations were applied to the negative expectations index.

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[2] Follow-up exploratory analyses were conducted using a sample consisting solely of participants with complete data on attachment, negative expectations, and peer acceptance (n = 807). The pattern of findings was the same in the sample with complete cases as it was when using full information maximum likelihood in the full sample.

Table 1.1

Descriptive Statistics and Bivariate Correlations Among Study Variables

Variable	N (%)	M	SD	1	2	3	4	5
1. Gender (Male)[a]	1267 (*38.20*)							
2. Race (White)[a]	1306 (*65.10*)			.03				
3. Attachment Anxiety		3.49	1.07	-.03	.003			
4. Attachment Avoidance		3.10	1.02	-.05	-.13**	.09**		
5. Negative Expectations		22.51	5.46	.24**	-.02	.26**	.17**	
6. Peer Acceptance		0.00	1.00	-.05*	-.04	-.06*	-.03	-.19**

[a]All correlations with this variable are either biserial or phi. Gender was coded as 1 = Male, 0 = Female. Race was coded as 1 = White, 0 = Non-White. Peer acceptance scores are standardized
* $p < .05$, ** $p < .01$.

Structural Model: Direct Effects

A measured variable path model was estimated using Mplus version 5.2 (Muthén & Muthén, 1998-2007) to test our hypotheses that adolescents' insecure attachment style dimensions would relate to their negative expectations for peers' behaviors, and that negative expectations would explain indirect links between insecure attachment style dimensions and low peer acceptance from classmates. The model included attachment anxiety, attachment-related avoidance, and covariates of adolescent gender (0 = female, 1 = male), race (0 = non-white, 1 = white), and six dummy variables representing school membership.[3] All variables were allowed to covary. The model was just-identified ($\chi 2 = 0$), and model fit indices were therefore not interpreted.

As hypothesized, attachment anxiety ($\beta = 0.24$, $p < .001$) and avoidance ($\beta = 0.17$, $p < .001$) both predicted more negative expectations. Negative expectations, in turn, predicted lower

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[3] One school included only 11 participants (other schools ranged from 93 - 488 participants). A dummy variable for this school was not included as a covariate because the standard error for this variable would be unreliable. These 11 participants' scores on the remaining school dummy variables were treated as missing.

peer acceptance (β = -0.18, p < .001). Surprisingly, neither attachment anxiety (β = -0.03, p =

.33) nor avoidance (β = -0.05, p = .88) predicted peer acceptance when controlling for negative

expectations. However, an exploratory follow up analysis determined that greater attachment

anxiety (but not avoidance) significantly predicted lower peer acceptance when negative

expectations were *not* statistically controlled (anxiety β = -0.07, p = .02, avoidance β = -0.03, p =

.24) (see Figure 1.1).
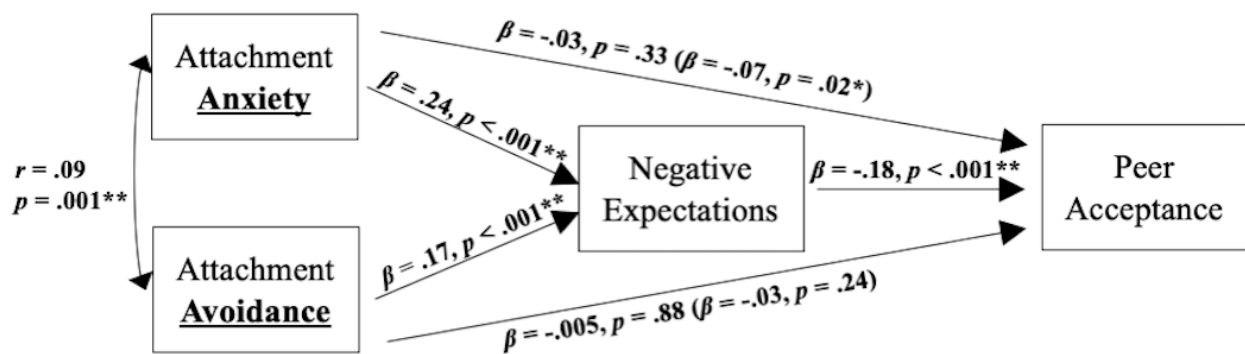
Figure 1.1. Structural model of attachment anxiety and avoidance predicting peer acceptance
through negative expectations. Parentheses contain the coefficients of attachment anxiety and
avoidance predicting peer acceptance without controlling for negative expectations.
* p < .05, ** p < .01.

Structural Model: Indirect Effects

Indirect effects were estimated though Mplus' MODEL INDIRECT procedure (Stride et

al., 2015) to test our hypothesis that negative expectations would explain indirect links between

insecure attachment styles and low peer acceptance. We utilized 5,000 bootstrapped samples to

estimate confidence intervals around the indirect effects. As hypothesized, negative expectations

explained both an indirect relation between attachment anxiety and peer acceptance, 95% CI [-

0.07, -0.02], and between attachment avoidance and peer acceptance, 95% CI [-0.05, -0.01].

Exploratory Multigroup Model: Gender Differences

Gender differences were explored through a multigroup structural equation model. Significance tests were conducted on gender differences for all structural paths in the model. One significant gender difference emerged, such that the link between negative expectations and peer acceptance was significant for girls (β = -0.25, p < .001) but only marginally significant for boys (β = -0.11, p = .052).

Discussion

This study is the first, to our knowledge, to directly examine the role of negative expectations in the links between attachment style dimensions and peer relations. Findings revealed that adolescents with greater attachment anxiety and those with greater attachment-related avoidance held negative expectations for how their peers would behave, and these negative expectations, in turn, predicted low peer acceptance. Exploratory findings demonstrated that adolescents with greater attachment anxiety (but not avoidance) were less accepted by their peers; however, this link was not significant when controlling for negative expectations. Our findings coincide well with research revealing links between attachment and social information processing (SIP) variables such as attributions (Zajac et al., 2020), memory (Dykas et al., 2014), and attention (Dewitte & De Houwer, 2008) and with research on how negative SIP relates to poor functioning in peer relationships (Lansford et al., 2010; Martinelli et al., 2018). Our findings extend this literature by highlighting the role of one key aspect of SIP–*negative expectations*–in explaining the link between attachment and peer relations, and by focusing on the role of attachment *style* (anxiety and avoidance) as opposed to adolescents' attachment to *specific parents* in predicting SIP and subsequent peer relations. The findings highlight the importance of negative expectations as a possible reason for insecure adolescents' tendencies to

have poor relationships with peers. We now discuss each finding, suggest avenues for future research, and discuss clinical implications.

Attachment and Expectations

In the present study, adolescents' attachment style dimensions (attachment anxiety and avoidance) related to their negative expectations concerning how their peers will behave toward them. It is notable that both dimensions of attachment insecurity had unique effects on negative expectations when controlling for the other. The two forms of insecurity are similar in that they both reflect a lack of confidence that close relationship partners will be supportive in times of need (Mikulincer & Shaver, 2016). Yet, clear distinctions exist between the cognitions and emotions characteristic of each attachment style dimension. As such, it is likely that some avenues through which anxiety and avoidance relate to negative expectations overlap, and some avenues are distinct. One overlapping avenue could be that, for both styles, low confidence in close relationship partners' availability and responsiveness is generalizing beyond beliefs about how *close relationship partners* will behave to shape predictions of how *nonspecific peers in ambiguous social situations* will behave. Another shared avenue is that both styles encompass negative beliefs about the self (Mikulincer & Shaver, 2016), possibly contributing to insecure individuals' (often nonconscious) beliefs that they do not deserve to be treated well by peers.

In addition, it is likely that attachment anxiety and avoidance also relate to negative expectations through distinct mechanisms. For instance, individuals with high attachment anxiety are preoccupied with relationships and experience intense fears that they will be abandoned by relationship partners (Brennan et al., 1998). It is reasonable to expect that such preoccupations and fears could lead to negative expectations of peers through mechanisms such as threat vigilance and subsequent negative memory biases. Both theory and empirical work suggest that

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individuals with an anxious attachment style are vigilant to threatening social information in their environment (Maier et al., 2005; Mikulincer & Shaver, 2016), even outside the context of close relationships. Such vigilance toward potential threats can contribute to greater attention to negative social stimuli. Negative attentional biases, in turn, can contribute to negative memory biases. Selectively remembering negative interactions could contribute to beliefs that negative interactions are more probable than positive ones, therefore generating risk for expectations that others will behave negatively.

On the other hand, individuals who are high on attachment-related avoidance are uncomfortable with closeness and intimacy and dismiss their needs for comfort and support (Brennan et al., 1998). Therefore, it is possible that avoidance could relate to negative expectations regarding peers through a lack of support seeking. An individual uncomfortable relying on others for comfort and support in times of distress is unlikely to seek a friend for support in a difficult circumstance (e.g., Collins & Feeney, 2000; Pascuzzo et al., 2013; see also Loeb et al., 2020 for evidence in adolescents with dismissing attachment states of mind). If individuals do not seek support, they cannot build a repertoire of repeated experiences of *receiving support* to draw upon when making predictions about the future. As such, it is unlikely that avoidant individuals would expect others to behave in a kind and supportive manner. In essence, both dimensions of attachment insecurity generate risk for harmful cascades; both include beliefs that can lead to experiences and emotions that affect expectations and, in turn, experiences with peers.

Expectations and Peer Acceptance

The present findings indicate that anxious and avoidant adolescents' negative expectations relate to low acceptance by peers. Exploratory analyses, however, indicated that the

effect was only marginal for boys ($p = .052$), thus, gender differences are worthy of further examination. Such an association could emerge from adolescents' negative expectations contributing to harmful self-fulfilling prophecies; negative expectations could contribute to negative behaviors, thus reducing peer acceptance. One such negative behavior may be withdrawal from peers when expecting peers to behave negatively. Indeed, one study revealed that adolescents who expected to be rejected tended to withdraw from social situations (London et al., 2007). Withdrawal can prevent adolescents from having the positive interactions with peers crucial for peer acceptance.

Another possibility is that adolescents select peers who behave in line with their expectations. If adolescents expect to be treated poorly, it is possible that they will select peers who treat them poorly; such adolescents may then tolerate the negative treatment because it matches their expectations. To the extent that such peers have negative opinions of the adolescent, affiliation with those peers could inhibit the adolescent's ability to find social partners who are more accepting of them. One longitudinal study supporting this notion (Loeb et al., 2018) found that adolescents with negative expectations at age 13 were more likely to have friends with hostile attitudes at age 18. This link held even when controlling for friends' hostile attitudes at age 13, indicating that adolescents with negative expectations tolerate increases in their friends' hostile attitudes over time (see also Cassidy and colleagues [2003] for further discussion of peer selection as it links to views of the self).

Additionally, it is possible that adolescents with negative expectations behave aggressively. Adolescents who expect to be treated poorly may be primed to reciprocate and treat others poorly. Further, negative expectations could cause adolescents to experience greater levels of anger and physiological dysregulation (see Lemerise & Arsenio, 2000, for a theoretical

examination of links between SIP and emotion). Such anger and dysregulation could increase the likelihood that adolescents would behave aggressively regardless of whether peers' behaviors coincide with the adolescents' negative expectations. Indeed, well replicated links exist between one component of SIP related to negative expectations (negative attributions) and aggression (Martinelli et al., 2018), and between aggression and peer rejection (Casper et al., 2020; Lansford et al., 2011).

Attachment and Peer Acceptance

Although negative expectations explained *indirect links* between both dimensions of insecure attachment and peer acceptance, neither anxiety nor avoidance had a significant *direct effect* on peer acceptance when controlling for their shared variance with negative expectations. Such findings indicate the possibility that SIP plays a particularly crucial role in explaining the well replicated links between attachment and peer relations. Further, an exploratory analysis demonstrated that when negative expectations were not controlled for, a direct link between attachment anxiety (but not avoidance) and peer acceptance emerged.

The lack of evidence for a direct link between *avoidance* and peer acceptance is somewhat surprising, given the well-replicated direct link between attachment and peer relations (e.g., Khan et al., 2020; Schneider et al., 2001). Several factors that could explain why the present findings differ from those of previous research. First, the vast majority of previous research utilized attachment measures that differ from those used here. More specifically, much previous research examines the role of attachment to specific parents rather than general attachment style in predicting peer relations (Groh et al., 2014). It is possible that attachment style affects peer relations differently from attachment to specific parents. Second, much of the literature examining attachment and peers examines links between attachment and close

friendships (e.g., Kochendorfer & Kerns, 2017), rather than those between attachment and

sociometric peer acceptance by classmates, as is the focus here. It is possible that the link

between attachment and peer relations is strongest in the specific domain of close friendships, as

demonstrated by one meta-analysis (Schneider et al., 2001), but not by a larger, more recent one

(Pallini et al., 2014).

It merits attention that anxiety was directly associated with peer acceptance, but

avoidance was not. The relatively stronger link between anxiety and peer acceptance may reflect

emotion regulation processes. It is possible that the deficits in emotion regulation associated with

attachment anxiety (becoming easily dysregulated, [Mikulincer & Shaver, 2016]) could lead to

more peer conflict than the emotion regulation deficits associated with attachment-related

avoidance (suppressing emotions and being over-regulated, [Mikulincer & Shaver, 2016]).

Another possibility is that avoidant individuals' fears of closeness and vulnerability are

influential in building close intimate friendships, but not in achieving broader peer acceptance.

Yet it is important to note that although the link between anxiety and peer acceptance was

significant, the effect was small ($\beta = -0.07$, $p = .02$). Thus, this finding should be interpreted with

caution pending further replication.

Strengths, Limitations, and Future Directions.

The present study has several strengths. It was well powered to detect effects, because of

the large sample size ($N = 2100$). Further, it included strong and well-validated measures,

including a sociometric measure of peer acceptance. Utilizing a sociometric measure limited the

influence of the social desirability biases that often characterize self-, teacher-, and parent-

reports. The study fills conceptual gaps in the literature about attachment, SIP, and peer relations,

and examines such constructs during a critical window for social development—adolescence. Finally, the findings have strong clinical implications for cognitive behavioral interventions.

Several limitations are present that can be addressed in future research. The study was cross-sectional. Thus, our ability to infer that the indirect effect of attachment style on peer acceptance reflects true sequential causal mediation is limited. Further, it is not possible to look at direction of effects or reciprocal relations among variables, because the study was cross-sectional. For example, it is possible that low peer acceptance causes negative expectations. Future work should examine attachment styles, expectations, and peer acceptance longitudinally. Assessing such constructs at multiple time-points would allow researchers to explore a possible chain of causality wherein attachment style, negative expectations, and peer acceptance reciprocally influence each other. Examining a chain of reciprocal relations would help researchers reveal the pathways involved in self-fulfilling development. Longitudinal work could also help reveal *timing* in such a causal chain, whereas the present study examines only one time-point in the chain: mid- to late-adolescence. It is likely that the chain begins much earlier than adolescence; research shows that expectations for unknown others' behaviors begin to develop as early as infancy (Woodward, 1998). Future work could reveal when reciprocal relations occur, and when attachment style begins to generalize beyond expectations of specific close relationship partners to include expectations of non-specific others.

It is possible that some measurement error was present in the sociometric peer acceptance assessment. More specifically, not all students from a given school participated in the study (range 26% - 41.5%, mean participation rate = 33.72%, *SD* = 4.79%). Although participation rates in the present study fell in the typical range of school participation rates (e.g., Kollerová &

Killen, 2021), it is important to consider that participation rates affect the accuracy of peer acceptance scores.

Although our model was derived from multiple theoretical perspectives (Bowlby, 1969/82; Crick & Dodge, 1994; Mikulincer & Shaver, 2016) and some experimental evidence (Carnelley & Rowe, 2007; Rabiner & Cole, 1989), it is important to consider alternative explanations for the findings. Given that the study was correlational, it is not possible to infer causality. As such, it is possible that a confounding variable (such as poor social skills, internalizing, or externalizing) could contribute to both negative expectations and low peer acceptance. Another possible alternative explanation is that insecure attachment contributes to low peer acceptance through mechanisms not examined here, such as poor emotion regulation capacities or poor social skills. Further, reverse directionality is a possibility, such that low peer acceptance may cause individuals to develop negative expectations, and negative expectations could in turn contribute to insecure working models of attachment. Future work could utilize experimental methods (e.g., security priming—manipulating temporary feelings of security) to test causality.

Another limitation was the use of an *explicit* measure of negative expectations. Future work could utilize *implicit* tasks (e.g., lexical decision tasks) to measure expectations without succumbing to social desirability biases. Additional future directions include further examination of the differential effects of the two attachment insecurity dimensions on additional social outcomes (e.g., social withdrawal, victimization, bullying), and the extent to which expectations mediate the effect of attachment on such outcomes.

Conclusion and Implications for Adolescent Well-Being

The present study suggests that insecurely attached individuals enter new social situations at a disadvantage to their securely attached counterparts because biased SIP occurs for insecure individuals *even in relation to people they do not yet know*. Negative SIP not only puts adolescents at a disadvantage because of self-fulfilling prophecies, wherein the negative scenarios that adolescents expect become increasingly likely to actually occur, but also puts adolescents at risk for falling into a vicious cycle in which expectations and peer relations reinforce each other and *worsen* over time. Given the negative repercussions of poor adolescent peer relations, such as depressive symptoms, anxiety (La Greca & Harrison, 2005), aggression (McElhaney et al., 2008; Schacter et al., 2019), poor physical health (Brendgen & Vitaro, 2008) and poor quality romantic relationships (Schacter et al., 2019), and the particularly important role of peer relations in adolescents' well-being (Allen & Tan, 2016; Rubin et al., 2015), it is critical to identify mechanisms through which poor peer relations unfold.

The present study points to negative expectations as a possible cognitive process to target clinically when working with adolescents. Fortunately, expectations are malleable cognitive processes that can be altered using cognitive behavioral therapy (CBT) techniques, which have demonstrated high efficacy even relative to other therapeutic approaches (e.g., Hoffman et al., 2012; Öst & Ollendick, 2017; Reinecke et al., 1998). One CBT protocol used in past studies specifically focused on changing parents' *negative attributions* (Bugental & Schwartz, 2009; Bugental et al., 2002). This kind of change reduced negative parenting behaviors such as physical abuse, non-abusive corporal punishment, and child neglect in high-risk families. It is likely that CBT interventions aimed at changing *negative expectations* could be effective as well. Further, future work could leverage knowledge about the importance of negative expectations by testing repeated priming interventions (e.g., Carnelley & Rowe, 2007) to improve insecure

adolescents' expectations. Such interventions could then, in turn, improve peer relations. The present study is an important step toward a goal we argue is critical to developmental science: understanding the role of SIP in paths between attachment and social outcomes and, in turn, promoting changes in SIP that ameliorate vicious cycles and protect individuals' relationships throughout the lifespan.

Chapter 4: Developmental Pathways from Early Attachment to Adolescent Romantic Relationship Functioning: The Roles of Social Information Processing and Friendship Quality

Abstract

Central to attachment theory is the notion that early relationships with caregivers guide thoughts and behaviors in future close relationships, such that early insecure attachment to caregivers put individuals at risk for poor quality romantic relationships throughout life. Although this claim is central, limited evidence exists for this direct link, and questions of *why* a link exists remain open. The present study is an attempt to answer this question by testing two possible pathways through which early attachment might relate to romantic relationship quality: a pathway wherein negative attribution biases mediate the link, and a pathway wherein negative attributions and friendship quality sequentially mediate the link. The sample included participants enrolled in the National Institute of Child Health and Human Development's longitudinal Study for Early Childcare and Youth Development who were in romantic relationships in early adolescence ($N = 347$). Across 15 years, participants completed assessments of attachment to mothers, negative attribution biases about peers, friendship quality, and romantic relationship quality. Neither pathway explained indirect links between children's attachment to mothers and their romantic relationship quality in young adolescence. Further, no direct links between early attachment and romantic relationship quality emerged. Early attachment, however, was predictive of children's negative attribution biases, and friendship quality was predictive of romantic relationship quality. Findings highlight the importance of experiences with peers in laying the foundation for experiences with romantic partners, and

findings underscore the importance of continuing to critically evaluate the claim that early

attachment experiences have lasting impacts on close relationships throughout the lifespan.

Introduction

Early attachment theorists posited that early relationships with caregivers would guide thoughts and behaviors in future close relationships, such that individuals' early insecure attachment to their caregivers would put them at risk for poor quality relationships throughout life (Bowlby, 1969/82, 1973, 1980). Although this claim is central to attachment theory, limited empirical evidence exists for a direct link between insecure attachment to caregivers early in life and later poor-quality romantic relationships (e.g., Englund et al., 2011; Roisman et al., 2005). Even where there is evidence, the effect sizes are only small to moderate (Fraley & Roisman, 2019). It is possible that the effect sizes for this *direct* link are small to moderate because the relation is better explained by underexplored *indirect* links along developmental pathways through which early insecurity relates to future relationship functioning (see Booth-La Force & Groh, 2018, Fraley & Roisman, 2019, and Simpson et al., 2014, for calls for future research).

Theory suggests that social information processing (SIP) could be a key indirect linking mechanism on a pathway from early insecurity to later poor romantic relationship functioning (Bowlby, 1973; Dykas & Cassidy, 2011). Some research supports this notion by providing evidence for certain components of the pathway. More specifically, some research has demonstrated that *children's and adolescents'* insecurity contributes to their negative attribution biases concerning peers (e.g., Dwyer et al., 2010; Raikes & Thompson, 2008; Zajac et al., 2020), and that *adults'* negative attributions about their own partners relate to poor romantic relationship quality (e.g., Hazelwood et al., 2012). However, little research (yet see Fitter, 2020, for one unpublished thesis) has examined *direct* links between negative attribution biases and poor romantic relationship functioning in adolescence—a time when relationships are first emerging and setting the stage for future relationship functioning (Valle & Tillman, 2014). No

research has examined the *indirect* link between early attachment and adolescents' poor romantic relationship functioning that occurs through the mechanism of negative attribution biases.

Another factor to consider regarding pathways through which early experience may affect later romantic relationships is friendship quality, because skills learned through friendships can build a foundation for positive experiences in romantic relationships (Allen & Tan, 2016; Rubin et al., 2006a). Evidence that negative attribution biases and poor friendship quality may work sequentially on a pathway between early insecurity and adolescents' poor romantic relationship functioning comes from research on components of the pathway. More specifically, in addition to evidence that early insecurity relates to negative attribution biases (e.g., Raikes & Thompson, 2008), negative attribution biases relate to low friendship quality (e.g., Spencer et al., 2013), and low friendship quality relates, in turn, to poor romantic relationship quality (e.g., Oriña et al., 2011). However, no research has tested how attribution biases and friendship quality work sequentially over time to explain links on developmental pathways from early attachment to adolescent romantic relationship quality. Given the potential consequences of negative adolescent romantic relationship experiences for future well-being (see Gomez-Lopez, 2019, for a review), it is important to examine antecedent processes of adolescents' romantic relationship functioning. The present study is designed to examine the mediating effects of attribution biases and friendship quality on links between early insecurity and young adolescents' romantic relationship quality, as well as the enduring direct effects of early insecurity on young adolescents' romantic relationship quality (see Figure 2.1), using the National Institute of Child Health and Human Development's (NICHD) longitudinal Study of Early Child Care and Youth Development (SECCYD; NICHD Early Child Care Research Network, 1997).
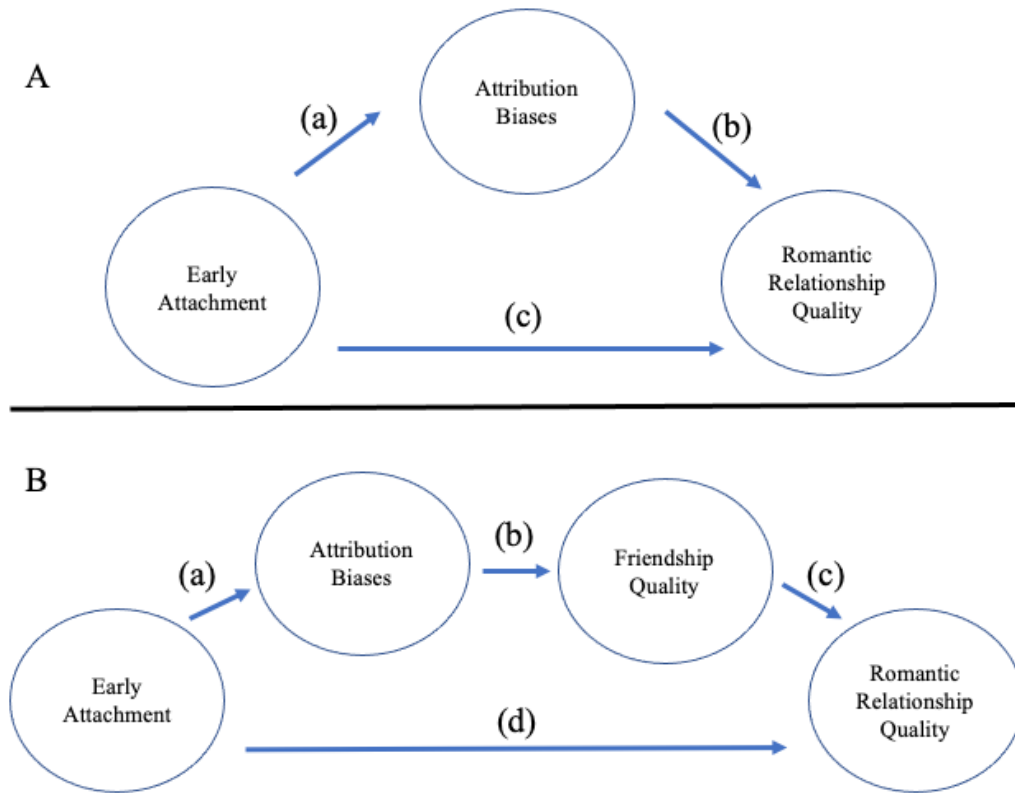
Figure 2.1. Conceptual models: Pathways from early attachment to later romantic relationship quality. A. Attribution biases as a mediator. B. Attribution biases and friendship quality as sequential mediators across time.

Early Attachment to Caregivers and Subsequent Romantic Relationship Functioning

Although a key claim of attachment theory is that early attachment quality in relationships with caregivers affects future romantic relationship functioning (Bowlby 1973; 1980), surprisingly little research has tested this direct link. Much of what we know about this direct link comes from the Minnesota Longitudinal Study of Risk and Adaptation (MLSRA; Sroufe, 2005)—an ongoing study concerning how social experiences affect developmental outcomes. This study began in 1975 and follows a sample of children at high risk for caretaking problems (e.g., low socio-economic status, single-parent households, exposure to environmental stressors) from birth through adulthood. A series of studies from this sample indicate that

attachment in infancy may have downstream consequences for later romantic relationship functioning. More specifically, research in the MLSRA has linked infants' insecure attachment to their mothers to many negative romantic relationship outcomes in early adulthood, such as difficulties in regulating negative emotions during (Simpson et al., 2007) and after (Salvatore et al., 2011) conflict resolution with a partner, disengagement and self-focus while resolving conflicts (Girme et al., 2020), and low self-reported (Englund et al., 2011) and observed (Roisman et al., 2005) relationship quality.

The MLSRA's rich collection of strong behavioral and self-report measures collected from infancy through adulthood makes it an influential study that provides rich insight into how early insecurity can predict later romantic relationship functioning. Yet the MLSRA is based on a high-risk sample that dwindled to fewer than 100 participants during romantic relationship assessments during adulthood, and no published studies from this sample link attachment to romantic relationships in *adolescence* (i.e., age 15). Thus, further study of such connections in additional samples of large sizes that span across various levels of risk and developmental stages is necessary.

Although only a handful of studies from the MLSRA directly find evidence for links between early attachment security and adult romantic relationship functioning, additional data from the MLSRA and from other samples examine related links: (a) links between *early parenting quality* and adolescents' and adults' romantic relationship functioning and (b) links between *adolescents' attachment* (both to parents and attachment states of mind) and adolescent romantic relationship functioning. Regarding links between *early parenting quality* and children's later adult romantic relationship functioning, data from the MLSRA demonstrate that early maternal sensitivity relates to greater competency in relationships (Raby et al., 2015a) and

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lower physiological arousal during conflict (Raby et al., 2015b). Further, longitudinal research from additional samples indicates that early maternal sensitivity is associated with adults' secure attachment to romantic partners (Zayas et al., 2011) and lower hostility (Dagan et al., 2020), and with adolescents' later high-quality romantic relationships (Roisman et al., 2009).

Regarding links between *adolescents' attachment* and romantic relationship functioning, unpublished data from our lab found that 13-year-olds' attachment-related avoidance towards mothers predicted their concurrent lower relationship satisfaction (Fitter et al., 2021). Longitudinal research has demonstrated that attachment anxiety and avoidance towards parents in middle adolescence predicted increases in insecure attachment toward romantic partners over time (Furman & Collibee, 2018), and that insecure states of mind in early adolescence predicted poor conflict resolution skills, low support seeking (Tan et al., 2016), more negative behaviors during conflict discussions (Loeb et al., 2020), and greater aggression in relationships (Miga et al., 2010) in late adolescence. Further, one study demonstrated that insecure states of mind in late adolescence predicted poor relationship satisfaction in early adulthood (Roisman et al., 2001).

Evidence of an enduring direct link between early attachment and later romantic relationship functioning exists from the high-risk MLSRA sample (e.g., Englund et al., 2011, Girme et al., 2020) and indirect evidence for this link exists from research on related constructs (e.g., Miga et al., 2010). Yet more evidence is still needed on the connection between early attachment and later romantic relationship functioning—a connection that is central to attachment theory.

Pathways Through Which Early Insecure Attachment Relates to Later Poor Romantic Relationship Functioning.

The Mediating Role of Negative Attributions.

The question of *why* a link between early attachment and later romantic relationships may exist remains open. The present study is an attempt to answer this why question by examining two possible pathways through which early insecurity might relate to romantic relationship quality. The first is a pathway through *negative attributions* (see Figure 2.1A). To understand why negative attribution biases might play a key role in such a pathway, it is important to understand the cognitive models associated with early insecure attachments. A child who is insecurely attached to a caregiver has an insecure *internal working model* (IWM) of that caregiver—an experience-based cognitive model of the caregiver as unavailable, uncaring, and unresponsive in times of need (Bowlby, 1973, 1980). Over time, it is possible for this internal working model of a caregiver to generalize and affect a child's cognitive models of how others generally think and behave (Bowlby, 1988). When insecurely attached children's negative IWMs of caregivers spill over to affect their cognitions about others beyond their caregivers, these children view the world through a negatively biased lens. Such a lens can cause a benign behavior, such as a peer bumping into the child on the playground, seem aggressive. This child may believe that a stable negative trait (e.g., the peer is a mean person) caused the behavior, and that the peer intended to harm the child. The tendency to interpret the cause of others' behaviors through such a negative lens is referred to as a *negative attribution bias.* Such an interpretation could lead to a negative response, leading in turn to poor peer relations (Crick & Dodge, 1994; Lansford et al., 2011), and in time, to poor quality romantic relationships (Collins et al., 2006; Feeney, 2016).

To assess attribution biases in children and adolescents, researchers typically use vignette-based measures referring to unknown peers. In such procedures, participants read or listen to a story about a *hypothetical peer* with unknown intentions causing a negative event.

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Participants are then asked about possible reasons (i.e., attributions) for the peer's behavior. Such measures capture negative attribution biases—tendencies to make negative attributions. Because the child has never met the person in the story, they cannot draw upon experiences with that person when making attributions; they must rely on their general cognitive schemas of others. Thereby, any negative attribution should reflect an underlying negative attribution bias because it cannot reflect an objective experience-based assessment of the person's intentions.

Much empirical evidence supports the notion that insecure attachment to parents relates to negative attribution biases (e.g., Cassidy et al., 1996; Suess et al., 1992). For example, one longitudinal study indicated that infants' disorganized attachment predicted hostile attribution biases at age eight (Zajac et al., 2020). Another longitudinal study found that 3-year-olds' avoidant attachment to mothers predicted their hostile attribution biases at age 4, and that 3-year-olds' resistant attachment to mothers predicted hostile attribution biases at ages 6-7 (Raikes & Thompson, 2008). Research also reveals cross-sectional links between children's attachment and attributions. For instance, one study demonstrated that 4- to 7-year-olds' disorganized attachment predicted their concurrent hostile attribution biases (Zaccagnino et al., 2013). Similar relations hold in adolescence. For instance, one study found young adolescents' attachment to mothers, but not to fathers, predicted negative attribution biases (Simons et al., 2001). Another demonstrated that sixth grade girls who were insecurely attached to their fathers (but not to their mothers) made negative attributions in hypothetical scenarios involving close friends (Dwyer et al., 2010).

Although there is an established link between child and adolescent attachment to parents and negative attribution biases, only one unpublished thesis (Fitter, 2020) examined the *consequences* of adolescents' attribution biases on romantic relationships. Young adolescents'

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who made negative attributions about hypothetical scenarios with future romantic partners forecasted they would behave negatively if they were in that scenario. In addition to this indication, it is theoretically expected (Bowlby, 1973; Crick & Dodge, 1994) that children and adolescents' negative attribution biases would generate risk for negative romantic relationship functioning. If adolescents enter early romantic relationships with a bias that others' behaviors are driven by negative forces (e.g., malicious intentions or undesirable personality traits), they will likely interpret romantic partners' behaviors through this lens and behave in ways that could generate conflict (e.g., accusing the partner of lying or of being intentionally cruel).

This theory is partially supported by the existing literature on attributions in adult romantic relationships. For instance, research demonstrates that adults who make negative attributions about *their own partner* experience poor communication with partners (Pearce & Halford, 2008), negative emotions in response to partners' behaviors (Collins et al., 2006), low forgiveness (Kimmes & Durtschi, 2016), and poor relationship satisfaction (Karney & Bradbury, 2000; Kimmes et al., 2015; Sumer & Cozzarelli, 2004; Waldinger & Schulz, 2006). However, negative attributions about one's own partner may reflect accurate assessments of the partner's negative characteristics or behavior, and not a negative attribution *bias*—a tendency to make negative attributions. In sum, there is a lack of research on outcomes of adolescents' negative attribution biases on romantic relationship functioning, and methodological limitations of research on adult attributions makes it difficult to draw conclusions about links between attribution *biases* and romantic relationship functioning. Therefore, the question of whether negative attribution biases could be a mechanism through which early insecure attachment to caregivers predicts later poor romantic relationship functioning remains open.

The Sequential Mediating Roles of Friendship Quality and Negative Attributions.

In addition to negative attribution biases, a key aspect of child and adolescent social functioning is the quality of close friendships. Therefore, we also examined friendship quality to enrich our model representing the complex processes through which insecurity relates to later romantic relationship functioning. We examined this by testing an additional pathway—a pathway through the sequential mediators of attribution biases and friendship quality (see Figure 2.1B). More specifically, it is possible that early insecurity leads children to develop negative attribution biases, in turn leading to low quality friendships, in turn leading to poor quality romantic relationships. Theory and data support the hypothesis that when children enter social situations with pre-existing negative attribution biases, it can cause negative interactions with friends (e.g., an accidental collision from a friend on the playground could elicit an aggressive response) and reduce the quality of relationships with friends (Crick & Dodge, 1994; Lansford et al., 2011). Indeed, longitudinal research indicates that negative attribution biases predict later poor friendship quality. For instance, negative attribution biases in first grade predicted lower friendship quality in third grade (McElwain et al., 2008), and negative attribution biases in fourth grade predicted less positive and more negative interactions with close friends in sixth grade (Chen et al., 2019). Cross-sectional research on adolescents supports this connection as well; for example, two studies found that adolescents with negative attribution biases had high levels of conflict with best friends (Bowker et al., 2010; Spencer et al., 2013).

In addition to the connection between negative attributions throughout childhood and adolescence and friendship quality, friendship quality has the potential to affect later romantic relationship functioning. Friendships provide valuable opportunities to practice social skills that can help build a foundation for optimal relationship functioning, such as communication, conflict resolution, and providing and receiving emotional support (Allen & Tan, 2016; Rubin et al.,

2006a). Theory and empirical work suggest that these social-emotional skills can spill over into romantic relationships, thus facilitating positive romantic relationship functioning (Oriña et al., 2011; Rubin et al., 2006a). For example, longitudinal research demonstrates that high quality best friendships in adolescence predict better emotion regulation during conflicts with romantic partners (Simpson et al., 2007), greater relationship commitment (Oriña et al., 2011), and higher relationship quality (Yu et al., 2014) in early adulthood. Similarly, one study indicated that 10-year-olds with higher quality best friendships had better romantic relationship quality in adolescence (Kochedorfer & Kerns, 2017). More specifically, greater intimate disclosure with best friends at age 10 predicted greater feelings of intimacy and companionship with romantic partners at ages 12 and 15. Surprisingly, however, greater conflict in friendships at age 10 predicted *greater* feelings of intimacy with romantic partners at age 15.

The Present Study

The present study was motivated by the following gaps in our understanding of a central tenet of attachment theory—that the quality of early relationships with caregivers affects the quality of later close relationships. First, more empirical work in large samples that span a variety of socio-economic and risk contexts is necessary to support this central tenet by determining whether and *how* early attachment security relates to subsequent relationship functioning—an understanding crucial to discovering how best to intervene along the pathway. Second, no research (to our knowledge) examines links between early attachment to caregivers and *young adolescents'* romantic relationship functioning. Young adolescence is a time when romantic relationships are just beginning. It is possible that negative experiences in early relationships can create problematic prototypes for what future relationships will be like, setting negative cascades in motion that could affect relationship functioning throughout the lifespan

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(Rubin et al., 2006a). It is important to understand whether and how early attachment to caregivers predicts adolescents' relationship functioning, because adolescence is a sensitive period of development (Blakemore & Mills, 2014). More specifically, adolescents are particularly sensitive to social input. This sensitivity leads social experiences at this age to be particularly influential for shaping prototypes of what future relationships will be like and interactions in future relationships.

Third, a fair amount of research shows links between early insecurity with caregivers and children's negative attribution biases (e.g., Raikes & Thompson, 2008) and between adolescents' insecurity with parents and adolescents' negative attribution biases (e.g., Dwyer et al., 2010). However, only one unpublished thesis (Fitter, 2020) examines whether adolescents' negative attribution biases have consequences for romantic relationship functioning. Albeit some research indicates that adults' negative attributions about their own partners relate to negative outcomes in their relationships with those partners (e.g., Sumer & Cozzarelli, 2001).

Finally, although there is an established link between children's and adolescents' negative attributions and friendship quality (e.g., McElwain et al., 2008), and a link between adolescents' friendship quality and later adult romantic relationship functioning (e.g., Simpson et al., 2007), no research examines how attribution biases and friendship *work together* over time on a pathway between early insecurity and adolescent relationship functioning. For instance, the field has not clarified the directionality of links between attribution biases and friendship over time on such a pathway, whether they influence each other reciprocally, or the developmental timing of when attribution biases and friendship begin to relate to each other.

As such, the overarching goal of the present study was to examine two possible pathways through which early insecurity can relate to romantic relationship quality: a pathway wherein

negative attribution biases mediate the link between early insecurity and romantic relationship quality (Figure 2.1A), and a pathway wherein negative attributions and *low friendship quality* sequentially mediate the link between early insecurity and romantic relationship quality (Figure 2.1B). The sample includes 347 participants from the NICHD SECCYD followed from birth to 15-years-old. At 15 months, 24 months, and 36 months of age, children completed attachment assessments. From 54 months of age to fifth grade (10/11 years of age), children completed annual assessments of their attributions in responses to hypothetical scenarios with unknown peers and of friendship quality. Finally, in sixth grade (ages 11/12) and at age 15, adolescents who were in current relationships answered questions about the quality of their relationships. We tested three pre-registered hypotheses (see osf.io/ceyr9).

1) Negative attribution biases in fifth grade would directly predict sixth graders' and 15-year-olds' less positive and more negative romantic relationship quality.

2) Negative attribution biases from 54 months to fifth grade would mediate links between early insecure attachment and sixth graders' and 15-year-olds' less positive and more negative romantic relationship quality.

3) Negative attribution biases and friendship quality from 54 months to fifth grade would sequentially mediate links between early insecure attachment and sixth graders' and 15-year-olds' less positive and more negative romantic relationship quality.

We also tested two pre-registered exploratory research questions to gain a deeper understanding of processes through which early insecurity relates to later romantic relationship quality. First, would a model with direct and indirect effects or a model with just indirect effects best explain the process through which early attachment predicts adolescent romantic relationship functioning? We had no a-priori hypotheses regarding this exploratory question

because both models are viable possibilities based on theory and previous research. If a model with only indirect effects fits best, this could help explain why effect sizes for direct effects in previous research are small to moderate.

Second, would negative attribution biases and friendship quality reciprocally influence each other from 54 months to fifth grade, and when would these reciprocal relations occur? Although some research suggests reciprocal relations may exist (Lansford et al., 2011), more information is necessary to support strong a-priori hypothesis about the developmental timing of when attribution biases and friendship quality reciprocally relate to each other. Examining reciprocal relations in addition to sequential mediation can help deepen the field's understanding of not only the complex processes through which early insecurity relates to negative romantic relationship quality, but also the complex processes through which early insecurity relates to negative friendship quality. The present study is an important step in the direction of answering the question of *how* early attachment influences future close relationships.

Method

Participants

Data were collected from children enrolled in the NICHD SECCYD, a longitudinal study following children and families from birth to 15 years of age. Data were collected across 10 study sites in the United States. Researchers sampled and screened 8986 mothers from hospitals shortly after they gave birth. Mothers were excluded if they (a) were under 18, (b) were not fluent in English, (c) had plans to move, (d) lived far from the study site or in a location unsafe to home visitors, (e) had a child with a disability or a child who was hospitalized for more than 7 days after birth, or (f) had a substance use disorder. Of all the mothers screened, 5265 were eligible and a random sample of 1364 children from this group were enrolled in the study.

Additional details about recruitment procedures can be found at

https://www.nichd.nih.gov/research/supported/seccyd/overview.

The present study includes all participants who endorsed being in a romantic relationship in sixth grade, age 15, or at both time points ($N = 347$; 46.69% female). The sample was 74.9% White, 18.2% Black or African American, 0.3% American Indian, Eskimo, or Aleutian, 0.6% Asian or Pacific Islander, and 6.1% other. Regarding ethnicity, 7.5% were Hispanic. The average years of education for mothers was 13.81 ($SD = 2.45$) and the average income to needs ratio was 2.98 ($SD = 2.55$). Income to needs ratio was highly positively skewed (skewness = 2.81).

Procedures

Children and families were followed from the child's birth through age 15. Data collection occurred when the child was 1, 6, 15, 24, 36, and 54 months old, annually from first to sixth grade, and at age 15. Assessments were conducted in participants' homes, by telephone, and in laboratories by trained researchers from the 10 study sites. The following sections include information about the measures included in the present study. More information about the study procedures is located at https://www.nichd.nih.gov/research/supported/seccyd/overview.

Measures

Early Attachment Security

Attachment Security (15 months). At 15 months old, children and mothers participated in the Strange Situation Procedure (SSP; Ainsworth et al., 1978)—a gold standard 25-minute procedure consisting of a series of episodes aimed at briefly creating stress for the infant in order to elicit attachment behaviors. The procedure includes two mother-child separations and two reunions. The quality of children's attachment to their mothers is coded from the infant's

attachment behaviors (i.e., proximity seeking, contact maintenance, resistance, and avoidance) during the two reunion episodes.

Attachment behaviors were coded by two to three trained coders according to Ainsworth et al.'s (1978) well-established coding system. Infants can be classified as secure (B; the infant seeks comfort from the mother when distressed and is able to return to exploratory play), avoidant (A; the infant does not seek comfort from the mother upon reunion and may ignore and distance themselves from the mother), resistant (C; the infant is distressed and angry and seeks contact with the mother but is not comforted or able to return to exploratory play), or disorganized (D; the infant shows fear and behaviors such as freezing, vacillation between approach and avoidance, and appearing disoriented). Infants who cannot be classified are labeled as insecure/unclassifiable (U). The Strange Situation demonstrates strong reliability and validity (Ainsworth et al., 1978; Lyons-Ruth & Jacobvitz, 2008; Solomon & George, 2008). See NICHD Early Child Care Research Network (1997) for more information on the Strange Situation procedure and coding.

In the present study, we utilized a continuous security score following procedures initially created by Richter and colleagues (1988) and modified by Van IJzendoorn and Kroonenberg (1990). Richter and colleagues (1988) utilized discriminant function analyses with data from Strange Situations coded by Mary Ainsworth and colleagues (e.g., Ainsworth, 1978) to devise an algorithm to yield a continuous security score. Discriminant function analysis is a statistical procedure that utilizes a set of variables to predict group membership. The variables included five subscales of behaviors from the two reunion episodes of the SSP (proximity seeking—the extent to which the child consistently and persistently tries to gain or maintain physical contact with the caregiver, contact maintenance—the extent to which a child displays

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persistent effort to stay physically close to the caregiver once contact is established, resistance—the child's displays of anger and resistance towards the caregiver's attempts to gain or maintain proximity, avoidance—the extent to which a child actively avoids contact with the caregiver, and crying—the extent to which the child cries during the reunions).

Weights were created from the discriminant function that reflected the optimal combination of values across the five subscales that best differentiated children classified as secure from those classified as insecure (see Van IJzendoorn and Kroonenberg, 1990, Table A-1, for weights). Weights were then used to calculate a linear composite score that can be used as a child's security score, such that a child with a high score has a combination of values on the five subscales that make it likely they were classified as secure, and a child with a low score has a combination of values that make it likely they were classified as insecure. Van IJzendoorn and Kroonenberg (1990) validated the algorithm cross-culturally and simplified it for use when scores for crying are not available, such as in the SECCYD. In the present study, continuous security scores were computed using Van IJzendoorn and Kroonenberg's (1990) modified version of Richter and colleagues' (1998) algorithm, following procedures from previous research in the SECCYD sample (e.g., Choi, 2013; Groh et al., 2014; Roisman et al., 2013) and in additional samples (e.g., Biro et al., 2017; Lujik et al., 2011; Nofech-Mozes, 2019).

Utilizing a continuous score is advantageous because it allows maximum variability in infants' attachment security to be captured (see Fraley et al., 2015; Fraley & Roisman 2014; Fraley & Spieker, 2003, for taxometric evidence that attachment security is best modeled continuously). Further, evidence does not consistently demonstrate a pattern of which insecure attachment classification is most strongly associated with negative attribution biases (e.g., Raikes

& Thompson, 2008; Zajac et al., 2020), and examination of this question is outside the scope of the present study.

Attachment Security (24 months). Children's attachment security to their mothers was assessed at 24 months with the Attachment Q-Set (AQS; Waters & Deane, 1985). Trained research assistants (see McCartney et al., 2004, for a detailed description of training procedures from the present sample) conducted two-hour naturalistic observations of children's secure base behavior with their mothers in the home. After the home visit, research assistants sorted 90 behavioral characteristics of the child (e.g., "sits and cries instead of approaching") into nine piles ranging from least to most descriptive of the child. The correlation between the child's sorted behavioral profile and the profile of a prototypically secure child is used as a continuous score of attachment security to the mother (ranging from 1.0 to -1.0). AQS security scores demonstrated strong reliability and validity in research from the present SECCYD sample (Lucas-Thompson et al., 2007; Raikes et al., 2013) and across many additional samples (see Solomon & George, 2008, and van IJzendoorn et al., 2004, for reviews) and related to expected outcomes such as children's low internalizing and externalizing (McCartney et al., 2004).

Attachment Security (36 months). At 36 months, children and mothers participated in a modified version of the Strange Situation Procedure (Ainsworth et al., 1978; Cassidy & Marvin, 1992). This procedure was designed to induce moderate stress in the child to elicit attachment behaviors. Mothers and children were first instructed to make themselves comfortable in a room with toys and chairs. After three minutes, the mother left the room for the first separation (lasting three minutes unless the child was distressed). Next, the mother returned for a three-minute reunion, left again for five minutes, then returned for a final reunion.

The child's behavior was scored by trained coders using a system developed by the MacArthur Working Group on Attachment (MacArthur system; Cassidy & Marvin, 1992; see NICHD Early Childcare Research Network, 2001, for a detailed description of reliability training procedures). The Macarthur coding system classifies children as secure (B; the child seeks proximity and engages warmly with the mother upon reunion), avoidant (A; the child limits proximity during the reunion and expresses dampened emotion towards the mother), ambivalent (C; the child displays ambivalence about proximity seeking, such that they may seek proximity yet not be soothed by contact with the mother), or disorganized (D; the child either shows controlling behavior or behaves fearfully during the reunion with the mother). The system also yields a continuous global security rating ranging from 1 to 9. Previous research has supported the measure's strong psychometric properties (Solomon & George, 2008; O'Neill et al. 2021) and construct validity of the modified SSP; insecure ratings relate to expected variables such as maternal sensitivity and child behavioral problems in the SECCYD sample (NICHD Early Childcare Research Network, 2001). The 9-point continuous security rating was used in the present study for the same reasons listed for utilizing the continuous SSP security score, and following previous research in the SECCYD (e.g., McElwain et al., 2008; West et al., 2013).

Early Attachment Security Composite. Given the abundance of early attachment assessments (see NICHD Early Child Care Research Network, 2001, and Groh et al., 2014), an unpublished thesis demonstrating the relatively greater predictive power of a multi-year composite of attachment security in predicting children's socio-emotional outcomes in the SECCYD (Choi, 2013), the lack of stability in attachment security in the SECCYD (Groh et al., 2014), and the lack of a priori hypotheses about the age at which attachment best predicts negative attributions, we followed previous research in the SECCYD (e.g., Choi et al., 2013;

Steele et al., 2014) and created a composite rating of early attachment security. We created the composite by converting participants' scores from each time point into standardized scores and taking the mean of the three standardized scores. We used the averaging method because we did not have a theoretical reason to believe that a particular timepoint should be weighted more heavily than others (see Song et al., 2013, for a discussion of advantages and disadvantages of different methods of creating composites).

Negative Attribution Biases

Negative Attribution Biases (54 Months and First Grade). Negative attribution biases at 54 months and in first grade (at ages 6/7) were assessed with the Attribution Bias Questionnaire (Dodge et al., 1986). Children were presented with cartoon drawings of hypothetical scenarios involving ambiguous behaviors of unknown peers (e.g., a peer hits the child in the back with a ball). After each story, experimenters asked about the intentions of the peers. Interpretations of the peer's intent were coded as negative or non-negative for each story. Children were presented with four scenarios at 54 months ($\omega = .61$) and eight scenarios in first grade ($\omega = .71$). The measure demonstrates strong internal consistency and construct validity in additional samples (Dodge et al., 1986) and predictive validity, such that negative attributions measured in this way predict aggressive responses to provocations (Raikes & Thompson, 2008) and peer conflict (Raikes et al., 2013).

Negative Attribution Biases (Third Through Fifth Grade). Negative attribution biases in third grade (ages 8/9) fourth grade (ages 9/10) and fifth grade (ages 10/11) were assessed with the Assessment of Intent Attributions (Crick, 1995). Children were presented with five stories describing ambiguous peer provocations (e.g., two classmates look at the child, whisper at each other, and laugh). After each story, children selected one of four choices of why the peer

behaved that way, and the child's selection was coded as hostile (e.g., "the kids were trying to make you mad"; 1) or benign (e.g., "the kids were laughing at a joke one of them told"; 0). After each story, children also selected whether the kid was "trying to be mean" (1) or "not trying to be mean" (0). Reliability was strong in the present sample (subscale ωs ranged from = .71 - .78, M = .75, SD = .04) and in previous research (Crick, 1995). Previous research using this measure demonstrated strong predictive validity, such that negative attributions related to aggressive behaviors (Crick, 1995; Crick et al., 2002;) and less prosocial behavior (Laible et al., 2014).

Friendship Quality

Friendship Quality (54 Months and First Grade). When children were 54 months old and in first grade, mothers completed the Quality of Classroom Friends scale (Clark & Ladd, 2000). This measure assesses the quality of a child's relationship with a friend. Mothers rate the extent to which they agree or disagree on a scale of 1 (*strongly disagree*) to 4 (*strongly agree*) with 19 statements concerning the child's interactions (11 positive items; e.g., "share with each other"; eight negative items; e.g., "fight verbally"). On average, the scale demonstrated good reliability in the present study (subscale ωs ranged from = .66 - .87, M = .75, SD = .09) and shows strong internal consistency in previous research (Clark & Ladd, 2000). This measure also demonstrates strong construct validity, such that poor quality friendship relates to externalizing behavior and poor social skills in the present sample (Engle et al., 2011) and low parent-child connectedness in an additional sample (Clark & Ladd, 2000).

Friendship quality at 54 months was also assessed through a semi-structured lab observation. Parents or child-care providers identified the child's closest friend (preferably, a same-sex friend) who was within 18 months of the child's age. An interaction task between the child and the friend took place in either the childcare setting or the home. The observation

consisted of three five-minute sessions in a standardized order. The first session focused on joint problem solving, and children played with a Mickey Mouse pop up toy. The second session focused on sharing limited resources, and children played with a Viewmaster that had only one slide. The third session focused on pretend role play wherein children played with a doll and a doctor kit. Children were told that the toys were intended for them to play with, but they were given limited instructions otherwise. Following previous research (McElwain et al., 2011), we examined ratings of the following behaviors from a coding scheme developed for the SECCYD: prosocial behaviors (e.g., sharing and taking turns), contribution to positive interaction (e.g., enthusiastically responding to the friend, paying attention to the friend), aggression (e.g., forcefully accessing a friend's toy, physically disrupting the friend's play), and contribution to negative interaction (e.g., making demands, engaging in controlling behaviors). Trained observers coded children's behaviors on 5-point scales from 1 (*low*) to 5 (*very high*). This measure shows strong construct validity, such that friendship quality assessed with this coding scheme has been linked to expected constructs in previous research in the SECCYD, such as maternal sensitivity, peer rejection, social anxiety, and school readiness (Gazelle & Spangler, 2007).

We created one factor for friendship quality (for each time point) for the sake of model parsimony, generalizability of the findings, and lack of a-priori hypotheses about the differential effects of positive versus negative friendship interactions on later outcomes and on attachment linking differently to positive versus negative interactions. Further, previous research has combined positive and negative friendship interactions in the SECCYD sample and showed that friendship measured in this way relates to expected constructs, such as poor social skills (Engle et al., 2011).

Friendship Quality (Third Through Fifth Grade). Friendship quality was assessed in third grade, fourth grade, and fifth grade with the self-report Friendship Quality Questionnaire (FQQ; Parker & Asher, 1993). Participants endorse the extent to which 21 statements about their relationship with their best friend applied to them from 1 (*not at all true*) to 5 (*really true*). The FQQ includes six subscales: companionship and recreation (e.g., "always like to sit together at lunch,") conflict and betrayal (e.g., "get mad at each other a lot,") intimate disclosure (e.g., "tell each other private things,") help and guidance (e.g., "when I'm having trouble figuring something out, I usually ask this friend for help and advice,") conflict resolution (e.g., "my friend and I always get over our arguments really quickly,") and validation and caring (e.g., "this friend tells me I'm pretty smart"). The FQQ has demonstrated strong psychometric properties in previous research (e.g., Kushner et al., 2018; Parker & Asher, 1993), and demonstrated adequate reliability in the present study (subscale ωs ranged from = .50 - .84, M = .72, SD = .11) Previous research with this measure demonstrates that friendship quality relates to expected constructs, such as depression (Kushner et al., 2018; Oldenburg & Kerns 1997), insecure adult attachment style (Fraley et al., 2013), and social withdrawal (Rubin et al., 2006b).

Friendship quality in fourth grade was also assessed through a semi-structured friendship interaction task. Researchers observed children interacting with a same-sex best friend that was within two years of the target child's age and had known the target child for at least six months. Interactions were videotaped and coded based on a scheme adapted from Allhusen and colleagues (2003). Coders rated both the child's behaviors, and the dyad's interactions on five-point scales from 1 (*not at all characteristic*) to 5 (*highly characteristic*) during four seven- to ten- minute episodes. Children first participated in free play, then they planned a hypothetical party together, then they shared snacks, and finally, they played a game of pick-up sticks for a

prize. We examined four behavioral ratings following previous research in the SECCYD (e.g., Blair & Perry, 2018; Chen et al., 2019). These ratings included children's positive behavior (e.g., positive engagement), children's negative behavior (e.g., hostility), dyads' positive interactions (e.g., taking turns), and dyads' negative interactions (e.g., conflict).

Romantic Relationship Quality (Sixth Grade and Age 15)

In sixth grade and at age 15, participants completed the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985), a 29-item self-report measure of romantic relationship quality. First, participants reported whether they were in a current relationship. Participants who endorsed being in a romantic relationship completed items about relationship quality. The NRI contains 10 subscales: companionship (e.g., "How much do you play around and have fun with this person?"), instrumental aid (e.g., "How much does this person help you figure out or fix things?"), intimacy (e.g., "How much do you share secrets and private feelings with this person?"), nurturance (e.g., "How much do you take care of this person?"), affection (e.g., "How much does this person have a strong feeling of affection (love or liking) toward you?"), admiration (e.g., "How much does this person treat you like you're admired and respected?"), reliable alliance (e.g., "How sure are you that your relationship with this person will continue in the years to come?"), conflict ("How much do you and this person disagree and quarrel?"), antagonism (e.g., "How much do you and this person get annoyed with each other's behavior?"), and criticism (e.g., "How often does this person point out your faults or put you down?"). Subscale scores were calculated by summing across subscale items (rated on a scale of 1 [*little or none*] to 5 [*the most!*]) for participants with complete data. Subscales demonstrated good reliability in previous research (Hebert et al., 2013; Yu et al., 2014) and, on average, in the present study (subscale ωs ranged from = .58 - .90, M = .80, SD = .09) and relate to expected

constructs, such as maternal sensitivity (Roisman et al., 2009) and social functioning (Hebert et al., 2013). We created two factors of romantic relationship quality following a Principal Component Analysis (PCA) by Roisman and colleagues (2009) that demonstrated evidence for two components: positive quality and negative quality.

Control Variables

Out of many potential control variables, we selected four a priori covariates: child sex, income to needs ratio, maternal education, and child race and ethnicity. These were selected because they were commonly used in previous research in the SECCYD. In particular, these covariates were commonly included in studies examining similar social-emotional variables as the present study, such as attachment, romantic relationships, negative attributions, and friendship quality (e.g., Fraley et al., 2013; Kochendorfer & Kerns, 2017; McElwain et al., 2008; Raikes & Thompson, 2008; Roisman et al., 2009). Covariates were all coded following previous research in the SECCYD (e.g., Fraley et al., 2013; Roisman et al., 2009) Child sex was coded as 1 = male, 2 = female. Income-to-needs ratio was standardized and then log transformed to reduce skew. Maternal education was coded as number of years of education, and ethnicity was reflected by a binary variable (1 = White and non-Hispanic, 0 = all others in the sample) due to the majority of the sample being White and non-Hispanic.

Results

Preliminary Analyses and Missing Data

Our pre-registered analysis plan can be found at osf.io/ceyr9. Table 2.1 presents descriptive statistics and bivariate correlations among study variables at all time points. Analyses were conducted on the sample of participants ($N = 347$) that endorsed being in a relationship in sixth grade, at age 15, or at both time points. On a bivariate level, children who were more secure

tended to have families with higher income to needs ratios ($r = .15$, $p < .01$) and more years of maternal education ($r = .18$, $p = < .01$). Girls tended to have better friendship quality in third ($r_b = .20$, $p < .001$), fourth ($r_b = .26$, $p < .001$), and fifth grade ($r_b = .22$, $p < .001$) relative to boys. No other bivariate gender differences in study variables emerged.

Participants' subscale scores were calculated only for those with complete item-level data on the subscale, following procedures of researchers from the SECCYD (NICHD ECRN, 2001). Otherwise, subscale scores were marked as missing. When participants were missing data on two out of the three attachment assessments, their security composite scores were treated as missing. Full information maximum likelihood estimation (FIML) was used to handle missing data, which assumes that data are missing at random (MAR) conditional on variables in the model. A series of covariates in the model was significantly predictive of attrition (maternal education, income to needs ratio, child race and ethnicity; NICHD ECRN, 2001) and inclusion in the dating subsample (maternal education, income to needs ratio, child race and ethnicity, attachment security). Including these variables in the model helped to ensure that the MAR assumption was met.

No participants were missing gender, maternal education, child race and ethnicity, friendship quality, or romantic relationship quality. 3.46% were missing income to needs ratio, 3.46% were missing attachment, and 12.97%, 8.07%, 6.92%, 4.03%, and 4.61% of participants were missing negative attributions at 54 months, first grade, third grade, fourth grade, and fifth grade, respectively.

Measurement Model

Our measurement and structural models were estimated using Mplus version 8.7 (Muthén & Muthén, 1998-2017). Bias-corrected bootstrapping was used to estimate the measurement model. Covariates (child race and ethnicity, child sex, maternal education, income to needs ratio,

and nine dummy variables representing membership to the 10 study sites), attachment security, and negative attributions were included in the model as measured variables. Latent variables were created for friendship quality and positive and negative romantic relationship quality. Five subscale scores from the semi-structured friendship interaction task (prosocial behavior 1, prosocial behavior 2, contribution to negative interaction [reverse coded], contribution to positive interaction, and aggression [reverse coded]) were used as measured indicators for friendship quality factors at 54 months and first grade. Three additional indicators (conflict [reverse coded], interactional harmony, and balance) from the mother-report Quality of Classroom Friends Scale (Clark & Ladd, 2000) were also used as measured indicators for the 54-month friendship quality factor.

Six subscale scores from the Friendship Quality Questionnaire (FQQ; Parker & Asher, 1993; companionship and recreation, conflict and betrayal [reverse coded], intimate disclosure, help and guidance, conflict resolution, and validation and caring) were used as measured indicators for friendship quality factors in third, fourth, and fifth grade. Four additional indicators from the semi-structured friendship interaction task (child positive, child negative [reverse coded], dyad positive, and dyad negative [reverse coded]) were also used as measured indicators for the fourth-grade friendship quality factor.

Given observational assessments can yield particularly rich information, we imposed a series of loading constraints for indicators that overlapped across time points with and without observations (observations were included at 54 months and in fourth grade). First, we estimated the factor loadings for all indicators freely for each timepoint. Next, we constrained the loadings for the mother-report indicators in first grade (a timepoint without an observation) to be equal to the loadings that were initially freely estimated for the mother-report indicators at 54 months (a

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timepoint with an observation), and we constrained the loadings for the self-report indicators in third and fifth grade (time points without observations) to be equal to the loadings that were initially freely estimated for the self-report indicators in fourth grade (a timepoint with an observation).

Seven subscale scores (companionship, instrumental aid, intimacy, nurturance, affection, admiration, and reliable alliance) from the Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985) were used as measured indicators for positive romantic relationship quality factors in sixth grade and at age 15. Three subscale scores (conflict, antagonism, and criticism) were used as measured indicators for negative romantic relationship quality factors in sixth grade and at age 15.

Following our a priori pre-registered analysis plan, we initially allowed errors for parallel items across friendship quality and romantic relationship quality and errors / disturbances of positive romantic relationship quality and negative relationship quality at concurrent grades to covary. We decided to include additional theoretically justifiable error covariances after examining modification indices. These additions included error covariances among all five indicators from the 54-month interaction task, and error covariances among all four indicators from the fourth-grade interaction task. Fit indices for the final measurement model ranged from good to poor ($\chi^2(1261) = 2464.84$, $p < .001$, RMSEA = .05, CFI = 0.819).

We examined measurement invariance across time for positive and negative romantic relationship quality by comparing our final measurement model to a model with romantic relationship indicator loadings constrained to be equal across time points. We used a CFI change of < .01 as the criterion for demonstrating invariance (Chung et al., 2015). The CFI in a model with loadings constrained was 0.816 (CFI Δ = .003), therefore we determined that measurement

invariance was met. We were unable to test measurement invariance for friendship quality due to dissimilarity in indicators across time and the loading constraints we imposed. Due to sample size limitations and missing data, we were unable to test measurement invariance by child sex.

Structural Model: Direct Effects

To test our hypotheses, we examined a series of direct and indirect effects in a cross-lagged panel model (see Figure 2.2 and Tables 2.2 - 2.5 for the results of the structural model).[4] We applied a Satorra-Bentler correction to handle non-normality of the latent and measured variables (Satorra & Bentler, 1994) and allowed errors between variables at concurrent timepoints to covary. The initial structural model demonstrated poor fit ($\chi^2(56) = 256.18$, $p < .001$, RMSEA = .10, CFI = .86). As such, we examined modification indices. The original structural model included paths from the last attributions and friendship timepoint (fifth grade) to romantic relationship outcomes but did not include paths from attributions and friendship at more distal timepoints to relationship outcomes. Modification indices suggested that including paths from more distal timepoints (namely, third and fourth grade) would improve model fit. Therefore, paths were added from negative attributions and friendship quality in third and fourth grade to all the romantic relationship outcomes. The final structural model fit well ($\chi^2(40) = 128.20$ $p < .001$, RMSEA = .08, CFI = .94).

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[4] We utilized factor scores to test our structural model. This was due to unreliable standard errors when examining the structural relations using latent variables. Unreliable standard errors were likely the result of (1) sample size limitations and (2) low covariance coverage due to low overlap of participants with romantic relationship data both in sixth grade and at age 15. The pattern of findings was the same across both methods.
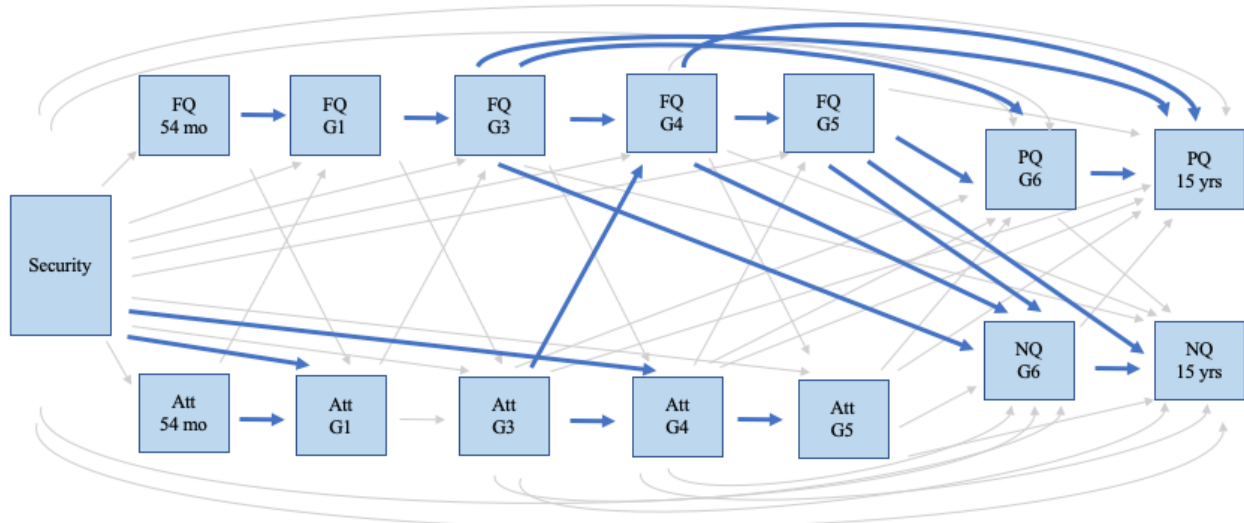
Figure 2.2. Structural model. Bold arrows are significant (*p* < .05), dashed arrows are marginal (*p* < .10) and grey arrows are nonsignificant (*p* > .10). Att = negative attributions; FQ = friendship quality; PQ = positive romantic relationship quality; NQ = negative romantic relationship quality. See Tables 2.2 – 2.5 for structural coefficients. Covariates not pictured here include child sex, income to needs ratio, maternal education, child race and ethnicity, and nine dummy variables to represent the 10 study sites.

Negative Attribution Biases

Two significant links emerged between attachment security to mothers and negative attribution biases. Children with higher attachment security had fewer negative attributions in first grade (β = -0.12, *p* = .045) and fourth grade (β = -0.12, *p* = .02). Security did not significantly relate to negative attributions at 54 months (β = -0.01, *p* = .55), third grade (β = 0.04, *p* = .59), or fifth grade (β = 0.02, *p* = .67). No significant or marginal links emerged at any timepoint between friendship quality and negative attribution biases one year later (all *p*s > .05).

Friendship Quality

Security to mothers did not relate to friendship quality at any timepoint (all *p*s > .05). More negative attributions in third grade significantly predicted better friendship quality in fourth grade (β = 0.10, *p* = .04; all other *p*s > .05). No reciprocal relations emerged between

friendship quality and negative attribution biases, such that the only significant and marginal links that emerged were unidirectional.

Romantic Relationship Quality

Security to mothers did not significantly relate to any of the romantic relationship outcomes (positive quality in sixth grade, $\beta = 0.01$, $p = .86$, negative quality in sixth grade, $\beta = 0.01$, $p = .84$, positive quality at age 15, $\beta = 0.03$ $p = .34$, negative quality at age 15, $\beta = 0.001$, $p = .99$). Negative attributions did not relate to any of the romantic relationship outcomes (all ps > .05). Friendship quality showed consistent links with romantic relationship quality. Greater friendship quality in third grade predicted more positive ($\beta = 0.26$, $p < .001$) and negative ($\beta = 0.22$, $p < .001$) relationship quality in sixth grade, and less positive romantic relationship quality at age 15 ($\beta = -0.35$, $p < .001$). Greater friendship quality in fourth grade predicted less negative quality in sixth grade ($\beta = -0.27$, $p < .001$) and more positive quality at age 15 ($\beta = 0.23$, $p < .001$). Greater friendship quality in fifth grade predicted greater positive ($\beta = 0.47$, $p < .001$) and negative ($\beta = 0.26$, $p < .001$) quality in sixth grade, along with less negative quality ($\beta = -0.15$, $p < .01$) at age 15.

Structural Model: Indirect Effects

The Mediating Roles of Negative Attribution Biases and Friendship Quality

To test negative attribution biases as a mediator of the links between early attachment and romantic relationship quality, we conducted bias-corrected bootstrapping with 500 samples to estimate 95% confidence intervals around total indirect effects for each of the romantic relationship outcomes. To calculate total indirect effects through attributions, we summed a total of five specific indirect effects. More specifically, regarding positive romantic relationship quality in sixth grade (PQ G6), the first specific indirect effect was through the path from *early*

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attachment to attributions at 54 months, then through the subsequent attribution time points, and then to PQ G6. The second specific indirect effect was through the path from *early attachment to attributions in first grade*, then through the subsequent attribution time points, and then to PQ G6. This pattern of calculations continued through the fifth specific indirect effect—through the path from *early attachment to attributions at fifth grade* to PQ G6—and then the bootstrapped sum of all five indirect effects was computed. The same procedure was followed for each of the four romantic relationship outcomes. There were no significant total indirect effects of early attachment through attributions on sixth grade (positive, 95% CI [-0.02, 0.04]; negative, 95% CI [-0.03, 0.01]) or age 15 (positive, 95% CI [-0.01, 0.03]; negative, 95% CI [-.02, 0.02]) romantic relationship quality.

We utilized the same approach to test negative attribution biases and friendship quality as sequential mediators of the links between early attachment and romantic relationship quality. To calculate total indirect effects through attributions and friendship quality sequentially, we summed a total of four specific indirect effects for each romantic relationship outcome. More specifically, regarding PQ G6, the first specific indirect effect was through the path from *early attachment to attributions at 54 months*, *to friendship quality in first grade*, then through the subsequent friendship quality time points, and then to PQ G6. The second specific indirect effect was through the path from *early attachment to attributions in first grade*, *to friendship quality in third grade*, then through the subsequent friendship quality time points, and then to PQ G6. This pattern of calculations continued through the fourth specific indirect effect—through the path from *early attachment to attributions at fourth grade, to friendship quality in fifth grade*, and then to PQ G6—and then the bootstrapped sum of all four indirect effects was computed. The same procedure was followed for each of the four romantic relationship outcomes. There were

no significant total indirect effects of early attachment through attributions and friendship quality

on sixth grade (positive quality, 95% CI [-0.002, 0.04], negative quality, 95% CI [-0.004, 0.01])

or age 15 (positive quality, 95% CI [-0.001, -0.01], negative quality, 95% CI [-0.01, 0.003])

romantic relationship quality.

Table 2.1
Descriptive Statistics and Bivariate Correlations Among Main Study Variables

Variable	N (%)	M^b	SD^b	1	2	3	4	5	6	7
Demographics and Attachment Security										
1. Child race (White)[a]	244 (70.32%)	-	-	-						
2. Child sex (female)[a]	162 (46.69%)	-	-	.02	-					
3. Income to needs ratio		2.94	2.57	**-.16**	.03	-				
4. Maternal years of education		13.81	2.45	**-.18**	-.11	**.50**	-			
5. Security		-.001	0.65	-.10	.05	**.15**	**.18**	-		
Negative Attributions										
6. Att 54 months		1.84	1.29	.06	-.03	-.03	**-.17**	-.10	-	
7. Att G1		5.02	2.09	.11	-.04	**-.21**	**-.13**	**-.15**	**.14**	-
8. Att G3		0.32	0.22	.08	-.04	-.05	-.07	.004	-.001	.08
9. Att G4		0.32	0.24	**.18**	.03	**-.12**	**-.16**	**-.14**	.03	**.08**
10. Att G5		0.26	0.27	**.13**	.03	-.05	**-.12**	-.05	.01	.03
Friendship Quality										
11. FQ 54		0	0.29	**-.18**	.01	.01	.02	.01	-.01	-.11
12. FQ G1		0	0.32	**-.13**	.03	.06	.06	-.01	.05	-.06
13. FQ G3		0	0.42	**.20**	**.20**	**-.11**	**-.14**	-.07	.01	.06
14. FQ G4		0	0.43	**.11**	**.26**	-.05	-.08	-.01	-.01	.03
15. FQ G5		0	0.41	.05	**.22**	-.001	-.06	-.02	-.004	.01
Romantic Relationship Quality										
16. PQ G6		0	1.66	.05	.10	-.10	**-.11**	-.03	.002	.03
17. NQ G6		0	0.99	**.26**	.08	**-.15**	**-.15**	-.05	.01	**.06**
18. PQ 15 years		0	1.10	-.05	.09	-.01	-.03	.04	-.004	-.01
19. NQ 15 years		0	1.68	**.24**	-.01	**-.10**	-.08	-.04	.03	.03

Variable	8	9	10	11	12	13	14	15	16	17	18
Demographics and Attachment Security											
1. Child race (White)[a]											
2. Child sex (female)[a]											
3. Income to needs ratio											
4. Maternal years of education											
5. Security											
Negative Attributions											
6. Att 54 months											
7. Att G1											
8. Att G3	-										
9. Att G4	**.45**	-									
10. Att G5	**.21**	**.45**	-								
Friendship Quality											
11. FQ 54	-.01	-.04	**-.04**	-							
12. FQ G1	.02	-.03	-.03	**.64**	-						
13. FQ G3	.04	.03	.02	**.10**	**.20**	-					
14. FQ G4	.11	.06	.002	.04	**.09**	**.49**	-				
15. FQ G5	.05	.02	.02	.02	**.05**	**.27**	**.59**	-			
Romantic Relationship Quality											
16. PQ G6	.03	.02	.02	.01	.02	**.16**	**.30**	**.51**	-		
17. NQ G6	**.06**	**.09**	.09	-.05	-.04	**.13**	**.14**	**.19**	**.11**	-	
18. PQ 15 years	-.002	-.04	-.08	.02	.04	**.11**	**.24**	**.44**	**.70**	-.08	-
19. NQ 15 years	.03	**.07**	.08	**-.05**	-.05	.05	-.003	-.03	.03	**.67**	-.07

[a]All correlations with child sex (coded as 1 = male, 2 = female) and child race (coded as 0 = White and non-Hispanic, 1 = other) are either biserial or phi. [b]M and SD for latent variables reflect the M and SD for factor scores. Att = negative attributions; FQ = friendship

quality; PQ = positive romantic relationship quality; NQ = negative romantic relationship quality. Correlations in bold are statistically significant (p < .05).

Table 2.2
Structural Autoregressive Paths (Stability)

	Negative Attributions		Friendship Quality		Positive Romantic Relationship Quality		Negative Romantic Relationship Quality	
	ß	*p*	*ß*	*p*	*ß*	*p*	*ß*	*p*
54 months - G1	0.14	.01	0.64	< .001	-	-	-	-
G1 - G3	0.06	.28	0.23	< .001	-	-	-	-
G3 - G4	0.44	< .001	0.39	< .001	-	-	-	-
G4 - G5	0.44	< .001	0.58	< .001	-	-	-	-
G6 - 15 years	-	-	-	-	0.73	< .001	0.68	< .001

Table 2.3
Structural Cross-Lagged Paths

	Att → FQ		FQ → Att		PQ → NQ		NQ → PQ	
	ß	*p*	*ß*	*p*	*ß*	*p*	*ß*	*p*
54 months - G1	0.08	.10	-0.10	.10	-	-	-	-
G1 - G3	0.03	.50	0.04	.41	-	-	-	-
G3 - G4	0.10	.04	-0.04	.38	-	-	-	-
G4 - G5	-0.02	.63	-0.04	.41	-	-	-	-
G6 - 15 years	-	-	-	-	0.16	.17	-0.07	.17

Note. Att = negative attributions; FQ = friendship quality; PQ = positive romantic relationship quality; NQ = negative romantic relationship quality.

Table 2.4
Security Predicting Negative Attributions, Friendship Quality, and Romantic Relationship Quality

	Security → Att		Security → FQ		Security → PQ		Security → NQ	
	ß	*p*	*ß*	*p*	*ß*	*p*	*ß*	*p*
54 months	-0.07	.21	-0.01	.83	-	-	-	-
G1	-0.12	.05	-0.03	.55	-	-	-	-
G3	0.04	.51	-0.03	.59	-	-	-	-
G4	-0.12	.02	0.01	.80	-	-	-	-
G5	0.02	.67	-0.01	.81	-	-	-	-
G6	-	-	-	-	0.01	.86	0.01	.84
Age 15	-	-	-	-	0.03	.34	0.001	.99

Note. Att = negative attributions; FQ = friendship quality; PQ = positive romantic relationship quality; NQ = negative romantic relationship quality.

Table 2.5
Negative Attributions and Friendship Quality Predicting Romantic Relationship Quality

	Att → PQ		Att → NQ		FQ → PQ		FQ → NQ	
	ß	*p*	*ß*	*p*	*ß*	*p*	*ß*	*p*
G3 - G6	0.05	.31	-0.04	.48	0.26	< .001	0.22	< .001
G4 - G6	0.06	.24	0.06	.47	-0.11	.14	-0.27	< .001
G5 - G6	-0.08	.16	0.04	.52	0.47	< .001	0.26	< .001
G3 - Age 15	-0.01	.73	0.03	.55	-0.35	< .001	-0.03	.48
G4 - Age 15	-0.02	.65	-0.02	.73	0.23	< .001	-0.05	.33
G5 - Age 15	-0.04	.29	0.01	.81	0.08	.13	-0.15	.01

Note. Att = negative attributions; FQ = friendship quality; PQ = positive romantic relationship quality; NQ = negative romantic relationship quality.

Model Comparison

We examined whether a model with direct and indirect effects or a model with just indirect effects best explained the process through which early attachment predicts adolescent romantic relationship functioning. We conducted a chi squared difference test between the structural model presented above, and a structural model with no direct paths from early attachment to romantic relationship quality. Neither model fit significantly better than the other $(\chi^2\varDelta(4) = 0.52, p = .97)$. We interpret this with caution given no direct or indirect effects of attachment on romantic relationship quality were significant.

Exploring Gender Differences

Given gender differences in adolescents' experiences in romantic relationships (Sears et al., 2006; Shulman & Scharf, 2000), we used a multigroup model to test whether structural paths between romantic relationship variables and attributions, friendship quality, and attachment differed between boys and girls. Three significant group differences emerged. First, there was a significant link between greater negative attributions in fifth grade and less positive romantic relationship quality in sixth grade for boys $(\beta = -0.18, p = .03)$ but not girls $(\beta = 0.05, p = .52)$. Second, although neither link was significant, negative attributions in fifth grade predicted *less* negative romantic relationship quality at age 15 for girls $(\beta = -0.09, p = .15)$ but *more* negative romantic relationship quality for boys $(\beta = 0.12, p = .15)$. Finally, the link between greater friendship quality in fourth grade and more positive romantic relationship quality at age 15 was stronger for girls $(\beta = 0.30, p < .001)$ than for boys $(\beta = 0.15, p = .011)$.

Discussion

The present study examined attribution biases and friendship quality as sequential mediators on pathways from early attachment to mothers to romantic relationship quality in

young adolescence, as well as the enduring effects of early attachment on romantic relationship quality. The hypotheses were unsupported, such that there was no evidence for indirect effects of early attachment on romantic relationships. Early insecurity to mothers, however, did link to more negative attributions in first and fourth grade, negative attributions in third grade significantly linked to better friendship quality in fourth grade, and friendship quality in third, fourth, and fifth grade related to romantic relationship quality in sixth grade and at age 15. There were no direct effects of early attachment on friendship quality or on romantic relationship quality at any time point.

The present study makes an important contribution to the literature by providing compelling evidence that friendship quality in middle and late childhood predicts young adolescents' relationship quality and some indication that early attachment relates to children's attributions about peers. Further, the study contributes to the literature by failing to support two pathways through which early attachment may relate to later romantic relationship outcomes. The lack of support for the hypothesized pathways can help direct the field to examine alternative avenues through which early attachment predicts (or does not predict) later relationship outcomes.

We begin the following section with a discussion of findings surrounding the mediating role of negative attributions (hypotheses 1 and 2). Next, we discuss findings surrounding the sequential mediating roles of negative attributions and friendship quality (hypothesis 3). Then, we discuss exploratory findings and broader implications for attachment theory. We conclude by addressing study limitations and future directions.

The Mediating Role of Negative Attributions on Pathways from Early Attachment to Romantic Relationship Quality (Figure 2.1A)

Hypothesis 1 stated that negative attribution biases in fifth grade would directly predict sixth graders' and 15-year-olds' less positive and more negative romantic relationship quality. This hypothesis was not supported, such that negative attributions did not relate to romantic relationship quality. Exploratory analyses, however, did show a link between boys' (but not girls') greater negative attributions in fifth grade and less positive romantic relationship quality in sixth grade. Hypothesis 2 stated that negative attribution biases from 54 months to fifth grade would mediate a link between early insecure attachment to mothers and sixth graders' and 15-year-olds' less positive and more negative romantic relationship quality. This hypothesis was unsupported, such that negative attributions did not mediate an indirect effect of early attachment on any romantic relationship outcomes.

Attachment and Negative Attributions **(Figure 2.1A; Path a)**

That early attachment showed some relation to negative attributions—in first and fourth grade—aligns with research that indicates early attachment predicts individual differences in attributional processes in early (Cassidy et al., 1996) and middle (Zajac et al., 2020) childhood. Findings could reflect that children's secure internal working models of their mothers (e.g., as supportive, well-intentioned, and trustworthy) could be generalizing to facilitate children's positive cognitions about peers' intentions. That more links did not emerge may reflect that attributional processes are best predicted by *concurrent* levels of attachment (e.g., see Dwyer et al., 2010 for evidence of cross-sectional links between attachment to parents and attributions about peers).

In the present study, there was a lagged effect of attachment on attributions, such that attachment did not predict attributions at 54 months. It is possible that increases in cognitive capacities from 54 months to first grade cause attributional processes to solidify and relate more

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strongly to expected constructs. Still, this lagged effect does not align with past research that indicates attachment predicts attributions as early as 18 months (Suess et al., 1992) or the theory that attachment can generate negative cascades by fueling *early* attribution biases that initiate a host of social problems (Dykas & Cassidy, 2011; Lansford et al., 2011). Measurement differences between the two time points may also explain the lagged effect—the attributions questionnaire in first grade had more stories (eight) than the one at 54 months (four). As such, it is possible that the first-grade measure had less error (reliability was indeed higher) and was more accurate in assessing attribution biases.

Negative Attributions and Romantic Relationships (Figure 2.1A; Path b)

That no links emerged between attributions and romantic relationship quality contrasts past literature (e.g., Pearce & Halford, 2008). Past research on this connection, however, largely examines how attributions about *romantic partners* predict relationship outcomes. It is possible that attributions about *peers* do not reflect a global attribution bias across relational domains (i.e., about romantic partners). If the negative attribution bias is specific to peers, it may not generalize to affect attributions about romantic partners. Biases about peers may therefore not relate to thoughts and behaviors in romantic relationships. Further, research on links between attributions and relationship quality is largely in adults. It is possible that attributional processes do not play as significant of a role in young adolescents' relationship dynamics as they do in adult relationships. Instead, peer and parental factors such as peers' attitudes about relationship norms (Connolly & Friedlander, 2009) and witnessing parent marital conflict (Kinsfogel & Grych, 2004) may be most influential. The exploratory finding that boys' greater negative attributions in fifth grade predicted their less positive romantic relationship quality in sixth grade, however, indicates that this link is worth further examination.

The Sequential Mediating Roles of Negative Attributions and Friendship Quality (Figure 2.1B)

Hypothesis 3 stated that negative attribution biases and friendship quality from 54 months to fifth grade would sequentially mediate a link between early insecure attachment and sixth graders' and 15-year-olds' less positive and more negative romantic relationship quality. This hypothesis was unsupported, such that negative attributions and friendship quality did not mediate an indirect effect of early attachment on any romantic relationship outcomes. It merits attention, however, that friendship quality consistently linked to relationship outcomes. Although one link between attributions (in third grade) and friendship quality (in fourth grade) emerged, it was in the unexpected direction and there were not enough links to detect the hypothesized total indirect effect.

Negative Attributions and Friendship Quality (Figure 2.1B; Path b).

The scarcity of links between negative attribution biases and friendship quality does not align with past research, such that past empirical work finds such links in childhood (e.g., Chen et al., 2019) and adolescence (e.g., Spencer et al., 2013). It is notable that attribution biases were assessed with questions about *unknown* peers—not close friends; perhaps attribution biases about unknown peers don't affect interactions with friends whom the child knows well. Additionally, friendship quality may be influenced more strongly by other aspects of SIP—such as expectations (Loeb et al., 2016; White et al., 2021). Further, it is possible that attributions affect friendship quality earlier than was examined in the present study, and then early friendship quality uniquely predicts later friendship quality (friendship quality showed significant stability across time points—see Figure 2.2 and Table 2.2). The nature of the one extant link between attributions (in third grade) and friendship quality (in fourth grade) was unexpected, such that

more negative attributions predicted *better* friendship quality. The direction of this effect strongly contrasts past theory (Lemerise & Arsenio, 2010) and research (Chen et al., 2019) and warrants further exploration.

Further, there was no evidence for reciprocal relations between attributions and friendship quality or direct links between attachment and friendship quality. Thus, the present study did not find evidence that attachment drives a cascade wherein attributions and friendship quality reinforce each other and worsen over time. Further, findings contrast SIP theory wherein negative attributions and behaviors in peer relationships reciprocally influence each other (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). That no direct links emerged between security and friendship quality at any time point is particularly surprising; central to attachment theory is the notion that IWMs of parents become internalized to affect thoughts, feelings, and behaviors in other close relationships (Bowlby, 1969/82; Bretherton & Munholland, 2016), and direct links between attachment and friendship are well-documented in past research (see Groh et al., 2014, and Pallini et al., 2014, for meta-analyses). Perhaps early IWMs of caregivers most strongly generalize to affect IWMs (and in turn thoughts, behaviors, and emotions) about less familiar peers—generalizations that could affect outcomes such as peer competence and peer selection— but don't generalize to affect IWMS of close friends—the type of friendships assessed in the present study.

Friendship Quality and Romantic Relationship Quality (Figure 2.1B; Path c)

Friendship quality in third, fourth, and fifth grade consistently linked to romantic relationship quality, albeit sometimes in the opposite direction as expected. More specifically, findings in the expected direction were that greater friendship quality in third grade predicted more positive relationship quality in sixth grade, greater friendship quality in fourth grade

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predicted less negative quality in sixth grade and more positive quality at age 15, and greater friendship quality in fifth grade predicted more positive quality in sixth grade and less negative quality at age 15. Surprisingly, better friendship quality in third grade predicted *more* negative relationship quality in sixth grade and *less* positive romantic relationship quality at age 15, and greater friendship quality in fifth grade predicted *more* negative relationship quality in sixth grade.

The majority of these findings support theory (Rubin et al., 2006a) and research (Oriña et al., 2011) that suggest positive experiences in friendships scaffold high-quality romantic relationships. The present findings contribute to past research on friendships and romantic relationships—a body of work primarily focused on friendships in mid adolescence and romantic relationships in early adulthood—by suggesting these links emerge for young adolescents as well. These connections likely exist because high quality interactions with close friends provide opportunities for children to learn skills critical to positive romantic relationship functioning, such as conflict resolution, compromise, and prosocial skills (Rubin et al., 2006a). Conversely, negative interactions in friendships can transfer into negative behaviors in romantic relationships (Connolly et al., 2000). For instance, research has shown that adolescents who are aggressive towards friends are also aggressive towards romantic partners (Connolly & Friedlander, 2009). Further, strong friendships can serve as sources of support and guidance while adolescents navigate the challenges of dating. Indeed, one study found that young adults with high perceptions of support from friends had higher quality romantic relationships (Wider et al., 2019).

That greater friendship quality sometimes predicted *more* negative romantic relationship quality and *less* positive relationship quality is somewhat counterintuitive. Yet the majority of

research on links between adolescent friendships and dating experiences examines friendships in mid-adolescence (e.g., Simpson et al., 2007), and processes may work differently in early adolescence. For instance, strong friendships can set high standards for early romantic partners, and conflict may ensue when early partners do not meet these standards. More specifically, research indicates that more conflict exists in adolescents' romantic relationships than in their friendships (Furman & Shomaker, 2008; Kuttler & La Greca, 2004), and this conflict may be particularly distressing to adolescents who are accustomed to positive interactions. To the extent that adolescents with high quality friendships are particularly disconcerted by conflict, they may respond to partners negatively—fueling even greater conflict. These counterintuitive findings are worthy of further examination.

The results indicate that friendship quality in middle childhood had an enduring effect on young adolescent romantic relationship quality that was independent of the proximal effect of friendship quality in late childhood. In other words, variation in friendship quality in middle childhood carried over to predict romantic relationship quality in ways that were not simply because of the correlation between friendship in middle and late childhood (see Figure 2.2). It is possible that the independent effects of middle childhood friendship quality on young adolescent romantic relationship quality are because friendship experiences in middle childhood shape social skills critical to later romantic relationship functioning. Additionally, it is more likely that the specific friendships the participants reported on in late childhood (relative to those from middle childhood) endured into young adolescence. As such, it is possible that the independent effects of more proximal friendship quality on romantic relationship quality are because of *concurrent* social capital, such that having high-quality friendships is beneficial while

adolescents are navigating the challenges of their first relationships. These results highlight the importance of fostering positive friendship experiences throughout childhood.

Exploring Direct Effects of Early Attachment on Romantic Relationship Quality (Figure 2.1B; Path d).

No direct effects of attachment to mothers on positive or negative relationship quality in sixth grade or at age 15 emerged. These findings contrast the existing—but somewhat sparse— evidence from past research that early attachment does indeed predict later romantic relationship outcomes (e.g., Englund et al., 2011; Roisman et al., 2005). It is possible that peers play a stronger role than parents in adolescents' romantic relationships. In one study of adolescents, high-quality friendships predicted greater emotional intensity of romantic relationships, however, the quality of parent-adolescent relationships did not (Shulman & Scharf, 2000). Similarly, in the aforementioned study wherein perceptions of support from friends related to better romantic relationship quality, perceptions of support from *parents* did not (Wider et al., 2019). Another possibility is that witnessing parent marital conflict has a greater bearing on romantic relationship quality in early adolescence than mental representations of parents do (see Grych & Kinsfogel, 2010; Steinberg et al., 2006, for evidence of interparental conflict predicting adolescents' poor romantic relationship outcomes). It is also possible that attachment in *adolescence* is more predictive of adolescents' relationship quality than early attachment is (see Tan et al., 2016; Loeb et al., 2020; Miga et al., 2010, for evidence that adolescent insecure attachment states of mind relate to poor romantic relationship outcomes).

Additional Findings: Stability

It merits attention that negative attributions and friendship quality were relatively stable across time. Particularly, friendship quality showed significant stability across all pairs of time

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points (see Table 2.2). Such stability supports the notion that positive experiences in friendships scaffold continued positive experiences in future close relationships (Rubin et al., 2006a). It is also possible that affiliating with peers with positive characteristics (e.g., prosocial characteristics) promotes long term affiliation with larger networks of peers with positive characteristics that facilitate high friendship quality. Yet measures were about a best friend, and it is possible that stability could simply reflect participants reporting about the same best friend across time.

Negative attributions were stable between all pairs of time points but one (from first grade to third grade). Such stability could reflect negative attribution biases perpetuating themselves through self-fulfilling prophecies wherein attributions predict negative interactions that facilitate future negative attributions (see Loeb et al., 2016, for evidence of self-fulfilling prophecies generated from negative expectations of unknown peers). Although negative attributions and friendship quality did not show reciprocal relations indicative of self-fulfilling prophecies, it is possible that reciprocal relations may emerge for experiences with less familiar peers. Additionally, attributions were not measured in second grade, and it is possible that the lack of stability from first to third grade is because stability is, on average, lower between more distal time points (Fraley et al., 2011; Jones et al., 2018).

Broader Implications for Attachment Theory

It is critical to note that study hypotheses—although strongly grounded in theory and past published research—were largely unsupported. These unexpected findings underscore the importance of continuously scrutinizing long-held theories—especially that early attachment-related experiences have long lasting impacts on later close relationships. It is possible that attachment does indeed have a long-lasting impact, but through entirely different mechanisms

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than those examined in the present study. For instance, past research indicates that self-esteem (Chandler & Lawrence, 2021) and emotion regulation (Cassidy, 1994; Rusu et al., 2019) relate to both attachment and romantic relationship outcomes. As such, these may be two important mechanisms.

It is also possible that early attachment does not have a long-lasting impact, and the file drawer problem (Rosenthal, 1979) could have contributed to why the results were unexpected. More specifically, it is possible that only the studies showing enduring links from infancy to adulthood (e.g., Girme et al., 2021) were published, and studies with null results were not accepted (or even submitted) for publication. To the extent that this file drawer problem exists for such research, it could have led the field to overemphasize the enduring effect of early attachment—perhaps evidenced by the small to moderate direct effects in past research (see Fraley & Roisman, 2019, for a discussion of variability in longitudinal links between early caregiving experiences and later romantic attachment). It is important to publish and build on null results by testing alternate theories. One promising avenue includes using data driven approaches (i.e., regression tree-based methods) in large datasets to derive new hypotheses. Such methods can help the field uncover new moderators and better understand how the broader ecological context affects links between early attachment and later relationships. Approaches such as these can help reconcile conflicting findings and refine and strengthen attachment theory.

The findings are promising from a public health perspective, such that the present study adds to work supporting the idea that early experiences do not define destiny (Zeanah, 2009). Resilience factors may be at play, such as secure attachments to additional caregivers, teacher-student relationships, and positive friendship experiences. Dissemination of null findings for

direct links can help alleviate parents' and practitioners' concerns that early poor-quality parent-child relationships predispose children for a lifetime of poor social outcomes.

Strengths, Limitations, and Future Directions

The present study includes many strengths. The study is rooted strongly in theory and past research and addresses important gaps regarding central tenets of attachment theory. Further, the study made use of gold standard measures and methods across multiple modalities (i.e., self-report, mother-report, behavioral observation). Another notable strength is the use of such methods across 15 years of development. Regarding statistical analyses, the use of latent variable modeling mitigates the influence of measurement error (Hancock, & Mueller, 2013) and the study was well-powered to test the hypotheses—alleviating concerns for type two errors.

Although the study has many strengths, findings must be considered in light of study limitations. It is important to note that the study only included participants who were in relationships in either in sixth grade, at age 15, or at both time points. This form of subsetting is common (and often necessary) in studies of adolescent relationships (e.g., Miga et al., 2010), yet research indicates that adolescents who date at an early age may differ from those who wait longer. More specifically, research shows certain risk factors link to early onset of dating, such as family stressors and poor-quality relationships with parents (Collins, 2003) and that early dating onset is associated with later poor psychosocial functioning (Zimmer-Gembeck et al., 2001). Thus, it is important to consider the extent to which our findings would generalize to participants without a propensity to date at an early age. The analyses, however, statistically controlled for factors that predict early dating, such as family stressors (SES and maternal education) and an indicator of mother-child relationship quality (insecure attachment to mothers) in all the links in the model (e.g., those between friendship quality and romantic relationship

quality). Statistically matching participants on risk factors related to dating onset helps generate estimates that generalize to low-risk populations.

The study was correlational, so causality cannot be inferred for any relations in the study. Experimental research could be fruitful, such as testing the effects of manipulating temporary feelings of security (security priming) on attributions and interactions with friends (see Chapter 4 [this volume] for evidence that security priming reduces negative attributions in young adults; see Gillath & Karantzas, 2019, for a review of additional outcomes of security priming).

Although cross-lagged panel models (CLPMs), such as that used in the present study, are commonly used to test developmental processes (e.g., Chow et al., 2016; Wang et al., 2013), they are not without limitations. Although path estimates are typically interpreted as *between-person effects* (the average difference in the outcome due to a change in a participant's level of the predictor, relative to other participants' levels of the predictor), *within person effects* (the average difference in the outcome due to a change in a participant's level of the predictor, compared to the same participant's mean level of the predictor across time) also contribute to the path estimates; this intertwining of between- and within-person effects can impede interpretability of the effects (Berry & Willoughby, 2017). In the present study, we were unable to use alternate methods such the latent curve model with structured residuals to disentangle such effects. This is because attachment was not assessed repeatedly across all time points in the present study, and assessments for friendship quality and attributions changed across time points. Future researchers should examine related questions with more modern approaches to modeling developmental processes (Curran & Hancock, 2021) to disentangle between- and within-person effects.

Some limitations exist surrounding measurement. For instance, measures of negative attributions and friendship quality differed across time points. As such, it was not possible to test measurement invariance of attributions or friendship quality across time. Further, changes in assessment methods across time limits the ability to draw conclusion about timing effects, such that it could be either developmental or measurement differences (or both) that determine the ages when links emerge. It is challenging to address this limitation because measures become less developmentally appropriate as children age, yet future research could implement measures with select overlapping items to establish invariance across time (see Tyrell et al., 2019, for a discussion of this method).

Although the NRI is a well-validated measure of relationship quality, it is possible that the various positive (e.g., nurturance) and negative (e.g., conflict) relationship quality subscales do not capture adolescents' *perceptions* of relationship quality—a relationship outcome that may relate more strongly to study variables than objective relationship quality as determined by the NRI scale developers. When considering this limitation, it is also important to note that there may be gender and age-related differences in the extent to which the NRI captures perceived relationship quality. For instance, one qualitative study found that girls emphasized caregiving when discussing advantages of being in relationships more than boys did (Shulman & Scharf, 2000; see also Sears et al., 2006, for a discussion of gender differences in adolescents' perceptions of abuse in relationships), and older adolescents were less likely than younger adolescents to endorse companionship and more likely to endorse excitement as advantages to being in relationships (Shulman & Scharf, 2000). Future research could mitigate issues of age and gender related differences in factors that determine perceived relationship quality by asking directly about perceived relationship quality.

Additional measurement concerns regard the use of self-report measures for romantic relationship quality. Further, some friendship quality time points only included self- or mother-report indicators (yet loading constraints were imposed to use information from time points with friendship observations to model friendship at time points without observations). Future research could incorporate more interaction tasks and behavioral observation.

Additional future directions include examining factors that promote resilience in the face of early insecure attachment, which aspects of friendship quality best explain romantic relationship outcomes, how within-person changes in study variables relate to each other, links between attributions about romantic partners and romantic relationship outcomes, links between study variables and mid to late adolescent romantic relationship quality, and links between study variables and attachment to fathers. Further, it is important to acknowledge the larger ecological context of the findings. Future work could test processes examined in the present study in different sociocultural contexts, such as clinical samples, samples with experiences of racial discrimination, and low SES, non-WEIRD, and LGBTQ samples.

Conclusion

The present study did not find evidence that negative attribution biases and friendship quality work together to explain longitudinal links between early attachment to mothers and romantic relationship outcomes, and no direct links between early attachment and romantic relationship outcomes were apparent. Findings did, however, reveal that attachment security links to negative attributions (albeit, inconsistently across ages) and that friendship quality in late childhood relates to romantic relationship outcomes in early adolescence. Findings highlight the importance of experiences with peers in laying the foundation for experiences with romantic partners. Further, the present study underscores the importance of continuing to evaluate the

claim that early attachment experiences have lasting impacts on close relationships throughout

the lifespan.

Chapter 5: Attachment, Attribution Biases, and Responses to Romantic Partners' Behaviors: An Experimental Mediation Analysis

Abstract

Abundant research indicates that insecure attachment relates to a host of romantic relationship problems. Yet questions about *why* such a connection exists remain open. Although social information processing (SIP) is one widely proposed mechanism, much of the work examining the mediating role of SIP is *correlational*. The present study uses an experimental design to evaluate whether one key component of SIP—negative attribution biases—could explain links between attachment and experiences in romantic relationships. We hypothesized that negative attribution biases would mediate links between security priming and negative explicit and implicit behavioral tendencies in response to imagined hypothetical romantic partners' transgressions. Participants who were not in relationships ($N = 198$) completed a security priming procedure wherein they were asked to visualize either a person they would turn to in times of trouble (secure prime) or a person they do not know well (neutral prime). Participants then made attributions about hypothetical imagined future romantic partners' transgressions, reported on their likely behavioral responses to the transgressions (explicit responses), and completed a novel go/no-go association task (GNAT) assessing implicit response tendencies. The findings revealed that individuals who were neutral primed made more negative attributions than those who were secure primed, and negative attributions in turn predicted participants' negative explicit responses. There was, however, no indirect effect of security priming on implicit response tendencies. These findings suggest that feelings of security may reduce negative attribution biases, and that attribution biases could play an important role in explaining links between attachment and experiences in romantic relationships.

Introduction

Abundant research shows that individuals' attachment orientations—broadly defined as the extent to which individuals are confident in the supportive responsiveness of relationship partners and their comfort in relying on them (Mikulincer & Shaver, 2007)—relate to the quality of their romantic relationships (Feeney, 2016; Mikulincer, 2006). Although empirical work has illustrated some mechanisms that explain this relation, such as emotion-regulation, conflict management, and caregiving quality (Mikulincer, 2006), questions regarding why attachment and relationship outcomes are connected remain open.

The following example illustrates an additional mechanism. Imagine that a man is looking forward to cooking dinner with his wife after a stressful day at work. When he arrives home, he learns that she has cancelled their plans in order to see a friend. He may wonder why she did this. One possibility is that her friend was in a crisis and his wife displayed sensitivity and kindness by putting her own plans aside to help the friend. Another is that she didn't value her plans with her husband, and insensitively abandoned the plans in favor of a preferred activity. Both reasons are plausible; he cannot know for sure which is true without more information. Before he obtains such information, he will need to rely on two sets of knowledge to interpret her behavior: in part on his previous knowledge of his wife's behaviors and motives, and in part on his broader thoughts and beliefs about the nature of close relationships. His inference about her ambiguous behavior will likely influence his next interaction with his wife, thereby determining whether this event leads to conflict.

Theory and empirical work explain individual differences in the outcomes of such scenarios by suggesting that attachment orientations influence how individuals process social information (Bowlby, 1969/82; Dykas & Cassidy, 2011; Mikulincer & Shaver, 2007). Research

demonstrates that social information processing (SIP), in turn, can contribute to a variety of outcomes in romantic relationships (Feeney, 2016; Mikulincer & Shaver, 2007). One facet of SIP that has particularly interested social scientists is *negative attribution biases*—that is, tendencies to attribute social partners' ambiguous behaviors to negative intentions or characteristics (Nasby et al., 1980).

Many researchers have examined links between attachment and attribution biases in romantic relationships (e.g., Collins et al., 2006; Kimmes et al., 2017; Pearce & Halford, 2008). Methodological limitations, however, prevent them from doing so fully because most research examines links between attachment and attributions *about one's own partner*. When individuals make negative attributions about *their own partner*, the negative attribution could reflect two things: a) a negative attribution *bias*, and/or b) accurate assessments of negative characteristics and behaviors of the specific partner. The present study aims to address this limitation by experimentally evaluating whether security is associated with lower negative attribution biases when evaluating *hypothetical future partners' transgressions*, and whether lower negative attribution biases, in turn, are associated with fewer negative responses to possible transgressions (see Figure 3.1 for the theoretical model).
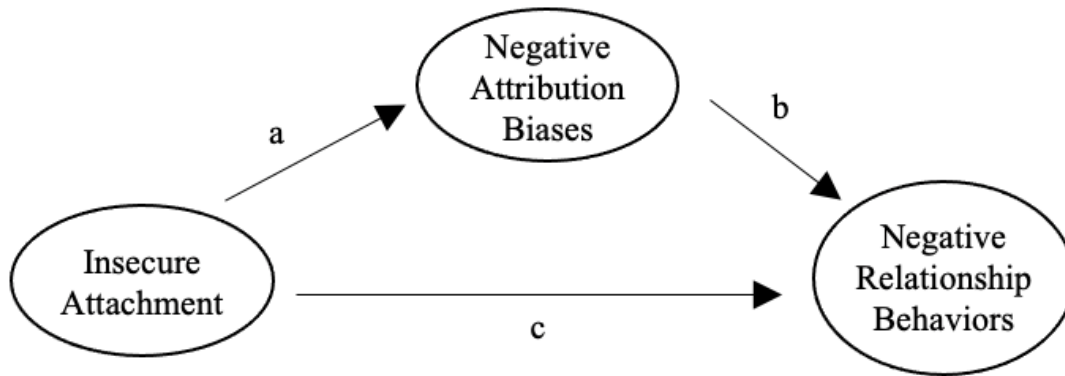
Figure 3.1. Theoretical model. Negative attribution biases mediating a link between insecure attachment and behaviors in relationships.

Attachment, Attribution Biases, and Attributions About Partners' Behaviors

As illustrated in the example above, individuals often receive ambiguous social input from romantic partners. Although the information is ambiguous, individuals must somehow interpret behaviors in order to know how to respond. Humans evolved with a cognitive mechanism to address this challenge—a way to quickly interpret social cues—which is critical for decision making in times of threat. This mechanism is referred to as an internal working model (IWM; Bowlby 1969/82; Cassidy, 2021). Experiences with close relationship partners shape IWMs of attachment. They encompass thoughts and beliefs about others' availability and responsiveness and about one's own worthiness of care. As such, negative IWMs of attachment (also operationalized as insecure attachment) can lead individuals to interpret ambiguous social input in negative ways. For example, someone with an insecure attachment orientation may enter social situations thinking others are "out to get them" and tend to interpret benign actions as aggressive—that is, hold a negative attribution bias. Indeed, intriguing data patterns indicate that children and adolescents' insecure attachment to their parents relates to negative attribution biases when making attributions about unknown peers (e.g., Raikes & Thompson, 2008; Simons et al., 2001; Zajac et al., 2020). Children and adolescents' attribution biases are assessed through

vignette-based measures which involve showing stories of peer provocations (e.g., a video of a child's block tower being knocked down by a peer) and asking participants about the unknown peer's intentions (Dodge et al., 1986). Attributions measured in this way allow researchers to capture a true bias. This is because the participants have no previous experience upon which to draw when making attributions about the unknown hypothetical peers.

A separate body of work demonstrates that adults' attachment style dimensions, namely attachment anxiety (fears of abandonment and rejection by relationship partners and preoccupation with relationships) and attachment-related avoidance (discomfort with emotional closeness with relationship partners and with reliance on others for support) relate to their negative attributions about *their own romantic partners* (e.g., Gallo & Smith, 2001; Pearce & Halford, 2008). The majority of such studies utilize the Relationship Attributions Measure (RAM; Fincham & Bradbury, 1992). The RAM presents vignettes of partners' transgressions and asks participants to imagine they are in the situations with *their partners.* Next, participants rate the extent to which they agree with a variety of possible negative reasons for *their partners'* behaviors in the scenarios. For example, one study (Hazelwood, 2012) found that women with high levels of either attachment anxiety or attachment-related avoidance endorsed more negative reasons for their partners' imagined behaviors. Men with these attachment insecurities, however, did not show the same trend. Another study (Collins et al., 2006) found that participants with high attachment anxiety made negative attributions when rating possible explanations for their partners' behaviors. Other researchers (Gallo & Smith, 2001) found that men who scored high on attachment-related avoidance (but not anxiety) made negative attributions about their wives.

Although such research examines attributions—momentary appraisals of why a partner acted a certain way—it is unclear whether it examines attribution *biases*—a person's tendency to

make negative attributions. The attributions could reflect an experience-based potentially accurate understanding of that partner's likely intentions based on the partner's characteristics and previous behaviors. Therefore, attributions in this line of work may reflect an attribution bias, a specific partner's characteristics and behavior, or a combination of both. Attributions measured in this way cannot disentangle attribution biases from the partners' characteristics and behaviors. Nonetheless, researchers often interpret findings as reflecting "tendencies" of an individual to make negative attributions (i.e., attribution biases) (e.g., Collins et al., 2006; Gallo and Smith, 2001)—regardless of the important methodological limitation that clouds such an interpretation. Researchers sometimes acknowledge this limitation. For instance, Pearce and Halford (2008) acknowledged that it is likely that attributions elicited from vignette-based measures about an individual's own partner are dependent on that partner's past behaviors. It is notable that one study about attachment and attributions did aim to disentangle the two by asking participants to imagine hypothetical romantic partners (Collins et al., 1996); however, many of these participants were in current relationships. Their relationship statuses make it difficult to conclude that participants were not drawing upon experiences from their current relationships. We argue that to fully understand whether insecure attachment predicts the pure SIP process of negative attribution biases, it is essential to disentangle an individual's attributional processes from the assessment of a specific, well-known partner's motives.

Negative Attributions and Relationship Functioning

The notion that negative SIP guides negative behaviors is well grounded in theory (Bowlby, 1969/82, 1980; Crick & Dodge, 1994; Dykas & Cassidy, 2011; Lemerise & Arsenio, 2000). Moreover, research demonstrates that negative attributions about partners' behaviors relate to negative responses toward such behaviors (Collins et al., 2006; Schaefer-Porter &

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Hendrick, 2000), anger during interactions with partners (Fincham & Bradbury, 1992), and poor communication (Pearce & Halford, 2008). Given this empirical evidence, it is unsurprising that abundant research has documented relations between negative attributions and poor relationship satisfaction (see Bradbury & Fincham, 1990, for a review; Chatav & Whisman, 2009; Fincham & Bradbury, 1992). One particularly notable longitudinal study evaluated negative attributions and marital satisfaction over the course of eight years (Karney & Bradbury, 2000). Initial levels of attributions predicted changes in marital satisfaction more than initial levels of satisfaction predicted changes in attributions. These results indicate that attributions could be the factor driving satisfaction, instead of vice versa. Yet it is important to note that most research on links between negative attributions and relationship functioning also use the RAM. Thus, such research is limited in its ability to partial out whether it is the attribution biases or the partners' negative characteristics that predict relationship outcomes. Nonetheless, research on links between negative attributions about one's partner and relationship functioning still provides important indications that attribution biases *might* relate to relationship functioning.

Gaps in Understanding Links Among Attachment, Attribution Biases, and Relationship Outcomes.

Although a large body of evidence exists on links among attachment, attributions, and relationship outcomes, notable limitations and gaps remain. The most central limitation is that researchers who study attributions often interpret their findings as reflecting the antecedents and consequences of attributional tendencies. However, as previously mentioned, most of the work on attributions in romantic relationships measures attributions about an individual's own partner. When attributions are measured in this way, it is not possible to separate attribution biases from partners' characteristics or behaviors (see Waldinger & Schultz, 2006, for one possible

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exception). More research on attribution *biases* is needed to have confidence that it is truly the SIP process of attributional tendencies that attachment predicts and that, in turn, predict negative relationship outcomes.

An additional limitation that merits attention is that it is difficult to rule out alternative explanations for a causal link between attachment and attributions (Figure 3.1, path a), because research on this link is largely *correlational* (e.g., Collins et al., 2006; Hazelwood, 2012). One alternative explanation involves reverse causality, such that negative attributions instead contribute to a person's insecurity. Perhaps believing a partner has negative intentions contributes to fears of abandonment (reflected in attachment anxiety) or discomfort with being close to that person (reflected in attachment avoidance). Another alternative explanation is that a confounding variable may be at play, such as a partner's negative behaviors. More specifically, it is possible that the relation between insecure attachment and negative attributions is spurious and is a reflection of the fact that a specific partner's negative behavior causes both insecurity and negative attributions. Because experiences contribute to IWMs of attachment, it is likely that a partner's negative behavior could contribute to insecurity. Further, because individuals are likely to use knowledge of their partners to make attributions, it is likely that partners' negative behaviors would lead individuals to make negative attributions about them (see Figure 3.2 for graphical depictions of these two possible explanations for links between attachment insecurities and negative attributions that differ from that proposed link in Figure 3.1, path a).
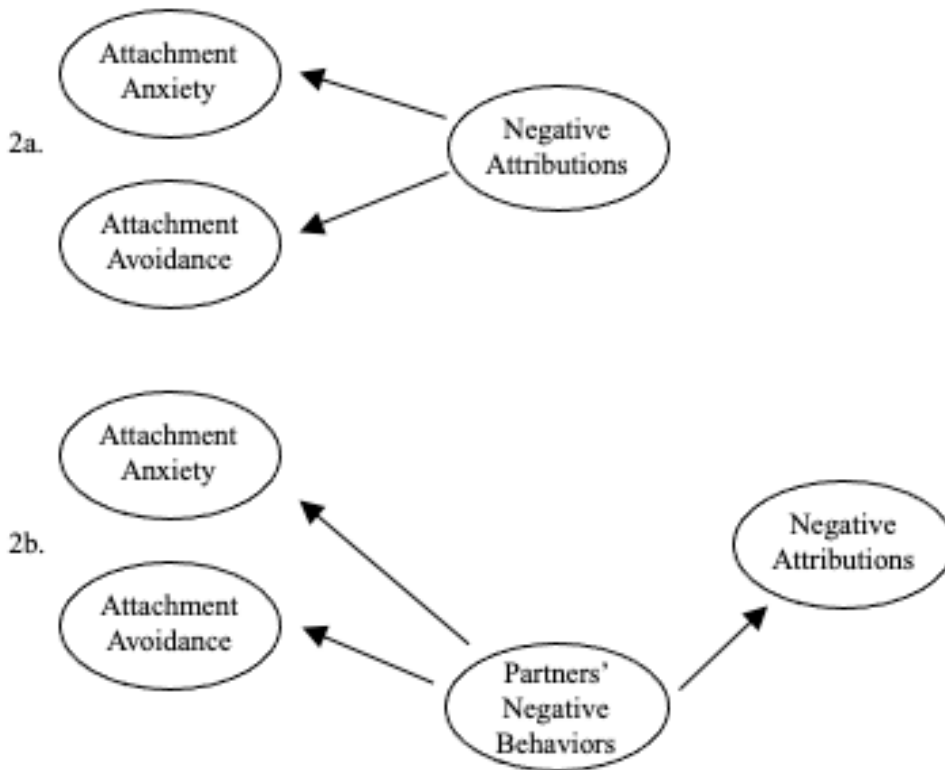
Figure 3.2. Alternate explanations for links between attachment insecurities and negative attributions. 1a: Reverse causality. 1b: Partners' behaviors as a confounding variable.

Two experimental studies using security priming—an experimental proxy for attachment security that temporarily activates a secure mental representation of attachment—do address the limitation of potential alternate explanations for a causal link between attachment and attributions. One such study demonstrated that security priming led pessimistic individuals to make fewer negative attributions about the occurrence of specific events (Deng et al., 2016). Another study revealed that security priming reduced attributions about a company's guilt following a negative occurrence (Whelan & Dawar, 2016). Although neither study directly examined the causal link between attachment and attribution biases about social partners' behaviors, their findings on related constructs provide some indication that this causal link may exist.

It is also important to note that research on the direction of effects for links among attachment, attribution biases in adults, and relationship outcomes (Figure 3.1, paths a and b) is limited. One longitudinal study demonstrated evidence of attributions preceding relationship problems (Karney & Bradbury, 2000),yet more research is needed on whether attribution biases put relationships at risk for or stem from negative relationship dynamics. Moreover, much research on attributions and relationship outcomes utilizes *self-report* measures to assess relationship outcomes. Such measures may succumb to social desirability bias, and it is important to incorporate implicit tasks as well. We argue that it is critical to address gaps and limitations about research on attachment, attribution biases, and relationship outcomes. This is in part to strengthen the causal theory, and in part to aid clinicians' knowledge of whether attributional tendencies are worthy intervention targets.

The Present Study

The present study emerged from: (a) correlational evidence indicating that negative attribution biases might mediate a pathway from insecure attachment to negative relationship outcomes, (b) the need to address methodological limitations of previous research on attribution biases, (c) a lack of experimental evidence of links between attachment and attribution biases, and (d) sparse evidence on both the direction of effects of links between attachment and attribution biases and between attribution biases and relationship outcomes. The present study is the first to utilize the experimental procedure of security priming to examine the relation between attachment and negative attribution biases about hypothetical future romantic partners' behaviors. It is also the first to examine whether such biases mediate links between security priming and responses to hypothetical romantic partners' transgressions. Participants who were not in current relationships ($N = 198$ university students) first completed a security priming

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visualization procedure, then read four vignettes about hypothetical future romantic partners'

transgressions. For each vignette, participants first rated the likelihood of each of several reasons

for the behavior described in the vignette, then reported on how they would respond to the

behavior, and finally completed a task to assess their implicit responses to the potential

transgressions. The implicit task was included to avoid social desirability biases when reporting

responses. Implicit responses were assessed with a novel version of the go/no-go association task

(GNAT; Nosek & Banaji, 2001). Although the GNAT is frequently used to measure implicit

associations (e.g., Sturge-Apple et al., 2015), a variation has also been used to test implicit

responses (Jones et al., 2021).

       We focus our hypotheses on a sample of participants who are not in relationships because

the individuals answered questions about a hypothetical person they have not met; therefore, they

could not draw on that person's specific characteristics or behaviors when making attributions.

As such, the momentary attribution should reflect an attributional tendency, that is, an attribution

bias. Our pre-registered hypotheses (see https://osf.io/ebp6n) include that:

1) Security primed participants would demonstrate a lower attribution bias than neutrally
   primed participants when responding to vignettes of hypothetical partners' behaviors.

2) Reduced negative attribution biases would mediate a link between security priming
   and less negative *implicit* responses to hypothetical future partners' ambiguous
   behaviors.

3) Reduced negative attribution biases would mediate a link between security priming
   and less negative *explicit* self-reported responses to hypothetical future partners'
   ambiguous behaviors.

We also examined several pre-registered exploratory questions to deepen the interpretation of our findings. For instance, it is important to examine whether effects differ by attachment style (see research showing that results of security priming can vary as a function of attachment anxiety and avoidance; Cassidy et al., 2009). As such, we will explore the following two questions:

1) For participants who are not in relationships, does the effect of security priming on negative attribution biases differ as a function of attachment anxiety and avoidance?

2) For participants who are not in relationships, does the indirect effect of security priming on implicit and explicit responses through attribution biases differ as a function of attachment anxiety and avoidance?

Although the study focuses on hypotheses about participants who were *not* in romantic relationships at the time of data collection, we also collected data from participants in relationships. We did so in order to explore whether our hypothesized links differed between these two groups. We explored the following additional questions:

3) Does the effect of security priming on attribution biases differ between participants who are not in relationships and are imagining a hypothetical future partner and those in relationships who are imagining a current dating partner?

4) Does the indirect effect of security priming on implicit and explicit responses to partners' behaviors differ between participants who are imagining a hypothetical future partner, and those imagining a current dating partner?

We utilized latent variable structural equation modeling (SEM) to test our hypotheses and exploratory research questions.

Method

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Participants

Participants were 198 undergraduate students recruited from psychology courses at a large American university (26.9% identified as male, 70.6% identified as female, 1% identified as transgender, and 1.5% identified as non-binary) ranging in age from 17 to 23 years (M_{age} = 18.93, SD = 1.15). The sample was racially and ethnically diverse, with 44.7% of the participants identifying as White, 27.9% as Asian, 16.8% as Black or African American, 7.1% as Hispanic / Latinx, 3% as multiracial, and 0.5% as other. Participants were compensated with course credit after completing the lab session.

Procedures

Data collection for the present study took place on two occasions. First, participants completed a battery of online questionnaires in an online survey that took approximately 15 minutes. Participants completed the Experiences in Close Relationships Scale (ECR; Brennan et al., 1998), the Eysenck Personality Questionnaire Revised–Short form, Neuroticism scale (EPQR-S-N; Eysenck et al., 1985), the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979), and questions about demographics.

The second data collection session occurred during a 30-minute lab visit in groups of 1 to 4 participants. During the lab session, research assistants described the session procedures, and participants completed a series of computer-based tasks after providing informed consent. The session began with a priming procedure (described below).

Next, participants were asked whether they were currently in a relationship. This question was nested within a series of filler yes/no questions of neutral valence (e.g., "Do you have any roommates?" "Are you a psychology major?") to draw attention away from the question and reduce possible priming effects of reflecting on one's relationship status.

Next, participants read four vignettes from Collins and colleagues (2006) about romantic partners' potentially negative behaviors (e.g., "Imagine this person left you standing alone at a party where you didn't know anyone"). Participants who reported not being in a relationship were instructed to "Imagine that these situations are happening with someone you may date IN THE FUTURE when answering the questions." Participants who reported being in a relationship were instructed to "Imagine that these situations are happening in YOUR OWN relationship when answering the questions." Following imagining the situation in each vignette, participants answered two sets of questions regarding their attributions about their imagined or real partner's behaviors in the vignette.

Following rating attributions about their imagined or real partners' behaviors in the vignette, participants rated how likely they were to respond in various ways (e.g., "snap or yell," "ignore your partner") using a procedure from Collins and colleagues (2006). Finally, participants completed a novel go/no-go association task (GNAT; Nosek & Banaji, 2001) to test implicit responses to hypothetical partners' behaviors (Conflict Responses Go/No-Go Association Task; CR-GNAT).

Measures

Demographics

Participants answered questions about gender, race/ethnicity, age, and relationship status.

Experimental Manipulation

Participants were randomly assigned to either the secure ($n = 102$) or the neutral ($n = 96$) attachment priming condition. Participants in the secure priming condition received instructions on their screen to think about "the person you can most depend on to be there to comfort you in times of trouble," whereas participants in the neutral priming condition were asked to think about

"someone in one of your classes whom you do not know well and rarely think about." A research assistant then asked participants to close their eyes and guided them through a two-minute visualization of the individual they chose, using procedures developed by Baldwin et al. (1996) and used in previous studies examining the effects of attachment security priming (e.g., Cassidy et al., 2018; Mikulincer et al., 2005) on a broad range of outcomes. After the visualization, participants were asked to write the name of the person they were imagining. This person's name remained in the top left corner of the screen throughout the study.

Attachment Style

Participants completed the Experiences in Close Relationships scale (ECR; Brennan et al., 1998). The ECR is a 36-item self-report measure of the two dimensions of attachment style: attachment anxiety (fear of rejection and abandonment by close relationship partners; 18 items; e.g., "I get uncomfortable when someone wants to be very close to me") and attachment avoidance (discomfort with intimacy in close relationships and relying on relationship partners for support; 18 items; e.g., "I get uncomfortable when someone wants to be very close to me"). Participants rated each item on a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). Following Brennan and colleagues (1998) some subscale items were reverse scored (e.g., "I do not often worry about being abandoned") such that higher scores reflect greater avoidance and greater anxiety. Attachment anxiety and avoidance composite scores were calculated by averaging responses across subscale items. The subscales demonstrated excellent internal consistency (anxiety ω = .89, avoidance, ω = .90).

Attributions About Romantic Partners' Behaviors

Participants read four vignettes from Collins and colleagues (2006) about romantic partners' potentially negative behaviors (e.g., "Imagine your partner didn't comfort you when

you were feeling down."). After each vignette, participants answered two sets of questions regarding their attributions.

The first set of questions about attributions included Collins and colleagues' (2006) explanations for potentially negative partners' behaviors. Participants rated how likely possible explanations were for the behavior in the vignettes on a 7-point Likert-type scale from 1 (*not at all likely*) to 7 (*extremely likely*). For each vignette, participants rated three negative attributions (e.g., "My partner doesn't care enough about me or my feelings.") and three benign (reverse scored) attributions (e.g., "My partner didn't realize I was feeling so down."). Negative attributions on Collins and colleagues' (2006) measure showed good convergent validity with negative attributions on the Relationship Attributions Measure (RAM; Fincham & Bradbury, 1992), a well-validated measure of attributions for partners' behaviors. The subscales demonstrated strong reliability in the present sample (negative ω = .84, benign ω = .78).

The second set of questions about attributions was the *Relationship Attributions Measure* (RAM; Fincham & Bradbury, 1992). Participants completed this measure in response to Collins and colleagues' (2006) vignettes. Participants were asked to rate their agreement on a 6-point Likert-type scale from 1 (*strongly disagree*) to 6 (*strongly agree*) with statements that reflect two subscales of attributions, causal attributions (three items; e.g., "My partner's behavior is due to something about them") and responsibility attributions (three items; e.g., My partner's behavior was motivated by selfish rather than unselfish concerns.") The measure demonstrates strong internal consistency and test-retest reliability (Fincham & Bradbury, 1992) and is a consistent predictor of relationship satisfaction (e.g., Chatav & Whisman, 2009; Karney & Bradbury, 2000). In the present sample, the responsibility attributions subscale demonstrated strong

reliability ($\omega = .79$) and the causal attributions subscale demonstrated moderate reliability ($\omega = .61$).

A negative attributions latent variable was created using four measured indicators. Two of these indicators, from Collins and colleagues' (2006) explanations for partners' behaviors, were mean ratings of (1) negative attributions and (2) reverse-coded benign attributions. Two additional indicators, from the RAM, were mean ratings of (3) causal attributions and (4) responsibility attributions.

Explicit Responses to Partners' Behaviors

After each set of attributions questions, participants rated how likely they were to respond to the behavior in five negative ways (e.g., "snap or yell," "criticize or complain to your partner") on a 7-point Likert-type scale ranging from 1 (not at all likely) to 7 (extremely likely), following Collins and colleagues (2006). This measure has demonstrated strong reliability in previous research (Collins et al., 2006) and in the present sample ($\omega = .92$).

A negative explicit responses latent variable was created using five measured indicators: mean scores for each of the five negative responses across the four vignettes.

Implicit Responses to Partners' Behaviors

Participants completed a novel go/no-go association task to test implicit responses to hypothetical partners' behaviors (Conflict Responses Go/No-Go Association Task; CR-GNAT). Participants first completed two short practice blocks of the CR-GNAT (procedure described below). Next, they were asked to "Imagine that your partner didn't comfort you when you were feeling down." for 30 seconds. Next, the participants were asked to think about how they would respond for 30 seconds. Finally, participants completed the CR-GNAT.

Three types of word stimuli appeared one at a time on the computer screen for 650ms each (stimulus time following Sturge-Apple et al., 2015). Words belonged to either one of two attribute categories (positive and negative) or the target category (the words "my behavior"). Words in the positive attribute category were positive responses to the imagined behavior (e.g., "forgive," "trust,") and words in the negative attribute category were negative responses to the imagined behavior (e.g., "accuse," "yell"). The target category consisted solely of the words "my behavior."

Subjects participated in two positive blocks (one practice round with 14 trials and one real round with 42 trials) and two negative blocks with the same number of trials as the positive blocks, following previous research demonstrating that GNATs can achieve good reliability with 40 or more trials per block (Williams & Kaufmann, 2012). In the positive blocks, participants were instructed to press the space bar when they saw positive words, or the words "my behavior" and to do nothing for negative words. In the negative block, participants were instructed to press the space bar when they saw negative words, or the words "my behavior" and to do nothing for positive words.

Following previous research (e.g., Sturge-Apple et al., 2015), d' (d prime)—a sensitivity parameter derived from signal detection theory that takes both hit rates and false alarm rates into account (Green & Swets, 1966)—scores were used to quantify negative implicit responses. Two d' scores were generated, one for the positive block and one for the negative block. Higher d' scores on the negative block reflect participants' high effectiveness at distinguishing signal from noise when associating negative behaviors (e.g., "yell) with the target ("my partner") and reflect the extent to which participants display an implicit *negative* response to partners' behaviors

(Nosek & Banaji, 2001). Higher d' scores on the positive block reflect an implicit *positive* response to partners' behaviors.

Before calculating d', we standardized hit rates and false alarm rates using the standard normal N(0,1) function. We calculated d' with the following formula: d' = Z(hit rate) – Z(false alarm rate). The loglinear transformation approach was used (Stanislaw & Todorov, 1999) to handle extreme values that cannot be standardized (0s and 1s). Prior to calculating the hit rate, 0.5 was added to the number of hits and false alarms, and 1 was added to the number of signal trials and the number of noise trials. Following previous research (e.g., Boldero et al., 2007; Sturge-Apple et al., 2015) residual scores were utilized to remove method variance and control for general performance on the GNAT. A residualized index of d' scores for the negative block was calculated by regressing d' scores for the positive block on d' scores for the negative block. These scores reflect participants' performance on the negative GNAT block, controlling for overall performance on the GNAT.

Self-Esteem

Participants completed the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979) to assess their feelings of self-worth. Participants rated 10 statements (e.g., "On the whole, I am satisfied with myself;" "I feel that I have a number of good qualities") on a scale of 1 (*strongly disagree*) to 4 (*strongly agree*). A self-esteem composite score was calculated by averaging responses across the 10 items. This measure has shown strong reliability and validity in past research (Gray-Little et al., 1997) and strong reliability in the present sample ($\omega = .90$).

Neuroticism

Participants completed the neuroticism subscale of the Eysenck Personality Questionnaire Revised–Short form, Neuroticism scale (EPQR-S-N; Eysenck et al., 1985) to

assess emotional tendencies. Participants responded yes (1) or no (2) to 12 items (e.g., "Does your mood often go up and down?" "Are your feelings easily hurt?"). A composite neuroticism score was calculated by averaging responses across the 12 items. The measure has demonstrated strong reliability and validity in past research (Francis et al., 1992) and showed strong reliability in the present sample ($\omega = .82$).

Results

Preliminary Analyses and Missing Data

Our full pre-registered analysis plan can be found at https://osf.io/ebp6n. All analyses, unless otherwise noted, were performed on our sample of interest—participants who were not in relationships ($N = 198$). Table 3.1 presents descriptive statistics and bivariate correlations among study variables.

Table 3.1

Descriptive Statistics and Bivariate Correlations Among Main Study Variables

Variable	N (%)	M	SD	1	2	3	4	5	6	7	8
1. Secure prime (Secure)[a]	102 (*51.51*)	-	-	-							
2. Gender (Female)[a]	139 (*70.20)*	-	-	-.03	-						
3. Negative attributions		1.03	0.55	**-.20**	.05	-					
4. Negative explicit responses		2.33	0.79	-.08	**.30**	**.71**	-				
5. Negative implicit responses		-0.10	0.64	-.02	.00	.06	**.22**	-			
6. Attachment anxiety		4.00	0.96	.00	.09	**.45**	**.35**	.03	-		
7. Attachment-related avoidance		3.39	0.93	.00	-.08	**.26**	**.17**	.01	**.29**	-	
8. Neuroticism		0.49	0.28	.00	**.19**	**.37**	**.37**	.02	**.59**	**.37**	-
9. Self esteem		2.91	0.53	.00	-.12	**-.29**	**-.21**	-.02	**-.53**	**-.42**	**-.59**

[a.]All correlations with gender (coded as 1 = male, 2 = female) and secure prime (coded as 1 = secure, 2 = neutral) are either biserial or phi. Correlations in bold are statistically significant (*p* < .05).

We examined whether participants differed in baseline variables across priming groups. We tested phi correlations to determine that there were no group differences in gender or race (all ps > .05). We conducted independent samples t-tests to determine that groups did not differ on levels of attachment avoidance, attachment anxiety, self-esteem, or neuroticism (all ps > .05). We also examined whether baseline variables correlated with our three outcome variables. We utilized Pearson's correlations for continuous baseline variables, and biserial correlations for dichotomous baseline variables.

Negative attributions significantly correlated with self-esteem, neuroticism, attachment anxiety, and attachment avoidance (all ps < .05); explicit responses correlated with gender, self-esteem, neuroticism, attachment anxiety, and attachment avoidance (all ps < .05); finally, no baseline variables correlated with implicit responses (all ps > .05). As such, we controlled for self-esteem, neuroticism, attachment anxiety, and attachment avoidance on all paths predicting negative attributions, and we controlled for this same set of variables (with the addition of gender) on all paths predicting explicit responses. Implicit and explicit responses to partners' behaviors were significantly correlated (r = .22, p = .004). Hit rates were negatively skewed (negative hit rate skewness = -1.51, positive hit rate skewness = -1.86) and false alarm rates were positively skewed (negative false alarm rate skewness = 1.29, positive false alarm rate skewness= 1.15) indicating high performance on the GNAT.

When participants responded to at least 50% of items on a scale, we used participant mean imputation to estimate participants' item responses to compute scale scores. Participant mean imputation is a statistically sound technique when less than 10% of item scores are missing (Parent, 2013, Schafer & Graham, 2002), as was the case across all subscales in the present study for participants who completed the measure. We utilized full information maximum likelihood

estimation (FIML) to handle scale-level missing data. Of the 198 participants, six were missing

gender[5], one was missing race, and two were missing attachment anxiety, attachment avoidance,

neuroticism, and self-esteem. No participants were missing data on any of the indicators for

negative attributions or negative explicit responses. Negative d' scores (indicating below chance

performance) on the Conflict Responses GNAT ($n = 5$) were treated as missing.

Measurement Model

The measurement and structural models were estimated using Mplus version 8.7 (Muthén

& Muthén, 1998-2017). Before testing our hypotheses, we fit a measurement model to evaluate

whether our measured variables were good indicators of our latent variables. We applied the

Satorra-Bentler correction for non-normality of the indicators (Satorra & Bentler, 1994). We

allowed all latent variables to covary and allowed errors for two pairs of items about explicit

responses to partners' behaviors to covary: one pair of items that both reflect aggressive

responses ("snap and yell at this person," "criticize or complain to this person") and one pair of

items that both reflect passive negative responses ("ignore this person" "give this person the

silent treatment"). The measurement model displayed good fit (RMSEA = 0.047, SRMR =

0.036, CFI = 0.986, χ^2 = 772.347, p < .001).

Confirmatory Structural Model[6]

Direct Effects

The main findings are depicted in Figure 3.3. The structural model displayed good fit

(RMSEA = 0.027, SRMR = 0.040, CFI = 0.987, χ^2 = 995.066, p < .001). As hypothesized,

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[5] Given the small proportion of participants that did not identify as male or female (2.5%), we treated these participants' gender as missing. This applied to five out of the six participants who were missing gender.
[6] Data from early participants ($n = 62$) were collected before the Covid-19 pandemic began, and data from the remaining participants ($n = 136$) were collected during the Covid-19 pandemic. We conducted difference tests in a multigroup model to determine whether our structural paths of interest differed based on pre- vs. post-Covid status. There were no significant differences in the hypothesized paths in across the two groups (all ps > .05).

individuals who received the security prime had fewer negative attributions than individuals who received the neutral prime (β = -0.197, p = .005). In partial support of our hypotheses, negative attributions related to more negative explicit (β = 0.702, p < .001) but not negative implicit (β = 0.057, p = .510) responses to partners' behaviors. There were no direct effects of security priming on explicit (β = 0.062, p = .356) or implicit (β = -.008, p = .910) responses to partners' behaviors.
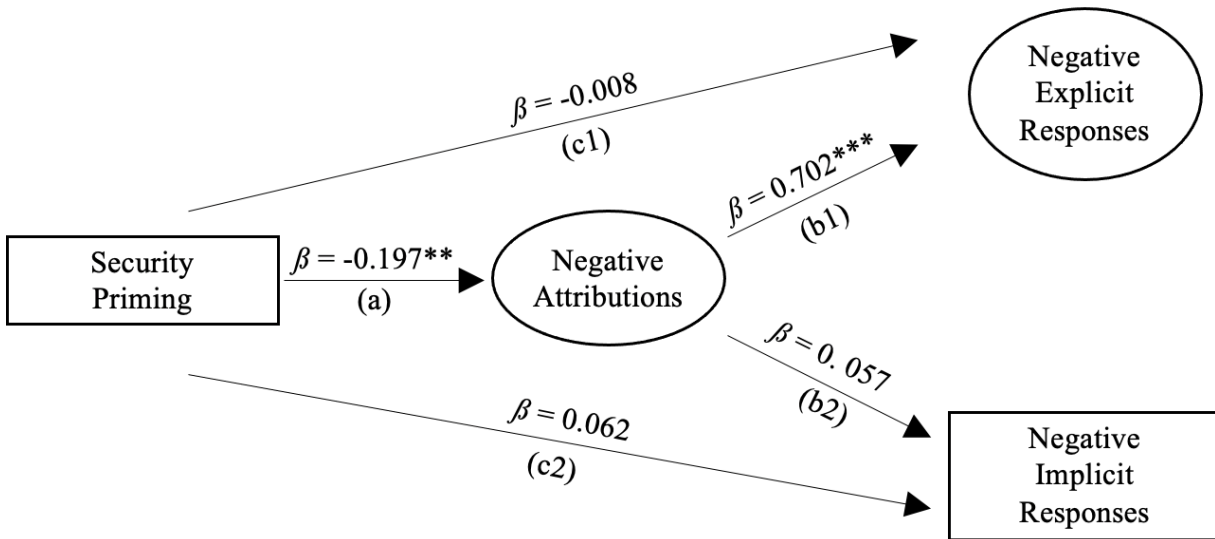
Figure 3.3. Structural model depicting relations among security priming, negative attributions, negative implicit responses, and negative explicit responses in participants who were not in relationships (N = 198).
* p < .05, ** p < .01, *** p < .001.

Mediation Analyses

As hypothesized, negative attributions mediated the link between security priming and negative explicit responses to partners' behaviors, such that security priming reduced negative attributions, and less negative attributions related to less negative explicit responses to partners' behaviors (95% CI [-0.461, -0.058]). Negative attributions did not mediate a link between security priming and negative implicit responses to partners' behaviors (95% CI [-0.070, 0.029]).

Exploratory Analyses

Direct and Moderating Effects of Attachment Style

Individuals with greater dispositional attachment anxiety ($\beta = 0.349$, $p = .001$) but not attachment-related avoidance ($\beta = 0.109$, $p = .203$) had more negative attributions. Neither avoidance nor anxiety directly related to negative explicit (anxiety, $\beta = -0.15$, $p = .858$, avoidance, $\beta = 0.014$, $p = .838$) or implicit responses (anxiety, $\beta = -0.049$, $p = .546$, avoidance, $\beta = -0.33$, $p = .668$) to partners' behaviors.

Neither attachment avoidance ($b = 0.092$, 95% CI [-0.061, 0.244]) nor attachment anxiety ($b = 0.074$, 95% CI [-0.077, 0.216]) moderated the effects of priming on negative attributions[7]. Attachment anxiety (but not avoidance), however, did moderate the link between negative attributions and negative explicit responses to partners' behaviors (anxiety, $b = 0.168$, 95% CI [0.045, 0.284], avoidance, $b = -0.041$, 95% CI [-0.175, 0.075]). Simple slopes analysis at one standard deviation above and below the mean levels of attachment anxiety showed that the positive effect of negative attributions on negative explicit responses was stronger for participants with high levels of attachment anxiety ($\beta = 0.854$, 95% CI [0.723, 0.957] than for participants with low levels of attachment anxiety ($\beta = 0.656$, 95% CI [0.524, 0.750]). Neither attachment anxiety ($b = 0.107$, 95% CI [-0.049, 0.263]) nor avoidance ($b = -0.046$, 95% CI [-0.279, 0.155]) moderated the link between negative attributions and negative implicit responses to partners' behaviors.

Gender Differences

We conducted an exploratory multigroup model to determine whether structural paths of interest differed between participants who identified as male and participants who identified as

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[7] The decision to use a bootstrapped approach to compute confidence intervals around our interaction terms was due to instability of our standard error estimates—likely due to the number of highly collinear interaction terms in our exploratory moderation model. Bootstrapped confidence intervals yield trustworthy significance tests when standard errors are unstable (Boos, 2003).

female.[8] For the sake of parsimony and to ensure consistency in the operationalization of latent variables, all factor loadings were fixed to be equal across groups. Structural paths among priming, negative attributions, and negative explicit and implicit responses to partners' behaviors were allowed to vary across groups. Significance tests were conducted on group differences for all structural paths in the model. One significant group difference emerged. Although priming reduced negative attributions for females (β = -0.259, p = .001) it did not reduce negative attributions for males (β = 0.091, p = .593).

Participants in Current Relationships

We explored whether security priming, dispositional attachment anxiety, and dispositional avoidance related to negative attributions in an additional sample that consisted of participants who were in current relationships (n = 88). We explored these within a multigroup model wherein we allowed structural paths to vary across the two samples and constrained factor loadings to be equal across groups. In the sample consisting of participants who were in current relationships, there was no significant direct effect of security priming on negative attributions (β = -0.107, p = .344). There was, however, a significant effect of dispositional attachment anxiety (β = 0.518, p = .001) but not avoidance (β = 0.125, p = .319) on negative attributions. The sample in current relationships had lower attachment avoidance than the sample of participants that were not in current relationships (t = 3.90, p < .001). The two samples did not differ in attachment avoidance (t = 1.30, p = .20).

Discussion

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[8] We interpret the findings from the gender multigroup model with caution, as only 53 participants identified as male.

The present study was the first to use security priming methods to show a *causal* link between adults' attachment security and their negative attribution biases about hypothetical future romantic partners. Negative attribution biases mediated a link between security priming and explicit (but not implicit) responses to romantic partners' transgressions. The present findings align well with correlational research indicating that insecure attachment style dimensions relate to negative attributions about romantic partners (e.g., Hazelwood, 2012; Kimmes et al., 2017, see also Dwyer et al., 2010; Zajac et al., 2020, for evidence that insecure attachment relates to children and adolescents' negative attribution biases about peers), and that negative attributions relate to poor relationship outcomes (e.g., Chatav & Whisman, 2000; Pearce & Halford, 2008).

The present findings expand on such literature by showing a link between attachment and negative attribution *biases*—tendencies to make negative attributions—about romantic partners. This contribution is particularly noteworthy because, in contrast to previous literature on attachment and attributions of individuals' partners, participants were making attributions about *hypothetical future romantic partners*. As such, attributions measured in the present study reflect biases rather than known partners' characteristics or behaviors. The present study makes an additional contribution to past literature by providing evidence for a *causal* link between attachment and negative attribution biases. Such findings underscore the notion that negative attribution biases act as a mechanism behind robust findings that attachment insecurity predicts a host of relationship problems (see Joel et al., 2020; Mikulincer, 2006, for reviews). We now discuss each finding in turn and suggest avenues for future research.

Direct Effect of Attachment on Negative Attribution Biases

Security priming reduced participants' tendencies to attribute hypothetical future romantic partners' behaviors (e.g., not providing comfort) to negative causes (e.g., the partner's dispositional insensitivity; see Figure 3.3, path a). This effect held even when controlling for self-esteem and neuroticism—as is typically the case in studies examining the effects of security priming on social and emotional outcomes (e.g., Jones et al., 2021). Security priming can affect thoughts and behaviors by temporarily activating a secure mental representation, that is, a state of confidence that someone has "got your back" (see Gillath & Karantzas, 2019). Such representations can affect attributional processes through many avenues. For instance, they facilitate more positive views of others (e.g., as well intentioned, supportive people)—views that lend themselves well to optimistic attributions about others' behavior. Further, secure mental representations can make individuals feel worthy of romantic partners' positive intentions (Bretherton & Mulholland, 2016).

It is also possible that priming affects attributions through stress-regulatory processes. Thinking of a trusted person can create a sense of safety that instils calmness, thereby reducing vigilance to threatening social information (see Bryant & Hutanamon, 2018, for experimental evidence that security priming reduces physiological stress responses, see also Cassidy et al., 2013, for a theoretical discussion of bidirectional links between security and physiological regulation). Reduced threat vigilance can, in turn, dampen the salience of negative attributions and help individuals consider benign alternatives (see Leerkes et al., 2016, for evidence that physiological dysregulation relates to negative attributions about children).

The present study provides compelling evidence that feelings of security themselves— through representational or physiological means—affect negative attribution biases. The experimental nature of the study helps rule out alternate explanations (see Figure 3.2) such as

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reverse directionality (i.e., negative attributions reducing feelings of security) or confounding bias (i.e., a third variable such as partners' negative behaviors causing both insecurity and negative attributions).

Direct Effect of Attribution Biases on Responses to Imagined Partners' Transgressions

Participants with greater negative attribution biases self-reported that they would behave more negatively in response to partners' transgressions (negative explicit responses; Figure 3.3, path b1), and there was a mediated effect of security priming on negative explicit responses via negative attribution biases. This effect held even when controlling for neuroticism and self-esteem. The finding that negative attribution biases relate to negative explicit responses aligns with SIP theory (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) and with empirical data indicating that individuals' negative attributions about their partners' behaviors relate to their own negative behaviors (e.g., Pearce & Halford, 2008). The present study expands on this literature by demonstrating that attribution *biases* about romantic partners relate to individuals' forecasting their own negative behaviors.

This association may emerge because SIP and emotional experiences are intertwined (Cassidy et al., 2013; Lemerise & Arsenio, 2000). Negative attributions can lead to physiological dysregulation. For instance, empirical work indicates that mothers' negative attributions about their children's behaviors (Leerkes et al., 2016), and individuals' negative attributions about romantic partners (see Mikulincer, 1998, for experimental evidence) relate to physiological dysregulation, such as reduced vagal withdrawal and increased heart rate. Physiological dysregulation can lead to poor emotion regulation capacities (Vasilev et al., 2009), and deficits in emotion regulation can lead to negative behaviors in relationships, such as criticism (Klein, 2016) lack of supportive behaviors, and low empathy (Rusu et al., 2019).

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Further, negative attributions could initiate frequent negative emotional states (in part via increased physiological arousal) such as fear, anger, and sadness (Collins et al., 2006; David et al., 2002; Lemerise & Arsenio, 2000; Yih et al., 2019). For instance, one study experimentally manipulated explanations for partners' behaviors (i.e., attributions), and participants who heard negative explanations were angered by the behavior more than those who heard benign explanations (Mikulincer, 1998). Negative emotions can set the stage for harmful behaviors. For instance, one study found that individuals' anger predicted hostility and rejection towards their partner during a conflict task (Lemay et al., 2012). In sum, the direct link between attributions and explicit responses may be explained by a host of emotional processes.

Although there was a direct effect of negative attributions on negative *explicit* responses, there was no direct effect on negative *implicit* responses—assessed with a novel go/no-go association (GNAT) task (Figure 3.3, path b2). It merits attention that GNATs have previously been used to measure implicit *attitudes* (see Williams & Kaufmann, 2012, for a review), as opposed to implicit *responses* (yet see Jones et al., 2021 for an exception), and it is possible that the GNAT is simply not effective at measuring implicit responses. There was, however, a significant correlation between explicit and implicit responses. This relation could indicate that the measures are in fact capturing the same construct (negative response tendencies), or that the implicit task captures a different but related construct (e.g., negative attitudes or emotions). To the extent that the task does capture implicit response tendencies, attributions may simply relate more strongly to individuals' explicit predictions of their behavior than to their actual behaviors. Another possibility is that the observed ceiling effect limited the ability to detect a significant relation. Interestingly, there was no significant direct effect of security priming on negative explicit responses when controlling for negative attribution s—highlighting the importance of

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SIP in well-replicated links between attachment and relationship challenges (Joel et al., 2020; Mikulincer, 2006).

The Direct and Moderating Roles of Dispositional Attachment Style Dimensions

Individuals with greater levels of attachment anxiety (but not attachment-related avoidance) displayed greater negative attribution biases. This effect may emerge because individuals with high attachment anxiety are often hypervigilant to relationship-threatening information (Collins et al., 2006; Mikulincer & Shaver, 2007), and a negative attribution is an appraisal of a situation as threatening. It is also possible that such vigilance to threat makes any information indicating threat (e.g., unresponsiveness following a bid for care) particularly emotionally dysregulating to anxiously attached individuals (Cassidy et al., 2013; Mikulincer & Shaver, 2007). Dysregulation can, in turn, inhibit individuals' capacities to thoughtfully consider a wide array of evidence before making attributions (see Weller et al., 2021, for a discussion of links between physiological dysregulation and decision-making).

Our findings align well with some studies that show effects of only attachment anxiety (and not avoidance) on negative attributions about one's own partner (e.g., Collins et al., 2006). Many studies, however, find effects of both dimensions of insecurity (e.g., Hazelwood, 2012; Kimmes & Durtschi, 2016; Whisman & Allan, 1996), and some find effects of only avoidance (Chandler & Lawrence, 2021). It is possible that although avoidance sometimes relates to negative attributions about known partners, it does not relate to attribution *biases*—possibly due to the defensive strategies avoidantly attached individuals use to protect themselves from negative emotions (i.e., averting attention away from relationship threatening cues [Dewitte & DeHouwer, 2008; Mikulincer & Shaver, 2007]). Avoidant individuals' tendencies to avert attention away from threatening information could make them less likely than anxious

individuals to hold negative attribution biases—especially because anxious individuals tend to be hypervigilant to relationship threats (Mikulincer & Shaver, 2007). In past research, avoidant individuals' negative attributions about their own partners could have been caused by factors other than attribution biases, such as their own rejecting and insensitive behaviors (Mikulincer, 2006) leading partners to have (actual) negative intentions towards them.

Turning to considering examination of dispositional attachment style dimensions as *moderators*, we found that neither anxiety nor avoidance moderated the link between security priming and negative attribution biases. Such findings indicate that increasing feelings of security may help reduce negative attributional tendencies regardless of attachment style. Interestingly, dispositional attachment anxiety (but not avoidance) moderated the link between negative attributions and negative explicit responses to partners' behaviors, such that the link was strongest for those with high levels of attachment anxiety. Negative attributions may be interpreted as more threatening to the relationship for those with high anxiety due to high threat vigilance (Mikulincer & Shaver, 2007). In response to feeling threatened, anxious individuals may hyperactivate their attachment systems to reconnect with their partners, and hyperactivating may manifest through conflict initiating behaviors (e.g., yelling at partners). Such behaviors can serve as a signal that the anxious individual is upset in hopes of eliciting care and reassurance of the partner's affection and availability (Mikulincer, 2006).

Relations Among Priming, Dispositional Attachment Styles, and Negative Attributions About Known Romantic Partners

We also explored how attachment relates to negative attributions for a sample of individuals who were in current relationships. Through this examination, we were able to test a causal link between increased feelings of security and attributions in one's own relationship.

Additionally, we were able to attempt to replicate past findings about dispositional attachment styles and attributions about one's own partner. Security priming did not reduce negative attributions about known partners' behaviors. It is possible that attachment security itself is not a primary force driving attributional processes in current relationships. Instead, insecure individuals may have existing biases *when entering new relationships.* Pre-existing biases could, in turn, cause relationship problems that contribute to a partner's negative behaviors and intentions, thereby leading to *accurate* negative attributions. Additionally, insecure individuals may *select partners* with negative characteristics that lead to accurate negative attributions. Another possibility is that a stronger priming procedure (such as repeated priming; see Carnelley & Rowe, 2007) is necessary to enhance state security enough to override individuals' attributional patterns in their own relationships. Regarding dispositional attachment style, anxiety (but not avoidance) related to greater negative attributions about known partners (as was the case with participants who were not in current relationships). This finding replicates findings from some past studies (e.g., Collins et al., 2006) and contrasts findings from other studies, specifically those that indicate avoidance also relates to negative attributions (e.g., Kimmes & Durtschi, 2016). More work is necessary to reconcile and understand these conflicting findings.

Strengths, Limitations, and Future Directions

The present study includes many strengths. Two primary strengths are the ability to measure attribution biases (given participants were not in relationships and were imagining hypothetical partners) and the use of experimental methods to introduce causal work into a body of largely correlational research. Further, the effects held even when controlling for self-esteem and neuroticism. As such, the present study provides compelling evidence that feelings of

security contribute to attribution biases above and beyond the contribution of personality factors. Additional strengths include the large sample size and the use of well-validated methods.

Although the study has many strengths, the findings should be considered in light of some study limitations. Negative attributions were not experimentally manipulated, so the present study does not provide evidence that negative attributions *caused* negative explicit responses. Future research should use experimental methods to examine the causal relation between attributions and responses in relationships (yet see Mikulincer, 1998, for some experimental evidence and Hrapczynski et al., 2012, for evidence that therapy-induced changes in attributions related to improvements in relationship satisfaction and communication).

Regarding methodology, negative explicit responses were self-reported. It is possible that individuals' forecasted behaviors do not entirely reflect what their actual behaviors and attributions would be in a future relationship. Yet it is important to note that explicit and implicit responses were correlated in the present study, and research has demonstrated that correlations between implicit and explicit measures indicate that both measures are predictive of individuals' behaviors (see Greenwald et al., 2009, for a review). Attributions were self-reported as well, and it is possible that shared method variance between the attributions and explicit responses assessment led participants with more negative affect to answer negatively to both. The link between attributions and explicit responses, however, was still significant when controlling for neuroticism—a trait that can serve as a proxy for general negative affect. Further, a ceiling effect was evident in the implicit response task. We encourage researchers to expand on our work by continuing to develop implicit measures of behavioral tendencies when behavioral observation is not possible. Further, the study was cross-sectional, and a fruitful next step could be examining *changes* in attributional processes over time. Moreover, future research could examine whether

negative attribution biases (measured when participants are not in relationships) predict participants' later relationship outcomes.

Regarding sample characteristics, the sample was predominantly comprised of White college students, and generalizability may be limited. Future studies should examine additional populations, such as BIPOC, LGBTQ, and low-income populations. In addition, our hypotheses regarded participants who were not in relationships, and such participants had significantly greater attachment-related avoidance than those in our sample of participants in current relationships. Thus, it is possible that relations among attachment, attributions, and responses may be different in a sample with lower avoidance. Attachment avoidance, however, did not significantly interact with priming or negative attributions. Therefore, we cautiously suggest that the high prevalence of avoidance in our sample did not have a strong impact on our results.

Conclusion

Negative attribution biases about hypothetical partners' behaviors may contribute to negative cascades in romantic relationships, such that negative attributions could lead to negative behaviors in a future relationship. Negative behaviors could, in turn, lead to conflict and relationship dissolution. These negative relationship outcomes could strengthen negative attribution biases and lead to poor outcomes in additional relationships.

The present study provides experimental evidence that enhancing security can lower risk for negative attribution biases about romantic partners, and that (to the extent that anticipated behaviors relate to real-world behaviors) fewer biases can relate to better relationship outcomes. Thus, we show that attributional processes are malleable and suggest that enhancing attachment security may be one avenue for improving them. Enhancing the field's understanding of antecedents and consequences of negative attribution biases from an attachment perspective can

guide clinicians to stop negative cascades and promote positive relationship functioning across the lifespan.

Chapter 6: General Discussion

Critical to attachment theory is the notion that attachment and social functioning are intertwined throughout the life course (Bowlby, 1969/82, 1973, 1980; Groh et al., 2014). A widely proposed mechanism through which this connection occurs is social information processing (SIP), such that internal working models (IWMs) of attachment shape how individuals process information in their social worlds, and such processing in turn guides social experiences (Crick & Dodge, 1994; Dykas & Cassidy, 2011; Lemerise & Arsenio, 2000). Yet many questions remain open about the exact processes through which SIP explains pathways from attachment to social functioning.

This collection of papers addressed such open questions and tested the long-held conceptual model that SIP explains why attachment relates to social functioning (see Figure 4.1). This collection of work examined this model across multiple levels of analysis and stages of development with a focus on two components of SIP: expectations and attributions. The model was examined in the context of various microsystems (i.e., peer groups, families), many relational domains (i.e., parent-child relationships, peer relationships, close friendships, romantic relationships), a variety of methods (i.e., experimental, observational, self- and parent-report, implicit, and sociometric), and across samples spanning infancy to young adulthood.
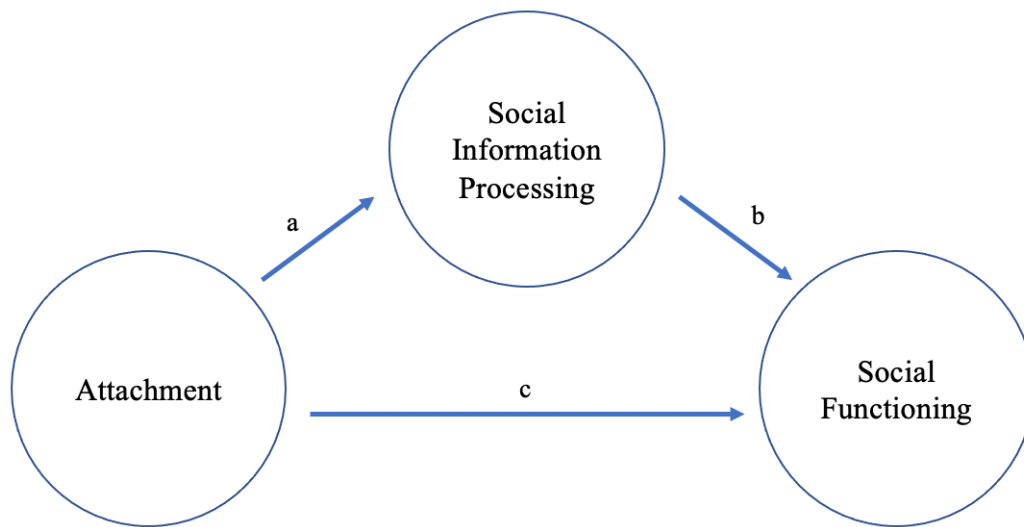
Figure 4.1. Overarching theoretical model: Social information processing as a mechanism through which attachment relates to social functioning.

The literature review summarized the evidence to date for a link between attachment orientations and negative attributions about peers and romantic partners. This review highlighted moderately consistent evidence of links between attachment and attributional processes across the lifespan. The review also revealed gaps in the field's understanding of this link and null results that warrant further investigation, such as a lack of consistency in which type of attachment insecurity predicts negative attributions and a lack of longitudinal work on links across time. Study 1 examined the indirect effects of adolescents' attachment style dimensions on their peer acceptance through their negative expectations of peers' behaviors. Findings revealed that adolescents with greater attachment anxiety and attachment-related avoidance held negative expectations for how their peers would behave, and negative expectations in turn related to low acceptance by peers. Study 2 examined the role of attribution biases and friendship quality on pathways from early attachment to young adolescent romantic relationship quality. Findings did not indicate that attribution biases or friendship quality mediate such pathways. Study 3 examined a *causal* link between attachment and attribution biases in young adults. Security

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priming led participants to make fewer negative attributions about hypothetical romantic partners' transgressions, and participants with fewer negative attributions in turn reported that they would respond less negatively to the transgressions. Across the three studies, findings provide support for SIP as a mechanism through which some conceptualizations of attachment (i.e., attachment style dimensions and temporary feelings of security) relate to social functioning, but do not support the theory that SIP—attributions specifically—explains longitudinal links between early attachment and later social functioning. In the following section, I will discuss the implications of the three studies for the hypothesized model (see Figure 4.1), limitations for the collection of studies, and future directions in studying attachment, SIP, and social functioning.

Attachment and Social Information Processing (Figure 4.1; Path a)

This collection of papers provides evidence for the theory that attachment relates to SIP (Dykas & Cassidy, 2011). In Study 1, adolescents' attachment anxiety and attachment-related avoidance was associated with their negative expectations for ambiguous peers' behaviors; in Study 2, early insecure attachment to mothers predicted negative attributions about unfamiliar peers' behaviors—albeit, inconsistently across ages; in Study 3, security priming (thought to temporarily induce feelings of security) led to less negative attributions. Such connections, on a cognitive level, could reflect insecure IWMs of attachment (whether they be about parents, across relationships, or experimentally manipulated IWMs) casting a negative lens on the social world—a lens that in turn biases the appraisal process and leads individuals to expect the worst of others. Such connections, on a physiological level, could reflect that secure IWMs have a calming effect, such that they reduce stress-response system activity (Bryant & Hutanamon, 2018; Cassidy et al., 2013). Reduced physiological arousal in the face of a possible threat—such

as ambiguous social information—could encourage flexible and positive processing of social information (Leerkes, 2016).

It is important to note, however, that some unexpected findings emerged. More specifically, in Study 2, early security to mothers only linked to children's attributions about peers at a few time points (marginally in first and significantly in fourth grade) and not others (54 months, third grade, and fifth grade). That a significant link only emerged in fourth grade could reflect attributional processes solidifying with development, thus relating more strongly to expected constructs. This finding is, however, not consistent with past research that find links as early as 18 months (Suess et al., 1992). Overall, the collection of papers provides substantial evidence for a link between attachment and SIP, with some inconsistencies worthy of further examination.

Social Information Processing and Social Functioning (Figure 4.1; Path b)

This collection of papers provides some evidence for links between SIP and social functioning. In Study 1, adolescents' negative expectations for ambiguous peers predicted their lower sociometric acceptance by their peers; in Study 2, negative attributions did not predict negative friendship quality or poor romantic relationship quality; in Study 3, fewer negative attributions related to fewer self-reported negative behaviors, but not to less negative behavioral tendencies assessed by an implicit task. The three studies provide some support for SIP theorists' (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) and attachment theorists' (Bowlby 1969/82; Dykas & Cassidy, 2011) notions that negative SIP relates to negative behaviors, and findings somewhat align with past evidence of this link (Lansford et al., 2011; Pearce & Halford, 2008). This relation could be due to the connection between SIP and emotional processes. Negative SIP could initiate physiological stress responses (Leerkes et al., 2016)—often resulting in emotion

regulation deficits (Vasilev et al., 2009)—and negative emotional states (Yih et al., 2019). Emotions and physiological dysregulation could then, in turn, initiate negative behaviors (Rusu et al., 2019). It is also possible that negative SIP—especially negative expectations—leads to negative behaviors through self-fulfilling prophecies (Loeb et al., 2018); negative expectations could lead individuals to withdraw from peers (London et al., 2007), display aggression (Casper et al., 2020; Martinelli et al., 2018), or select peers with negative characteristics who behave in ways that conform to the individuals' negative expectations (Cassidy et al., 2003; Loeb et al., 2018).

At the same time, some unexpected findings emerged regarding the link between SIP and social processes. For instance, children's negative attributions about ambiguous peers did not predict worse friendship or romantic relationship quality. These unexpected findings may reflect that SIP of ambiguous peers does not relate to how children process information about peers that they know well. Instead, perhaps SIP about ambiguous peers predicts social outcomes such as general peer competence (Raikes et al., 2013). Such a possibility aligns with findings from Study 1, wherein SIP linked to sociometric acceptance by peers. Regarding romantic partners, most research on attributions and relationship quality is in adults—perhaps attributions do not play a large role in relationship processes in early adolescence. Instead, it is possible that peer factors (Connolly & Friedlander, 2009) are more influential at that stage of development. Overall, the present collection of studies provides evidence for a link between SIP and some aspects of social functioning (peer acceptance and forecasted responses to romantic partners' transgressions) but not others (close friendship quality and young adolescents' romantic relationship quality).

The Missing Link: Attachment and Social Functioning (Figure 4.1; Path c)

Perhaps the most surprising finding across the three studies surrounds a link that was not directly involved in study hypotheses, yet was expected to exist given theory and an abundant body of research (Groh et al., 2014): the direct link between attachment and social functioning. In Study 1, no direct links emerged between attachment anxiety or avoidance and peer acceptance when controlling for negative expectations, yet a direct link between attachment anxiety and peer acceptance did emerge when negative expectations were not controlled for; in Study 2, no direct links emerged between early attachment to mothers and friendship or romantic relationship quality at any time point; in Study 3, no direct links between security priming and negative self-reported or implicit responses to hypothetical romantic partners' transgressions emerged.

It is critical to note that the lack of a direct link does not necessarily mean attachment and social functioning are not somehow related. As demonstrated in studies 1 and 3, attachment can relate indirectly to social functioning through various *mechanisms*. Connections such as these do not mitigate the potential importance of attachment in determining social functioning; rather, they provide even richer insights into the complex processes behind *why* attachment relates to social functioning. From this perspective, results from studies 1 and 3 do not necessarily counter long-held theory or past research. On the other hand, studies with a lack of support for direct *or* indirect links (such as in Study 2) may call the theory into question. In these cases, it is possible either that untested mechanisms are at play, or that the two are truly unrelated. For instance, attachment may have related to social functioning in Study 2 through untested mechanisms, such as emotion regulation or aggression. Thus, it is unclear if findings from Study 2 counter past theory and research on this connection, and further examination of this missing link is necessary.

Main Takeaways

Overall, the present collection of work provides substantial evidence for the long-held model that attachment relates to social functioning through SIP, yet it also challenges aspects of the model. For instance, questions remain about why early attachment did not predict SIP consistently across ages, why SIP about ambiguous peers did not relate to the quality of close friendships or romantic relationships, and why more direct links between attachment and social functioning did not emerge. That some findings challenged the long-held model underscores the need to be open minded to changes in both attachment and SIP theories and to publish null results. Such actions can prevent the file drawer problem, wherein only supporting evidence is disseminated, from influencing confidence in the field's theories. Findings from this collection of papers (both those that support and those that challenge attachment and SIP theories) highlight exciting new avenues of exploration but must be considered in light of study limitations.

Limitations and Future Directions

Each study contains its own set of strengths and limitations, described extensively in each paper (see Chapters 3, 4, and 5). Here, I will focus on the limitations across the entire collection of work. Although a strength of the collection of work is the use of multiple methods *across* studies, it is important for future work to utilize multimethod approaches *within* studies. Additionally, the three studies focus on just two aspects of SIP—attributions and expectations— but to fully test the long-held model it is critical to examine additional aspects of SIP (i.e., attention, memory, perception; see Dykas & Cassidy, 2011, for some existing evidence). It could also be fruitful to examine multiple aspects of SIP within the same study.

Further, although models in the three studies control for common covariates in the field (e.g., maternal education, self-esteem), it is important to include more variables that researchers believe are also involved in the causal process in the model, such as parent conflict (Kinsfogel &

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Grych, 2004) and emotion regulation (Rusu et al., 2019). Attachment theorists could utilize graphical causal modeling (Pearl, 2010) to fully understand complex processes through which attachment relates to social functioning—possibly through multi-lab collaborations among scholars with a broad array of knowledge about attachment, SIP, and social behavior.

Although some null and unexpected findings emerged within the present collection of work, the frequentist approaches used in the present study do not directly test the null hypothesis. Future work could make use of Bayesian statistics to make inferences about the null hypothesis itself. Further, the analytic methods were within a confirmatory framework. Exploratory data analysis (EDA) methods, such as machine learning, could be a fruitful next step in predicting social outcomes of attachment and generating future hypotheses (Jebb et al., 2017).

Further, findings can only generalize to the population to the extent that statistical assumptions (e.g., randomly distributed errors, independence of observations) were met and that samples accurately reflect the population of interest—ideally, social individuals across the globe (Nketia et al., 2021). The current studies, however, were comprised of WEIRD (Western, educated, industrialized, rich and democratic) and predominantly White samples. As such, generalizability is a notable limitation of the present studies. It is possible that connections among attachment, attributions, and social relations differ cross-culturally, such as in collectivist cultures (see Mesmen et al., 2016, for a review of cross-cultural differences in attachment across the globe). Future work could use design-based analyses in large cross-cultural population datasets with complex sampling methods to generalize findings to a broader target population. Further, although sexual orientation was not directly measured, the samples were likely (based on demographic distributions [Pew Research Center, 2013]) primarily comprised of heterosexual individuals. It is critical to study how hypothesized processes function in LGBTQ communities.

The function of negative SIP must be considered in the larger ecological context (Bronfenbrenner, 1994; 2005). SIP involves mental shortcuts that allows individuals to quickly make decisions about who to trust and how to behave (Crick & Dodge, 1994). As such, the extent to which *threat* characterizes individuals' daily lives should influence what types of social expectations and appraisals are adaptive. For instance, certain communities experience chronic threat, such as Black Americans (Feagin, 2013), and individuals in violent and impoverished neighborhoods (Graif et al., 2014). In such communities, negative SIP may in fact be accurate reflections of context and experiences, and therefore adaptive. For example, teaching Black children and children in violent neighborhoods to be vigilant towards potentially threatening social signals could help them stay physically and psychologically safe (Dunbar et al., 2017). To the extent that sensitive caregivers communicate these lessons to children, negative SIP may be precedented by secure attachment. Further, in threatened communities, negative SIP may be associated with more positive social outcomes, such as affiliating with less deviant peers. Thus, conducting SIP research with a broader ecological lens to see if links among SIP, attachment, and social relations differ as a function of threat is an important next step.

An additional limitation is that attachment was only modeled at one time point in each study. Repeated assessments of attachment could help disentangle between- and within-person effects of attachment on SIP, answer questions about how trajectories of attachment predict SIP, and examine when links between attachment and SIP emerge. Additional future directions include examining how SIP generalizes across relational domains (e.g., SIP about friends, romantic partners, and parents), what type of attachment best predicts SIP (e.g., attachment style, attachment to specific caregivers, and attachment state of mind), and whether SIP explains the

stability of attachment across the lifespan (see Feeney, 2016, for a discussion of the role of SIP in attachment stability).

Conclusion

Security is "confidence in the possibility of goodness" (Shaver et al., 2016, p. 905)—a lens through which we see the potential in others and in ourselves. Thus, security shapes how we process and experience our social world. The present collection of papers provides evidence for this notion using a multimethod approach spanning relational contexts and developmental stages to indicate that SIP could be a key linking mechanism between attachment and social functioning. The present body of work lays a foundation for future methodological and theoretical directions for answering questions surrounding attachment, SIP, and social functioning. Pursuing these future directions and challenging our theories may be a key to understanding how to promote positive social and emotional well-being throughout the lifespan.

Appendices

Appendix A: Experiences in Close Relationships Scale (Brennan et al., 1998)

The following statements concern how you generally feel in close relationships (e.g., with romantic partners, close friends, or family members). Respond to each statement by indicating how much you agree or disagree with it by circling **ONE** number.

1 = Disagree Strongly

4 = Neutral / Mixed

7 = Agree Strongly

1.	I prefer not to show others how I feel deep down.	1	2	3	4	5	6	7
2.	I worry about being rejected or abandoned.	1	2	3	4	5	6	7
3.	I am very comfortable being close to other people.	1	2	3	4	5	6	7
4.	I worry a lot about my relationships.	1	2	3	4	5	6	7
5.	Just when someone starts to get close to me I find myself pulling away.	1	2	3	4	5	6	7
6.	I worry that others won't care about me as much as I care about them.	1	2	3	4	5	6	7
7.	I get uncomfortable when someone wants to be very close to me.	1	2	3	4	5	6	7

8.	I worry a fair amount about losing my close relationship partners.	1	2	3	4	5	6	7
9.	I don't feel comfortable opening up to others.	1	2	3	4	5	6	7
10.	I often wish that close relationship partners' feelings for me were as strong as my feelings for them.	1	2	3	4	5	6	7
11.	I want to get close to others, but I keep pulling back.	1	2	3	4	5	6	7
12.	I want to get very close to others, and this sometimes scares them away.	1	2	3	4	5	6	7
13.	I am nervous when another person gets too close to me.	1	2	3	4	5	6	7
14.	I worry about being alone.	1	2	3	4	5	6	7
15.	I feel comfortable sharing my private thoughts and feelings with others.	1	2	3	4	5	6	7
16.	My desire to be very close sometimes scares people away.	1	2	3	4	5	6	7
17.	I try to avoid getting too close to others.	1	2	3	4	5	6	7
18.	I need a lot of reassurance that close relationship partners really care about me.	1	2	3	4	5	6	7

19.	I find it relatively easy to get close to others.	1	2	3	4	5	6	7
20.	Sometimes I feel that I force others to show more feeling, more commitment to our relationship than they otherwise would.	1	2	3	4	5	6	7
21.	I find it difficult to allow myself to depend on close relationship partners.	1	2	3	4	5	6	7
22.	I do not often worry about being abandoned.	1	2	3	4	5	6	7
23.	I prefer not to be too close to others.	1	2	3	4	5	6	7
24.	If I can't get a relationship partner to show interest in me, I get upset or angry.	1	2	3	4	5	6	7
25.	I tell my close relationship partners just about everything.	1	2	3	4	5	6	7
26.	I find that my partners don't want to get as close as I would like.	1	2	3	4	5	6	7
27.	I usually discuss my problems and concerns with close others.	1	2	3	4	5	6	7
28.	When I don't have close others around, I feel somewhat anxious and insecure.	1	2	3	4	5	6	7
29.	I feel comfortable depending on others.	1	2	3	4	5	6	7
30.	I get frustrated when my close relationship partners are not around as much as I would like.	1	2	3	4	5	6	7
31.	I don't mind asking close others for comfort, advice, or help.	1	2	3	4	5	6	7

32.	I get frustrated if relationship partners are not available when I need them.	1	2	3	4	5	6	7
33.	It helps to turn to close others in times of need.	1	2	3	4	5	6	7
34.	When close relationship partners disapprove of me, I feel really bad about myself.	1	2	3	4	5	6	7
35.	I turn to close relationship partners for many things, including comfort and reassurance.	1	2	3	4	5	6	7
36.	I resent it when my relationship partners spend time away from me.	1	2	3	4	5	6	7

Appendix B: Adapted Children's Expectations of Social Behavior Questionnaire – Peer version (CESBQ-P; Rudolph et al., 1995; adapted by Cassidy & Woodhouse, 1997)

Here are some short stories about you and some peers. Read each one carefully. You may not have really been in all of these situations, but just pretend that they are happening to you. For each one, circle the number that corresponds to the statement that you think best tells what the other teens might do if this really happened. Remember to read all of the choices before you choose one, and please be as honest as you can.

Choices are coded from 1 (least negative) to 4 (most negative)

1. You're hanging out in the school yard and one of the older students comes up and starts to pick on you. What do you think the students in your class might do?
    1. They might just walk away so that they won't be involved. (3)
    2. They might stick up for me and tell the older student to leave me alone. (1)
    3. They might join in with the older student and start teasing me also. (4)
    4. They might suggest I walk away. (2)

2. You're thinking about running for president of your class and you ask a friend to help make you some posters to hang around the school. What do you think your friend might say?
    1. My friend might have faith that I would win and would help me make posters. (1)
    2. My friend might say that I'd never win anyway so it's not worth it to root for me. (4)
    3. My friend might run off to do other things on their own. (3)
    4. My friend might say they're too busy to help me right now, but would wish me luck. (2)

3. You're working on a group project with some other students at school and you make a suggestion for something that you could all do. What do you think they might say?
    1. They might consider everyone's suggestions before choosing an idea. (2)
    2. They might laugh and say that it was a pretty stupid idea. (4)
    3. They might just pretend that I didn't say anything and ignore my idea. (3)
    4. They might say it was a good idea and try it out to see if it would work. (1)

4. You're really excited to go to school one day because it's your birthday and you can't wait to see the other students. What do you think happens that day in school?

1. The other students didn't know that it was my birthday. (2)
2. The other students might play a mean joke on me for my birthday. (4)
3. The other students knew it was my birthday, but didn't think it was a big deal, so didn't say anything. (3)
4. The other students might say happy birthday to me, and maybe even give me cards or presents. (1)

5. You're feeling kind of upset about something that happened one morning at home and you decide to try to talk about it with a friend. When you see your friend, you walk over and start to tell them about your problem. What do you think your friend might do?
    1. My friend might listen to my problem and try to make me feel better. (1)
    2. My friend might tell me that I always seemed to have problems and that I should stop bothering them. (4)
    3. My friend might just ignore me and walk away. (3)
    4. My friend might say they were headed somewhere right now, but maybe we could talk later. (2)

6. You go to a birthday party and bring your friend a present that you picked out really carefully because you were sure your friend would like it. All the guests give their presents and then you give yours. What do you think will happen when your friend receives your present?
    1. My friend might just leave it on the floor and pay attention to all the other presents. (3)
    2. My friend might say that my present was really cool and thank me for it. (1)
    3. My friend might pay attention to all the presents. (2)
    4. My friend might tell me that the other people's presents were better. (4)

7. You really like another teen in your class who you decide to ask to come over to your house to hang out after school. What do you think they might say?
    1. The teen might make it clear that they didn't like me and that they didn't want to hang out with me. (4)
    2. The teen might say that they had too many other things that they had to do. (3)
    3. The teen might say that they would really like to come over. (1)
    4. The teen might say that they had plans, but maybe we could get together some other time. (2)

8. Some students at school are trying to hang a banner in the gym and they ask you to help. You help them, but when you're almost done, you drop your end and make a big mess. What do you think the other kids might do?
    1. They might tell me that it was OK that I dropped my end, everyone makes mistakes. (1)
    2. They might just ignore it and not say anything, but just start over with my help. (2)
    3. They might ignore that you're still there and have someone else take over your end. (3)

      4. They might yell at me and tell me that I ruined everything. (4)

9. You see some teens playing a game during lunch one day, so you go over and ask if you can join them. What do you think they might say?
      1. They might say nasty things about me and tell me to go away. (4)
      2. They might just act like I wasn't even there and keep playing. (3)
      3. They might tell me join in the game and make room for me. (1)
      4. They might tell me there's no room, but that I can probably join in later. (2)

10. The teacher yells at you in class because he thinks that he saw you passing a note to another student. You know that you really didn't pass the note. What do you think that the students sitting next to you might do?
      1. They might just not say anything at all to the teacher. (3)
      2. They might not even see what happened. (2)
      3. They might stick up for me and tell the teacher that I didn't pass it. (1)
      4. They might pretend that I really did pass it and get me in trouble. (4)

11. A friend of yours promised to sleep over at your house one weekend, but then somebody else invites your friend to a party. What do you think your friend might do?
      1. My friend might tell me that the sleep-over would be boring and go to the party instead. (4)
      2. My friend might say that they were going to come over to my house anyway. (1)
      3. My friend might go to the party for a while then come and sleep over. (2)
      4. My friend might pretend that they forgot about the sleep-over and go to the party. (3)

12. You're running across the school parking lot and you trip and fall. Your knee really hurts and you bend over holding it in pain, with a really hurt look on your face. What do you think other teens nearby would do?
      1. They would come over and ask me if I was OK. (1)
      2. They would laugh at me and call me a baby for making a big deal about being hurt. (4)
      3. They would just ignore me. (3)
      4. They might not have seen what happened. (2)

13. One day a teen that you didn't know is really nice to you and acts like they want to get to know you. The next day, you see the teen with some friends and decide to join them. As you walk up, the teen's friends start to tease you. What do you think the teen might do?

1. The teen might tell them that I was pretty nice and that they should stop. (1)
2. The teen might pretend that we never met and act cool around the friends. (3)
3. The teen might join in with the group and start laughing at me too. (4)
4. The teen might not say anything either way. (2)

14. You see some students playing a game and ask if you can join them. They say "yes" and you start playing, but you're having trouble remembering all the rules, so you sometimes mess up. What do you think they might do?
    1. They might get annoyed and tell me I was ruining the game. (4)
    2. They might say that I just need to practice. (2)
    3. They might explain the rules to me again so that I could learn to play. (1)
    4. They might just walk away and stop playing the game. (3)

15. You have to finish a science project by the end of the week, but you still have a lot of work to do on it. You ask a friend of yours if they can help you one day after school. What do you think your friend might say?
    1. My friend might say that they already had plans with other friends and didn't have time. (2)
    2. My friend might say that it was a dumb project and that they didn't want to work on it. (4)
    3. My friend might agree to help me out on it for a while. (1)
    4. My friend might say yes, but then not come over. (3)

Appendix C: Attribution Bias Questionnaire (Dodge et al., 1986)

<u>**54-Month Attribution Bias Questionnaire**</u>

Girl Version

1. Pretend that you are playing catch with a ball. A girl named Nancy throws the ball and it hits you in the back. What do you think happened?
    a. Did Nancy hit you in the back by accident **or**
    b. Did Nancy want to hit you in the back?

2. Pretend that your mother gives you a brand-new doll. You go outside and play with it for awhile. Then you go back inside and leave the doll outside. Later, you go outside to get your doll and you can't find it. Then you see a girl named Sarah playing with your doll. What happened?
    a. Did Sarah steal your doll **or**
    b. Did Sarah find your doll and now know it was your doll?

3. Pretend that you are eating a snack quietly with some other kids. Jenny is sitting next to you and she is drinking grape juice. She spills grape juice all over you. What happened?
    a. Did Jenny want you to get all wet, and so she spilled the grape juice on purpose, **or**
    b. Did Jenny spill the grape juice by accident?

4. Pretend that you are playing with some other kids outside, and you decide to go back inside. You walk by a girl named Mary and you trip over her leg. What happened?
    a. Did Mary trip you by accident **or**
    b. Did Mary want to trip you?

Boy Version

1. Pretend that you are playing catch with a ball. A boy named Tim throws the ball and it hits you in the back. What do you think happened?
    a. Did Tim hit you in the back by accident **or**
    b. Did Tim want to hit you in the back?

2. Pretend that your mother gives you a brand-new toy truck. You go outside and play with it for awhile. Then you go back inside and leave the truck outside. Later, you go outside to get your truck and you can't find it. Then you see a boy named Bill playing with your truck. What happened?
   a. Did Bill steal your truck **or**
   b. Did Bill find your truck and now know it was your truck?

3. Pretend that you are eating a snack quietly with some other kids. John is sitting next to you and he is drinking grape juice. He spills grape juice all over you. What happened?
   a. Did John want you to get all wet, and so he spilled the grape juice on purpose, **or**
   b. Did John spill the grape juice by accident?

4. Pretend that you are playing with some other kids outside, and you decide to go back inside. You walk by a boy named Pete and you trip over his leg. What happened?
   a. Did Pete trip you by accident **or**
   b. Did Pete want to trip you?

First Grade Attribution Bias Questionnaire

Story A:
Pretend that you are standing on the playground playing catch with a kid named Jessica. You throw the ball to Jessica and she catches it. You turn around, and the next thing you realize is that Jessica has thrown the ball and hit you in the middle of your back. The ball hits you hard, and it hurts a lot.

Why do you think Jessica hit you in the back?

Story B:
Pretend that you see some kids playing on the playground. You would really like to play with them, so you go over and ask one of them, a kid named Leah, if you can play. Leah says no.

Why do you think Leah said no?

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Story C:
Pretend that you are walking to school and you're wearing brand new sneakers. You really like your new sneakers and this is the first day you have worn them. Suddenly, you are bumped from behind by a kid named Lisa. You stumble into a mud puddle and your new sneakers get muddy.

Why do you think Lisa bumped you?

Story D:
Pretend that you are a new kid in school and you would really like to make friends. At lunch time, you see some kids you would like to sit with and you go over to their table. You ask if you can sit with them and a kid named Carolyn says no.

Why do you think Carolyn said no?

Story E:
Pretend that you go to the first meeting of a club you want to join. You would like to make friends with the other kids in the club. You walk up to some of the other kids and say "Hi!", but they don't say anything back.

Why do you think the other kids didn't answer you?

Story F:
Pretend that you are walking down the hallway in school. You're carrying your books in your arm and talking to a friend. Suddenly a kid named Wendy bumps you from behind. You stumble and fall and your books go flying across the floor. The other kids in the hall start laughing.

Why do you think Wendy bumped into you?

Story G:

Pretend that it is your first day at school. You don't know a lot of the other kids and you would like to make friends with them. You see some kids playing a rope game so you walk up and say "Hi!" but no one answers you.

Why do you think the other kids didn't answer you?

Story H:
Pretend that you and your class went on a field trip to the zoo. You stop to buy a Coke. Suddenly, a kid named Allison bumps your arm and spills your Coke all over your shirt. The Coke is cold, and your shirt is all wet.

Why do you think Allison bumped into you?

Appendix D: Assessment of Intent Attributions (Crick, 1995)

I'm interested in why kids do things and I want to know your ideas about this. These are stories about some kinds of things that happen to kids. I'm going to read the stories and you can follow along in your booklet. You're going to pretend that the things in the stories are happening to you. At the end of each story, there are some questions for you to answer. I'll read the questions and the answers, and you can circle the letter of the answer that is most like what you think when things like this happen. I'll need you to wait until I've read all the answer choices before you pick your answer.

STORY 1: RADIO STORY
Imagine that you brought your new radio to school today. You saved up your allowance to buy the radio and you want to show it to the other kids at school. You let another kid play with it for a few minutes while you go get a drink of water. When you get back, you realize that the kid has broken your radio.

1. Why did the kid break your radio?
A. The radio wasn't made well.
B. It was an accident.
C. The kid was mad at you.
D. The kid was jealous of you.

2. In this story, do you think the kid was
A. Trying to be mean.
B. Not trying to be mean.

STORY 2: PLAYGROUND STORY
Imagine that you are looking for your friend on the playground. You can't wait to find your friend because you have an important secret to share. By the time you find your friend, your friend is already playing with someone else—a kid that you don't like very much.

1. Why did your friend play with someone else instead of you?
A. Your friend was mad at you.
B. Your friend didn't know that you wanted to play with him or her.
C. Your friend wanted to get back at you for something.

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D. Your friend didn't see you on the playground.

2. In this story, do you think your friend was
A. Trying to be mean.
B. Not trying to be mean.

STORY 3: MILK STORY
Imagine that you are sitting at the lunch table at school, eating lunch. You look up and see another kid coming over to your table with a carton of milk. You turn around to eat your lunch, and the next thing that happens is that the kid spills milk all over your back. The milk gets your shirt all wet.

1. Why did the kid spill milk all over your back?
A. The kid slipped on something.
B. The kid just does stupid things like that to you.
C. The kid wanted to make fun of you.
D. The kid wasn't looking where he was going.

2. In this story, do you think the kid was
A. Trying to be mean.
B. Not trying to be mean.

STORY 4: HALLWAY STORY
Imagine that you are standing in the hallway one morning at school. As you are standing there, two kids from your class walk by. As they walk by you, the two kids look at you, whisper something to each other, and then they laugh.

1. Why did the two kids laugh when they walked by you?
A. The kids were making fun of you.
B. The kids were laughing at a joke that one of them told.
C. The kids were just having fun.
D. The kids were trying to make you mad.

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2. In this story, do you think the kids were
A. Trying to be mean.
B. Not trying to be mean.

STORY 5: SHOES STORY
Imagine that you are walking to school and you're wearing your new shoes. You really like your new shoes and this is the first day you have worn them. Suddenly, you are bumped from behind by another kid. You stumble and fall into a mud puddle and your new shoes get muddy.

1. Why did the kid bump you from behind?
A. The kid was being mean.
B. The kid was fooling around and pushed too hard by accident.
C. The kid was running down the street and didn't see you.
D. The kid was trying to push you down.

2. In this story, do you think the kid was
A. Trying to be mean.
B. Not trying to be mean.

Appendix E: Quality of Classroom Friends Scale (Clark & Ladd, 2000)

Some children have no regular playmates while others have several playmates. Please tell us about your child's playmates. When these two children are playing together do they...

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. Play happily together?	1	2	3	4
2. Ignore each other's suggestion?	1	2	3	4
3. Compete for toys?	1	2	3	4
4. Settle arguments peacefully?	1	2	3	4
5. Take turns during conversation?	1	2	3	4
6. Fight verbally?	1	2	3	4
7. Say they like each other or are friends?	1	2	3	4
8. Reach agreement easily?	1	2	3	4
9. Do what the other child requests?	1	2	3	4
10. Say "I hate you" or "I'm not going to play with you" when angry?	1	2	3	4
11. Often show a pattern where one child dominates over the other child?	1	2	3	4

12. Agree with each other's attitudes and preferences?	1	2	3	4
13. Grab and take things from each other?	1	2	3	4
14. Pay attention to each other even when playing at a distance from each other?	1	2	3	4
15. Criticize each other?	1	2	3	4
16. Notice and respond to each other's protests and complaints?	1	2	3	4
17. Share with each other?	1	2	3	4
18. Protest when the other child attempts to control play?	1	2	3	4
19. Accuse each other of unfairness?	1	2	3	4

Appendix F: Friendship Quality Questionnaire (FQQ; Parker & Asher, 1993)

These questions are about your best friend. Please choose the most important same-sex friend you have. Do not choose a brother or sister.

	Not at all true	A little true	Somewhat true	Mostly true	Really true
1. This friend and I live really close to each other.	1	2	3	4	5
2. This friend and I would always like to sit together at lunch.	1	2	3	4	5
3. This friend and I get mad at each other a lot.	1	2	3	4	5
4. This friend tells me I'm good at things.	1	2	3	4	5
5. If other kids were talking behind my back, this friend would always stick up for me.	1	2	3	4	5
6. This friend and I make each other feel important and special.	1	2	3	4	5

7. This friend and I always pick each other as partners.	1	2	3	4	5
8. This friend tells me I'm pretty smart.	1	2	3	4	5
9. This friend and I are always telling each other about our problems.	1	2	3	4	5
10. This friend makes me feel good about my ideas.	1	2	3	4	5
11. When I'm mad about something that happened to me, I can always talk to this friend about it.	1	2	3	4	5
12. This friend and I argue a lot.	1	2	3	4	5
13. When I'm having trouble figuring something out, I usually ask this friend for help and advice.	1	2	3	4	5
14. This friend and I always make up easily when we have a fight.	1	2	3	4	5

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15. This friend and I fight.	1	2	3	4	5
16. This friend and I loan each other things all the time.	1	2	3	4	5
17. This friend often helps me with things so I can get done quicker.	1	2	3	4	5
18. This friend and I always get over our arguments really quickly.	1	2	3	4	5
19. This friend and I always count on each other for ideas on how to get things done.	1	2	3	4	5
20. This friend doesn't listen to me.	1	2	3	4	5
21. This friend and I tell each other private things a lot.	1	2	3	4	5
22. This friend and I enjoy playing sports together.	1	2	3	4	5
23. This friend and I enjoy playing computer games or other kinds of games together.	1	2	3	4	5

24. This friend and I like to hang out together.	1	2	3	4	5
25. This friend and I share our stuff.	1	2	3	4	5
26. I always want to be on the same team as this friend.	1	2	3	4	5
27. This friend and I look out for each other.	1	2	3	4	5
28. This friend and I like the same kinds of movies.	1	2	3	4	5
29. This friend and I like to do the same kinds of things after school.	1	2	3	4	5

Appendix G: Network of Relationships Inventory (NRI; Furman & Buhrmester, 1985)

By this age a few kids have started to have romantic relationships with a boyfriend or girlfriend.

PLEASE ANSWER THE FOLLOWING QUESTIONS, ONLY IF YOU ARE CURRENTLY IN A ROMANTIC RELATIONSHIP.

This next set of questions is about these special relationships. Now you are going to answer some questions about your relationship with this person. If you are in more than one relationship right now, pick the person you feel closest to.

	Little or none	Somewhat	A lot	A whole lot	"The most"!
1. How much does this person teach you things that you don't know?	1	2	3	4	5
2. How much do you talk about everything with this person?	1	2	3	4	5
3. How much do you and this person get upset with or mad at each other?	1	2	3	4	5
4. How much does this person like or love you?	1	2	3	4	5
5. How much does this person treat you like you're admired and respected?	1	2	3	4	5

6. How much do you and this person get annoyed with each other's behavior?	1	2	3	4	5
7. How much do you help this person with things he or she can't do by himself or herself?	1	2	3	4	5
8. How sure are you that your relationship with this person will continue in the years to come?	1	2	3	4	5
9. How often does this person point out your faults or put you down?	1	2	3	4	5
10. How much do you play around and have fun with this person?	1	2	3	4	5
11. How much does this person help you figure out or fix things?	1	2	3	4	5
12. How much do you share secrets and private feelings with this person?	1	2	3	4	5
13. How much do you and this person disagree and quarrel?	1	2	3	4	5
14. How much does this person really care about you?	1	2	3	4	5

15. How much does this person treat you like you're good at many things?	1	2	3	4	5
16. How much do you and this person get on each other's nerves?	1	2	3	4	5
17. How much do you protect and look out for this person?	1	2	3	4	5
18. How sure are you that this relationship will last no matter what?	1	2	3	4	5
19. How often does this person criticize you?	1	2	3	4	5
20. How often do you go places and do enjoyable things with this person?	1	2	3	4	5
21. How often does this person help you when you need to get something done?	1	2	3	4	5
22. How much do you talk to this person about things that you don't want others to know?	1	2	3	4	5

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23. How much do you and this person argue with each other?	1	2	3	4	5
24. How much does this person have a strong feeling of affection (love or liking) toward you?	1	2	3	4	5
25. How much does this person like or approve of the things you do?	1	2	3	4	5
26. How much do you and this person hassle or nag one another?	1	2	3	4	5
27. How much do you take care of this person?	1	2	3	4	5
28. How sure are you that this relationship will last in spite of fights?	1	2	3	4	5
29. How often does this person say mean or harsh things to you?	1	2	3	4	5

Appendix H: Eysenck Personality Questionnaire Revised–Short form, Neuroticism scale (EPQR-S-N Eysenck et al., 1985)

Please answer the following questions.

	Yes	No
1. Does your mood often go up and down?	1	2
2. Do you ever feel 'just miserable' for no reason?	1	2
3. Are you an irritable person?	1	2
4. Are your feelings easily hurt?	1	2
5. Do you often feel 'fed-up'?	1	2
6. Would you call yourself a nervous person?	1	2
7. Are you a worrier?	1	2
8. Would you call yourself tense or 'high-strung'?	1	2
9. Do you worry too long after an embarrassing experience?	1	2
10. Do you suffer from 'nerves'?	1	2
11. Do you often feel lonely?	1	2
12. Are you often troubled about feelings of guilt?	1	2

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Appendix I: the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1979)

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. On the whole, I am satisfied with myself.	1	2	3	4
2. At times I think I am no good at all.	1	2	3	4
3. I feel that I have a number of good qualities.	1	2	3	4
4. I am able to do things as well as most other people.	1	2	3	4
5. I feel I do not have much to be proud of.	1	2	3	4
6. I certainly feel useless at times.	1	2	3	4
7. I feel that I am a person of worth, at least on an equal plane with others.	1	2	3	4
8. I wish I could have more respect for myself.	1	2	3	4
9. All in all, I am inclined to feel that I am a failure	1	2	3	4

10. I take a positive attitude towards myself.   1   2   3   4

Appendix J: Relationship Attributions Measure (RAM; Fincham & Bradbury, 1992)

The following questions were displayed after participants read Collins and colleagues' (2006) vignettes about partners' transgressions. "My husband/wife" in the original measure was changed to "my partner" in the present study.

	Strongly Disagree					Strongly Agree
1. My partner's behavior was due to something about them (e.g., the type of person they are, the mood they were in).	1	2	3	4	5	6
2. The reason my partner behaved this way is not likely to change.	1	2	3	4	5	6
3. The reason my partner behaved this way affects other areas of our relationship.	1	2	3	4	5	6
4. My partner behaved this way on purpose rather than unintentionally.	1	2	3	4	5	6

| 5. My partner's behavior was motivated by selfish rather than unselfish concerns. | 1 | 2 | 3 | 4 | 5 | 6 |

| 6. My partner deserved to be blamed for their behavior. | 1 | 2 | 3 | 4 | 5 | 6 |

Appendix K: Vignettes and Possible Explanations for Partner Behavior (Collins et al., 2006)

Vignette 1: Your partner didn't respond when you tried to cuddle.

	Very Unlikely			Neutral			Very Likely
1. My partner doesn't want to be close to me.	1	2	3	4	5	6	7
2. My partner just didn't realize I was trying to cuddle.	1	2	3	4	5	6	7
3. My partner may be feeling less attracted to me.	1	2	3	4	5	6	7
4. My partner is just preoccupied with other things.	1	2	3	4	5	6	7
5. My partner is angry with me and is trying to get back at me.	1	2	3	4	5	6	7

6. My partner just isn't in a cuddling mood.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Vignette 2: Your partner didn't comfort you when you were feeling down.

	Very Unlikely			Neutral			Very Likely
1. My partner just wasn't sure how to help.	1	2	3	4	5	6	7
2. My partner is too caught up in their own life to be concerned about mine.	1	2	3	4	5	6	7
3. My partner didn't realize I was feeling so down.	1	2	3	4	5	6	7
4. My partner doesn't care enough about me or my feelings.	1	2	3	4	5	6	7

	Very Unlikely			Neutral			Very Likely
5. My partner just thought I needed a little space or some time alone.	1	2	3	4	5	6	7
6. My partner is not a very sympathetic person.	1	2	3	4	5	6	7

Vignette 3: Your partner wanted to spend the evening by themself.

	Very Unlikely			Neutral			Very Likely
1. My partner is tired and just needs some time to relax at home.	1	2	3	4	5	6	7
2. My partner may be losing interest in me.	1	2	3	4	5	6	7
3. My partner just needs time to hang out with their friends.	1	2	3	4	5	6	7

4. My partner may be seeing someone else or doing something behind my back.	1	2	3	4	5	6	7

5. My partner has important things to do such as homework or studying.	1	2	3	4	5	6	7

6. My partner would rather be with his/her friends than me.	1	2	3	4	5	6	7

Vignette 4: Your partner left you standing alone at a party where you didn't know anyone.

	Very Unlikely			Neutral			Very Likely
1. My partner just needed to get a drink or some munchies.	1	2	3	4	5	6	7
2. My partner may be tired or bored with me.	1	2	3	4	5	6	7

3. My partner may be attracted to someone else at the party.	1	2	3	4	5	6	7
4. My partner is selfish and not thinking about my needs.	1	2	3	4	5	6	7
5. My partner knows I don't mind being on my own at parties.	1	2	3	4	5	6	7
6. My partner just wants to mingle and talk to some friends.	1	2	3	4	5	6	7

Appendix L: Negative Explicit Responses to Partners' Behaviors (Collins et al., 2006)

	Very Unlikely			Neutral			Very Likely
1. Snap or yell at your partner	1	2	3	4	5	6	7
2. Criticize or complain to your partner	1	2	3	4	5	6	7
3. Give your partner the "silent treatment"	1	2	3	4	5	6	7
4. Do something you know will annoy or irritate your partner	1	2	3	4	5	6	7
5. Ignore your partner or give them the "cold shoulder"	1	2	3	4	5	6	7

Appendix M: Conflict Responses Go/No-Go Association Task (CR-GNAT, Fitter et al., in preparation) Word List.
Implicit Responses to Conflict

Positive words:
Trust
Forgive
Accept
Listen
Respect
Sympathize
Care
Support
Empathize
Connect
Cuddle
Embrace
Reassure
Smile

Negative words:
Yell
Scream
Fight
Ignore
Punish
Attack
Criticize
Reject
Shout
Scold
Insult
Blame
Distrust
Avoid
Belittle

Target words:
My behavior

Appendix N: Security Priming Script

Time	Read
:00	**Focus your attention on the person you chose. . .**
:06	**Picture this person's face. Really try to get an experience of the person being with you. . .**
:19	**You may want to remember a time you were actually with the person, or you may already have a clear experience of what this person is like. . .**
:31	**Just try to get a good image of this person. . .**
:38	**You may find that you can see the color of their eyes or hair . . .**
:45	**or maybe hear their voice. . .**
:55	**Imagine that this person is right there with you. . .**
1:07	**Now once you have an image of the person, try to zoom in and get a close-up, focused impression. . .**
1:22	**Hold this image for a little while. . .**
1:35	**Imagine talking with the person. . .**
1:45	**Try to feel them there with you.**
2:00	**Ok you can open your eyes** (Wait 10 seconds)

Appendix O: IRB Approvals for Chapter 5

DATE: January 16, 2020

TO: Jude Cassidy, PhD
FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [1537706-1] Priming and Social Information Processing
REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: APPROVED
APPROVAL DATE: January 16, 2020
EXPIRATION DATE: January 15, 2021
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category # 7; Subpart D (45CFR46.404) and Waiver of
                               Consent: 45CFR46.117(c)(1)

UNIVERSITY OF MARYLAND

INSTITUTIONAL REVIEW BOARD

DATE: January 6, 2022

TO: Jude Cassidy, PhD
FROM: University of Maryland College Park (UMCP) IRB

PROJECT TITLE: [1537706-4] Priming and Social Information Processing

SUBMISSION TYPE: Continuing Review/Progress Report

ACTION: APPROVED
APPROVAL DATE: January 6, 2022
EXPIRATION DATE: January 15, 2023
REVIEW TYPE: Expedited Review

REVIEW CATEGORY: Expedited review category #7. 45CFR46.404 applies. Waiver of parental
                    consent under 45CFR46.408.

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