

2011

Attachment Security and Social Cognition: Representations or Emotion Regulation?

Mairin E. Augustine
Lehigh University

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Attachment Security and Social Cognition: Representations or Emotion Regulation?

Mairin Augustine

A Thesis

Presented to the Graduate and Research Committee

of Lehigh University

in Candidacy for the Degree of

Master of Science

in

Psychology

Lehigh University

May 23, 2011

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Mairin E. Augustine

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Thesis is accepted and approved in partial fulfillment of the requirements for the Master of Science in Psychology.

Attachment Security and Social Cognition: Representations or Emotion Regulation?
Mairin E. Augustine

Approved April 27, 2011

Dr. Deborah J. Laible, Ph.D.
Advisor

Dr. Michael J. Gill, Ph.D.
Co-Advisor

Dr. Susan E. Barrett, Ph.D.
Co-Advisor

Acknowledgements

Many thanks to my graduate advisor, Deborah Laible, for her dedicated guidance through the course of this project, and for helping to prepare me for a future in developmental research. Thank you as well to my committee members Michael Gill and Susan Barrett for their valuable feedback and suggestions for providing a more well-rounded account of the theory and the data. Endless thanks to my fellow graduate students for being a remarkable source of wisdom and camaraderie throughout my time in this program. Lastly, thank you to my family and friends for your support and encouragement as I continue to pursue my academic goals.

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Abstract

This study explored relationships between attachment security, hostile attribution and social problem solving using data from the NICHD Study of Early Child Care and Youth Development. Attachment security was expected to predict lower levels of hostile attribution and higher levels of competent social problem solving, but it was predicted that emotion regulation fostered by a secure attachment would mediate or moderate the relationship between attachment security and social problem solving. Neither assessment of attachment security predicted hostile attributions. However, the data provide evidence for a moderating effect of emotion regulation on the relationship between Q-sort attachment security and social problem solving. Attachment security predicted higher levels of socially competent social problem solving in all children, but effortful control also predicted this outcome in children with low to moderate attachment security. These relationships, other variables of interest, and future directions are discussed.

Attachment Security and Social Cognition: Representations or Emotion Regulation?

A child's attachment to a primary caregiver, typically the mother, is thought to derive from an evolutionary need for basic care and protection that will ensure the child's survival through infancy (Bowlby, 1969). Attachment theory has been further developed, however, to explore the ways in which the quality of the mother's care influences the child's sense of security within the relationship. Typically this sense of security is thought to develop during the mother's responsiveness to the child during times of distress. The "attachment behavioral system" is activated at these times, and the child behaves in ways that promote proximity to the caregiver and seek a sense of felt comfort and security (Bowlby, 1969; Sroufe & Waters, 1977). Children who receive consistently sensitive care are thought to feel a greater sense of security in the attachment relationship, and thus form a "secure" attachment (Ainsworth, Blehar, Waters, & Wall, 1978). Children who receive care that is inconsistently sensitive or largely insensitive in turn develop less security within the relationship, and an "insecure attachment."

Security of attachment and maternal sensitivity is found to relate to a number of behaviors in children in terms of distress, proximity-seeking, as well as exploratory behavior (Ainsworth, 1972). Securely attached are thought to have a sense of trust in the mother's presence that allows them use her as a "secure base" (Ainsworth, 1972; Bowlby, 1969). These children are comfortable exploring their surroundings while also seeking proximity when necessary. Lacking this sense of security, insecurely attached children may become overly clingy, or conversely may not seek proximity even when distressed. Thus, a child's attachment may influence the child's tendency to explore the environment and initiate social interaction with other people (Cassidy, 2008).

Recognizing the impact of attachment security on a child's behavior with the mother and environment, early researchers identified the need to explore the correlates of attachment security beyond the first year of life (e.g. Yarrow, 1972). Subsequent research on the antecedents of attachment security has explored many aspects of the parent-child relationship as well as future outcomes for children. One important focus of research on child outcomes has been on the relationship between attachment and children's social competence. Competence as a construct has been defined as the ability to use and/or control one's environment and personal resources to reach positive and desirable outcomes (Ainsworth & Bell, 1974; Waters & Sroufe, 1983). Social competence thus may be thought to involve the ability to do so in ways that promote positive social interactions and social outcomes, and may be measured in a number of ways. Social competence develops with children's increasing interactions with parents and peers, but may also be fostered by certain aspects of the mother-child relationship.

Attachment security is found to relate to many elements of social competence as examined through the child's behavior or responses to others, including friends and unfamiliar peers (see Coble, Gantt, & Mallinckrodt, 1996 for a review). Secure attachment relates to greater independence and ego-resiliency in later years (Cassidy, 2008). A secure attachment is found to predict more positive, reciprocal, and engaged behavior when playing with a novel peer (Lieberman, 1997; Rose-Krasnor, Rubin, Booth, & Coplan, 1996) and is related to overall level of competence in the peer play setting (Suess, Grossmann, & Sroufe, 1992). Secure attachment also relates to more competence in play with the mother, which in turn predicts more competent play with preschool peers (Matas, Arend, & Sroufe, 1978; Waters, Wippman, & Sroufe, 1979). Attachment security

and maternal sensitivity have also been identified as antecedents of prosocial behavior and empathic responding in young children (Barnett, 1987; Cassidy, 2008; Feshbach, 1987). It is thought that children with secure attachments approach relationships with more positive expectations, which in turn promote or positive or prosocial responses to others. This is reflected in research finding that measures of attachment security in middle childhood and adolescence relate to greater friendship quality (see Allen & Land, 1999; Schneider, Atkinson, & Tardif, 2001). Measures of attachment security in late adolescence have also been found to relate to lower levels of perceived loneliness (e.g. Kerns & Stevens, 1996).

Researchers have also begun to explore the influence of attachment on aspects of children's social cognition. The construct of social cognition embodies the ways in which one perceives or thinks about other people, as well as how one understands other people's thoughts, intentions, behavior, feelings, or relationships with the self and others (Heider, 1967). Children are placed in a rich social world, and the ways in which children think about others may be a product of their cognitive development as well as their socialization (Lewis & Carpendale, 2002). Attachment is one aspect of the child's social history that is found to relate to certain aspects of social cognition. A secure attachment predicts greater theory of mind, measured through tasks such as false-belief understanding (Moore & Symons, 2005; Symons & Clark, 2000). Attachment security is also found to relate to different aspects of emotional understanding and emotional perspective-taking (DeRosnay & Harris, 2002; Laible & Thompson, 1998). The child's skilled awareness of thoughts, emotions and perspectives of other people may promote greater understanding in interactions with others, and has been found to relate to greater

teacher-rated prosocial behavior and social competence (e.g. Denham, Blair, DeMulder, Levitas, Sawyer, Auerbach-Majora, & Queenan, 2003; Garner, 1996). This study will focus on two interrelated aspects of social cognition found to relate to attachment security: hostile attribution bias and social problem solving.

Social information processing and hostile attribution bias. Crick and Dodge's model of social information processing was developed largely as basis for conceiving children's aggressive behavior and responses (e.g. Crick & Dodge, 1996; Dodge & Coie, 1987; Dodge & Crick, 1990). This construct describes processes that occur in perceiving and interpreting social information. Current formulations of social information processing assume that children approach social situations with certain developed cognitive pathways (Dodge, Coie, & Lyman, 2006; Lemerise & Arsenio, 2000). It is suggested that these pathways develop based on genetics as well as past social interactions. The child's response to social information is thus affected by elements of biology, memory, and the current situation. Children are thought to have a "database" of information that may be applied in social situations that may include memories, rules, social schemas and/or social knowledge (Crick & Dodge, 1994).

This model of social information processing has been described in terms of a series of steps. Dodge (1986) proposed a five-step process that was later reformulated by Crick and Dodge (1994) into a six-step process. In the first step, a child encodes cues from social information based on what is perceptually available and elements of information to which the child's attention and focus is directed. In the second step, the child derives an interpretation of meaning in the cues and in the intention of others' actions. This process of encoding and interpretation may involve relating the situation to

representations of past situational cues, evaluating past outcomes with the peer, inferring the cause of actions and perspectives of others in the situation, judging if goals have been attained for past social situations, and understanding the meaning of these past and present interactions for the self. The third step of the model involves the child selecting a goal or outcome of the situation, or choosing to continue with a present goal. Goals may be seen as arousal states that are directed toward the attainment of or desire for certain outcomes, which may be brought to the situation and/or revised in light of social stimuli. The fourth step involves accessing or creating possible responses to the situation. That is, children may draw representations of possible responses to similar situations from memory, or in novel situations may create new possible responses. The fifth step involves evaluating these possible responses in order to select a response. This process may include considering outcomes of the responses, the child's ability to carry out the response, and appropriateness of the response. Through this process the most positive response is selected. In the sixth and last step, the selected response is enacted.

When relating this model to studies of aggression in children, aggressive behavior is found to relate to the child's tendency to attribute hostile intent in others' actions (see Crick & Dodge, 1994 for a review). This tendency has been come to be known as a hostile attribution bias, as first conceived by Nasby, Hayden, and DePaulo, 1980. It is suggested that hostile attribution of intent may be based in both the encoding and interpretation steps of the social information processing model (e.g. Dodge, Coie, & Lynam, 2006; Kendall, Ronan, & Epps, 1991; Pepler, King, & Byrd, 1991). That is, aggressive children display a tendency to focus on aggressive social cues, or to rely on their own negative representations of others rather than take in new social information.

This may in turn negatively bias their attributions of intent in the interpretation stage. However, aggressive children are found to display greater attribution of negative intent even when ambiguous social information is presented. Thus, children with hostile attribution biases may come to negatively interpret others' intent regardless of what social information is available.

It is suggested that this bias is likely the antecedent of aggressive interactions and poor social adjustment (Crick & Dodge, 1994). That is, attributing hostile intent to others' actions may influence later stages of social information processing as well (Dodge & Crick, 1990). Hostile intent attributions may lead the child to select more retaliatory or aggressive responses, judge these responses as more favorable in terms of quality or outcome, and select them for action. Consequently, the presence of a hostile attribution bias has consistently been found to relate to reactive or relational, rather than proactive, aggression among children (Crick, 1995; Dodge & Coie, 1987; Crick & Dodge, 1996). Reactive aggression refers to aggression that comes in response to a perceived threat or provocation. Relational aggression refers to aggression intended to damage peer relationships, such as exclusion or friendship withdrawal. Both of these may serve a retaliatory purpose, while proactive aggression is deliberate, instrumental aggression which serves to fulfill a goal without necessary provocation. Due to the association between hostile attribution bias and aggressive social responses, the presence or absence of hostile attribution bias may serve as a good predictor of social competence in terms of early social information processing.

Dodge (1991) hypothesized that insecure attachment would predict hypervigilance and active aggression in children, though the relationship between child

attachment security and social information processing has been explored in few studies. Belsky, Spritz, and Crnic (1996) had children interact with puppets in ways in which the child experiences a positive social event (e.g. being recruited and thanked by a mother puppet for giving a birthday present to a child puppet) or a negative social event (e.g. being criticized for their clothing by the child puppet). They found securely attached children had better memory for the positive social events than negative events, while children with insecure attachments had better memory for negative events than positive events. The authors argued that differences in memory for positive or negative events may result from differences in what information the children actually encoded, or in their ability to relate these events to past positive or negative events stored in memory.

A small number of studies have examined the relationship between attachment and hostile attribution specifically. Suess, Grossmann, and Sroufe (1992) presented preschool children with cartoon-based hypothetical stories in which one child causes harm to another child or his toys, with either ambiguous or apparent intent. They found that children classified as securely attached in early childhood attributed intention to the aggressors that was more realistic (e.g. benign in the ambiguous story and aggressive in the intentional story) or positive (e.g. benign or prosocial in all stories) than children who were insecurely attached. Cassidy, Kirsh, Scolton, and Parke (1996) asked preschool-aged children to imagine situations in which a peer caused some sort of negative event to happen to them (e.g. spilling paint on the child's drawing). They found that secure and insecure-ambivalent children of preschool age identified more "positive" representations of peers in response to these stories, such as suggesting that it was an accident or a failed attempt to help. Secure children identified more positive representations than either

insecure group in middle childhood. Clark and Symons (2009) found similar patterns with this type of assessment in middle childhood, in that attachment security predicted positive, rather than negative, attributions. Raikes and Thompson (2008) found weak correlations between Q-set attachment security and negative attributions to hypothetical stories at 54 months, and this association did not remain after controlling for variables such as gender, race, and family income. In analyses using Strange Situation classifications, however, avoidant attachment classification was found to predict negative attributions after accounting for control variables. It seems that further research may be needed to examine the potential direct association between attachment security and negative attribution, as well as other possible mediators.

Social problem solving. The social problem solving literature is based in the idea that children must often negotiate interpersonal problems in order to promote desirable outcomes. Solving a social “problem” is conceived of as the achievement of an interpersonal goal (Krasnor & Rubin, 1983). This requires the flexible and persistent use of strategies that utilize perspective-taking and accurate processing of social information, allowing the child to correctly interpret the situation and the other actor(s) involved. Along with the ability to form many alternative strategies, social problem solving also involves the ability to predict the interpersonal results of their actions (Shure & Spivack, 1982).

Some researchers have asserted that social problem solving may be examined within a social information-processing framework (e.g. Rubin & Krasnor, 1986; Rubin, Bream, & Rose-Krasnor, 1991). This conception of social problem solving emphasizes the importance of selecting social goals and enacting social strategies. Though many

strategies may lead to attainment of the goal, social competence in terms of social problem solving requires maintaining positive relationships in the process (Rubin, Bream, & Rose-Krasnor, 1991). For example, a child may use aggressive strategies such as hitting or grabbing in order to acquire a toy from another child, or he may ask, wait, or seek an adult for intervention. Socially competent behaviors are expected to be the result of having goals to maintain positive relationships and selecting effective strategies to reach them.

Social problem solving skills have thus been linked to many adaptive aspects of social development in children. Shure, Spivack, and Jaeger (1971) found that among a number of problem-solving elements, conceptualizing solutions to interpersonal problems related to teacher-rated behavior skills in children. Further research has found relationships between certain social problem solving skills and prosocial behavior (Warden & Mackinnon, 2003), cooperation with peers (Landry, Smith, & Swank, 2009) and general ratings of social competence (e.g. Dubow, Tisak, Causey, Hryshko, & Reid, 1991; Youngstrom, Wolpaw, Kogos, Schoff, Ackerman, & Izard, 2000). Deficient social problem solving skills have been associated with aggressive social goals or strategies (Rubin, Bream, & Rose-Krasnor, 1991), externalizing behavior and attention problems (Youngstrom et al., 2000), bully behavior (Warden & Mackinnon, 2003), and general ratings of problem behavior (e.g. Dubow et al., 1991). A number of intervention programs targeted at improving social problem solving skills have also emerged, finding that skills training relates to improvements in indices of behavioral adjustment (Denham & Almeida, 1987), as well as reductions in antisocial behavior (e.g. Kazdin, Siegel, & Bass, 1992) and conduct problems (e.g. Webster-Stratton, Reid, & Hammond, 2001).

This suggests a causal link exists between increased social problem solving in children and increases in their socially competent behavior.

In terms of attachment security, securely attached children have been found to produce or endorse more positive responses to hypothetical events than insecurely attached children. Cassidy et al. (1996) found that secure and insecure-ambivalent children endorsed more positive or prosocial behaviors than insecure-avoidant children in response to a peer's negative actions in a hypothetical story (e.g. spilling paint on the child's drawing), such as suggesting, "I would say 'that's O.K.'" (The authors reasoned that insecure-ambivalent children may be inept at social relationships, but they are not usually found to be particularly hostile.) Similarly, Ziv, Oppenheim, and Sagi-Schwartz, (2004) found that securely attached children were better able than insecurely attached children to distinguish positive and negative social outcomes of their responses to hypothetical children who would or wouldn't let them join in play. Securely attached children evaluated a competent social response to have more positive interpersonal (e.g. "other children would like me") and instrumental (e.g. "other children would let me play") outcomes, and an inept or aggressive response to have negative outcomes. Other studies examining attachment security and measures designed specifically to assess social problem solving, such as the revised Social Problem-Solving Test (Rubin, 1983) are somewhat mixed. Rose-Krasnor et al. (1996) found weak correlations between attachment security and social problem solving skills as assessed by this measure. Raikes and Thompson (2008) found that Attachment Q-sort attachment security predicted social competent problem solving responses in this measure after controlling for factors such as family income, gender, and race. However, attachment indices were not found to relate to

aggressive social problem solving solutions.

Explanations for the Association Between Attachment and Social Cognition

Although past research suggests that attachment security may be associated with attribution biases and social problem solving skills, it is important to consider the reasons for which this connection exists. Previous studies suggest that this connection is may be established through the formation of attachment-based internal working models, however it is possible that emotion regulation is a major contributing factor as well.

Internal working models. Attachment theory posits the idea that a child's attachment relationship with the primary caregiver influences the formation of internal working models of self, of the primary caregiver, as well as of the attachment relationship (Bowlby, 1969; Main, Kaplan & Cassidy, 1985; Shaver, Collins, & Clark, 1996). The child is thought to form these cognitive representations based on the sensitivity and responsiveness of the primary caregiver, usually the mother, during times of distress. These representations in turn aid the child in making predictions about the mother's availability and sensitivity within the attachment relationship. The child also forms a representation of his or her own acceptability or effectiveness within that relationship. Finally, the child forms an overall representation of the attachment relationship and of other close relationships.

Children with secure attachments to their mothers are thought to form more positive internal working models within the attachment relationships. They form representations of the mother as responsive and nurturing, and consistently available to provide security. Based on their consistent receipt of sensitive care, these children form a model of themselves as effective within the mother-child relationship. They believe that

their actions will bring about responses from their mother that provide this sense of security. From this the child will form a positive representation of the attachment relationship, and the understanding that this relationship is consistent and will endure over time. Conversely, children with insecure attachments may form more negative internal working models. These representations formed within the attachment relationship may come to influence children's functioning in other relationships (Weinfield, Sroufe, Egeland, & Carlson, 2008). Children with secure attachments approach future interactions with a view of the self as competent, other people as sensitive and responsive, and relationships as positive and stable. Children with insecure attachments may view other people as unreliable or unresponsive, and the self as unworthy of sensitive treatment. They may in turn view relationships as negative, unpredictable, or unimportant.

Internal working models and hostile attribution bias. The presence of a hostile attribution bias implies that the child's memory and stored representations of others leads the cognitive system to code and interpret social information as hostile or negative. It has been suggested that this automatic activation of stored representations is similar to descriptions of internal working models in attachment theory. The social information processing model emphasizes the use of schemas, scripts or representations in memory that influence the encoding and interpretation of information (Crick & Dodge, 1994). Through repeated interaction with the caregiver, the child's internal working model of self and other may come to include positive or negative representations of the self and other within social interactions (McElwain et al., 2008). While positive internal working models of others formed through a secure attachment would lead the child to attribute

benign intent to ambiguous social information, negative internal working models of others may instead be reflected in negative interpretations of this information. This idea is congruent with past discussion of internal working models as constraining or filtering information (e.g. Main, 1995; Main, Kaplan, & Cassidy, 1985) or serving as event scripts and schemas (Bretherton & Munholland, 1999).

Many researchers who have explored the association between attachment and social information processing have indeed highlighted internal working models of attachment as a primary basis for this association (e.g. Belsky, Spritz & Crnic, 1996; Ziv, Oppenheim, & Sagi-Schwartz, 2004). Other studies examining the association between attachment security and positive or negative attributions of intent also maintain the explanation that representational or internal working models may influence children's attributions (e.g. Cassidy et al., 1996; Clark & Symons, 2009; McElwain et al., 2008; Raikes & Thompson, 2008; Suess, Grossmann, Sroufe, 1992). Given the proposed parallels between the influence of internal working models on children's general expectations of others in social interactions the influence of a hostile attribution bias on children's expectations about others intent in social interactions, it is reasonable to believe that the internal working models inherently formed within the attachment relationships may be the driving influence in predicting children's hostile attributions.

Internal working models and social problem solving. Among the few studies that have examined attachment security and social problem solving, internal working models have been mentioned as a possible influence. Rose-Krasnor et al. (1996) reasoned that children who expect positive interactions with others will choose goals or strategies in social settings that take into account others' needs, while those who have negative

expectations of social interactions may act aggressively or choose self-serving goals. Raikes and Thompson (2008) recognized that internal working models may influence children's social competence as reflected through social problem solving, but believed that other aspects of parenting might also influence these skills.

The coding and interpretation stages of social information processing, those often linked to the hostile attribution bias, may involve the automatic activation of mental representations parallel to internal working models. The goal and response selection steps linked to social problem solving, however, occur at a later stage of the social information processing model. Social problem solving is thus perhaps a less-automatic process influenced by other skills fostered in the attachment relationship, such as emotion regulation.

Emotion regulation. The regulation of emotion in children is thought to change from a largely dyadic process in infancy, to an internalized self-regulatory process in childhood and beyond (Sroufe, 1996). That is, the child's dependency on the caregiver to modulate and attenuate negative emotion in the early years serves as the basis for the later ability to independently regulate and maintain his or her emotional arousal. Given that attachment security is based in the caregivers' sensitive responding to the child in times of distress, attachment has been proposed as an antecedent of children's developing emotion regulation skills. In early infancy, the mother may recognize negative affective arousal in the child, identify it as meaningful, and respond in ways that modulate it. Eventually the child may come to communicate negative emotion to the caregiver in intentional ways in order to initiate dyadic regulation. For example, "secure base behavior" found in mother-child interactions may be seen as a reflection of the child

utilizing the parent for assistance in coping with threat or distress (Thompson, 1994). Over time a child may use these dyadic regulatory interactions to develop regulatory capacities of his/her own, eventually approaching self-regulation of emotion.

It is believed that a secure attachment predicts more skillful and adaptive emotion regulation (Sroufe, 1996). In the environment of a secure attachment, the mother successfully responds to the child's distress and aids the child in modulating emotion. In turn, the child develops a view of the mother as available to provide this response, and looks to her for assistance in regulation. This dynamic interplay of child-caregiver regulation eventually promotes a more successful transition to self-regulation of emotion in securely attached children. Experiences with the attachment figure may thus influence children's emerging emotion regulation skills. Insecure infants are thought to form less adaptive emotion regulation strategies based on the pattern of response received from the caregiver (Cassidy, 1994). Children with consistently unresponsive or insensitive caregivers may learn to minimize the display of negative emotions so as not to threaten the attachment relationship. These children continue to internalize negative affect and may not come to form the regulatory skills necessary to reduce it. Rather, they may come to display maladaptive, muted emotional responses in some contexts. Conversely, children who receive inconsistently sensitive responses from the caregiver may instead heighten their displays of negative emotion as a means to gain the caregiver's attention. The caregiver's response to this emotion may reinforce the utility of negative emotion displays in the child, rather than promoting the development of emotion regulation skills.

The association of emotion regulation to social competence has been examined in many ways in past literature. Emotion regulation is often assessed along with negative

emotionality, the stable, dispositional level of intensity and frequency with which a person experiences negative emotion (Eisenberg & Fabes, 2006; Eisenberg, Fabes, Murphy, Maszk, Smith, & Karbon, 1995). It is generally found that emotion regulation is associated with greater levels of socially competent behavior as measured by parents and teachers, particularly in children with high negative emotionality (Eisenberg et al., 1995; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Eisenberg, Fabes, Murphy, Karbon, Smith, & Mazsk, 1996). The greatest social competence is usually found among children with greater emotion regulation and lower levels of negative emotionality, though emotion regulation relates to greater levels of social competence in children with high negative emotionality. Conversely, lower levels of measures of emotion regulation have been found to relate to issues such as externalizing problems in children with greater levels of anger, and internalizing problems in children with greater levels of sadness (Eisenberg, Cumberland, Spinrad, Fabes, Shepard, Reiser, Murphy, Losoya, & Guthrie, 2001; Eisenberg, Valiente, Spinrad, Cumberland, Liew, Reiser, Zhou, & Losoya, 2009).

Emotion regulation may also influence many factors that may be relevant to competent social problem solving. For example, anger is found to have a negative association with cognitive perspective-taking, which may influence a child's ability to take into account the others' needs in a situation (Denham, 1986). Because emotion regulation is found to promote more socially competent responses in children prone to negative emotions, it may prevent this pattern. Children with high levels of emotion regulation have been found to have lower levels of negative arousal in intense peer interactions, instead displaying more socially competent responses (Fabes, Eisenberg, Jones, Smith, Guthrie, Poulin, Shepard, & Friedman, 1999). Regulated children may be

able to approach potentially emotion-arousing situations in ways that minimize negative emotion and promote competent behaviors. This pattern is reflected in some discussion of regulation in terms of selecting responses to social situations. Thompson (1994) discussed the idea that emotion regulation may not just be used to achieve one's goals in a situation, but that having the goal of benefits to the self might promote greater regulation. If one views competent behavior as beneficial, emotion regulation might coincide with the decision to enact it. Further, Lemerise & Arsenio (2000) discussed emotion in relation to social information processing specifically. They suggested that children who easily become emotionally overaroused may generate responses that avoid social interaction, such as running away, or harm successful interaction, such as acting aggressively. Alternatively, well-regulated children may access and evaluate a greater number or variety of responses, and evaluate them in ways that promote more competent responses. In other words, emotion regulation may allow children to select, evaluate, and enact responses that both achieve their goals and foster competent social interactions.

Given these suggested relationships, it seems possible that the proposed association between attachment security and social problem solving may be mediated by emotion regulation. This sort of mediated relationship has been found in the past for associations of attachment security and other measures of social competence in middle childhood such as peer acceptance and social skills (e.g. Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000). This pattern is not necessarily in opposition to the view that internal working models of attachment themselves have a specific regulatory component (e.g. Zimmerman, 1999). Rather, it suggests that security attachment will influence the development of emotion regulation, and these regulatory capacities will account for

enhanced social problems solving abilities among securely attached children.

It is also possible that emotion regulation has a moderating effect on the relationship between attachment and social problem solving. That is, attachment security may promote social problem solving skills in children who are low in emotion regulation, or emotion regulation may promote social problem solving skills in children who have low levels of attachment security. Belsky and Fearon (2002) explored interactions of attachment security and demographic/parenting risk factors, such as low socioeconomic status, maternal depression, and minority status, in predicting social competence. They found large decreases in social competence as risk level increased in children with an insecure attachment, particularly insecure-avoidant children. Securely attached children displayed smaller decreases in social competence between risk level groups. This suggests that attachment may provide a buffering effect for children who might otherwise be expected to experience negative outcomes. Similarly, emotion regulation may moderate the influence of certain risk factors. Silk, Shaw, Forbes, Lane, & Kovacs (2006) examined the relationship between maternal and/or child depression and later internalizing problems as moderated by emotion regulation strategies. They found that children with depressive symptoms generally had higher levels of internalizing behavior than children without depressive symptoms, across levels of maternal depression. However, the emotion regulation strategy of positive reward anticipation (focusing on the future reward when children were asked to wait for a prize) predicted lower levels of internalizing behavior in children with multiple risk factors of depressive symptoms and mothers with depressive symptoms. Children in this group who used a high level of positive reward anticipation were found to have low levels of internalizing behavior

similar to those of children with low depressive symptoms. This lends some support to the idea that emotion regulation provides some level of protection for children at risk for later behavior problems.

Further, although attachment security is expected to relate to greater emotion regulation and social problem solving skills generally, the impact of emotion regulation may vary with the child's negative reactivity. Children with high negative emotionality may have difficulty coming to competent social problem solutions without high levels of emotion regulation. This idea is in line with past research suggesting that children with high levels of negative emotionality may receive a particular benefit from emotion regulation skills when predicting social competence (e.g. Eisenberg et al., 2000). In children with high negative emotionality, the emotion regulation skills fostered by a secure attachment may have a considerable effect upon social problem solving skills, such that those with higher levels of emotion regulation will have much greater social problem skills than those with lower levels of emotion regulation. However, even moderate levels of emotion regulation may promote social problem solving skills in children with low levels of negative emotionality, with smaller improvements as regulation increases.

Current Study

The current study examined associations between attachment security, hostile attribution bias, and social problem solving using archival data taken from a large sample of children in the United States. This longitudinal dataset allowed for the prediction of social cognition variables at 54 months from earlier assessments of attachment security. Children of preschool age have the verbal abilities necessary to express their thoughts

concerning social interactions that younger children may not possess, however social competence may still be successfully promoted by intervention programs implemented at this age (e.g. Shure & Spivack, 1982). If risk factors for hostile attribution and incompetent social problem solving skills may be identified at young ages, then teachers and caregivers may use strategies to successfully address them before greater aggressive or behavioral problems result.

It was hypothesized that internal working models formed within the attachment relationship influence the automatic processing of social attributions, such that securely attached children are less likely to attribute hostility to others' actions. This study also expanded previous research examining attachment security and social problem solving. It was hypothesized that a secure attachment promotes the development of competent social problem solving skills. However, rather than viewing this association in terms of the child's attachment representations as seen in previous research, this study predicted that emotion regulation skills fostered by a secure attachment will influence the association between attachment security and competent social problem solving. Emotion regulation was expected to mediate the relationship between attachment security and social problem solving, or to have a moderating effect on this relationship. The impact of negative emotionality was also examined, with the prediction that the influence of emotion regulation would be particularly strong in children with high levels of negative emotionality.

Method

Participants

The data from this study was taken from the National Institute of Child Health

and Human Development (NICHD) Study of Early Child Care and Youth Development (SECCYD). This study began in 1991 shortly after the participating children's births, and data collection continued until participating children were 15 years of age. The purpose of this study was to collect large-scale data from a sample representative of the United States population. Data collection took place at ten locations throughout the United States, in the home, child care, school, or laboratory setting. The data used in this analysis was taken from the first and second phase of the study, which included measures for participants up to first grade. Data for each of the measures used in this study were collected when the child was between 6 months and 54 months of age. At 54 months the sample included 1,084 families, 69.2% of whom were above the poverty line. Maternal education varied; 8.5% of mothers had no high school degree, 20.1% of mothers had a high school degree or equivalent, 33.9% had attended some college, and 38.4% of mothers had a college degree or above. Among child participants, 78.8% were Caucasian, 11.2% were African-American, 5.6% were Hispanic, and the rest were identified as other or mixed races. Gender was roughly evenly distributed in child participants (50.5% male).

Measure Overview

Attachment security assessments.

Attachment Q-set. As a continuous measure of attachment security, experimenters completed a sort of the Attachment Behavior Q-set (AQS; Waters & Deane, 1985) for each child at 24 months of age. The AQS has been found to be a psychometrically sound measure of the child's secure base behavior. This measure involves a fixed distribution sort of 90 cards with written statements about the child,

some of which are relevant to the child's secure-base behavior (see Appendix A for items). Through a series of sorts, the sorter gradually divides the cards into nine piles, ranging from behaviors that are very much unlike the child to behaviors are very much like the child.

A trained experimenter made a 2 hour visit to the participant's home and observed behaviors within every day mother-child interactions as well as in semi-structured situations. In the case of reliability visits, two experimenters made observations. The semi-structured situations included a small book with surprise windows, a snack, and a hide-and-seek game. These semi-structured activities took place during the last hour of observation. The observer(s) took notes on the child's behavior throughout the visit, and performed the sort immediately after the visit based on notes and memory. In this study, observers sorted the card set into a 4-6-10-15-20-15-10-6-4 distribution. Cards most characteristic of the child received 9 points, and those most uncharacteristic of the child received 1 point. Scoring of the AQS involves correlating the sort with an optimal security sort. This yields a score ranging from -1 to 1, with scores closer to 1 indicating greater security. Across within-site reliability assessments, the inter-rater correlation was .73.

Strange Situation. Attachment security was also assessed when children were 15 months of age using the Strange Situation procedure (Ainsworth, Blehar, Waters, & Wall, 1978). This is a widely used and widely validated measure of attachment security that assesses categorical attachment pattern. Mother and child took part in a videotaped series of 3-minute episodes involving separations and reunions of the mother, child, and a stranger designed to increase child distress and activate the attachment system (see

Ainsworth, Blehar, Waters, & Wall, 1978). Trained coders viewed the child's behavior during the reunions and noted the child's proximity and contact seeking, contact maintaining resistance, and avoidance. After analyzing information about the child's attachment and exploratory behaviors, especially during reunions, the coder then classified the child into one of three attachment patterns: Secure (Group B), Insecure-Avoidant (Group A), or Insecure-Ambivalent (Group C) (see Ainsworth, Blehar, Waters, & Wall, 1978; Main & Solomon, 1990).

Social cognition child measures. As a measure of hostile attribution bias, children took part in a verbal attribution questionnaire in a laboratory setting at 54 months of age (see Appendix B). This measure was based on the Attribution Bias Questionnaire (Feshbach, 1990). This measure is used to assess children's tendencies to attribute other's actions as having hostile versus benign intent. The experimenter asks the child to imagine he/she is in four separate situations in which another's action may be viewed as hostile or benign (sample vignette from girls' version: "Pretend 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?"). As seen in the sample vignette, the child is asked a question in response to each situation through the course of the questionnaire. The child is provided with two options for each situation, one implying hostile intent and one implying benign intent, and the child may endorse one (sample vignette options from the girls' version: "Did Nancy hit you in the back by accident, or did Nancy want to hit you in the back?"). The experimenter marks the child's endorsed statement (hostile or benign) on written coding sheets during the course of the interview. The characters in the vignettes were matched to the child's gender (the original measure was assessed with

male participants/vignette characters only, and a version with female vignette characters was developed by NICHD researchers for use with female participants).

As a measure of social problem solving, participants took part in the Social Problem-Solving Test-Revised (Rubin, 1983) in a laboratory setting at 54 months of age. This is an interview-format measure in which children are presented with five hypothetical situations through drawings and a verbal story (see Appendix C for example test booklet pages). In each situation a child must acquire an object from another child (termed “object acquisition” stories in the measure) or become acquainted with another child (termed “friendship” stories). The participant is asked to provide two solutions for what the protagonist in the story may say or do. The participant is also asked what he or she would do in this situation. The children’s responses are coded for relevancy, flexibility, and type. For object acquisition stories, the possible solution types are prosocial, agonistic, authority intervention, trade-bribe, or manipulative. For the friendship stories, the possible solution types are invitation, prosocial/complimentary, adult intervention, conversation openers, indirect initiation, direct initiation, or non-normative. The characters in the story drawings were matched to the participant’s gender and ethnicity.

Emotionality and emotion regulation measure. Mothers of children participating in the study completed the Child Behavior Questionnaire (CBQ) Short Form when the child was 54 months of age (Rothbart, Ahadi, Hershey, and Fisher, 2001). The original CBQ includes 94 items intended to measure temperamental aspects in 3 to 7 year old children. The mother rates statements describing the child or his/her reaction to certain situations on a 7-point scale (from “extremely untrue” to “extremely true”) in

terms of how accurately the statement describes her child. Sample items include, “Becomes very excited while planning for trips,” and “Can easily stop an activity when s/he is told ‘no.’” This widely-used measure has been found to have predictive validity in terms of child temperament (Rothbart et al., 2001).

The CBQ includes three scales reflecting the dimensions of negative affectivity, effortful control, and extraversion. These scales may also be further divided into individual subscales. This study utilized the effortful control scale, as this construct is often used to represent emotion regulation (see Eisenberg, Smith, Sadovsky, & Spinrad, 2004). This study also utilized the negative affectivity scale as a measure of negative emotionality. NICHD researchers chose to collect a reduced number of CBQ subscales, resulting in a revised CBQ containing 80 items (see Appendix D). In terms of the scales used in this study, NICHD researchers gathered the inhibitory control and attentional control subscales of effortful control, and the anger/frustration, sadness, and fear subscales of negative affectivity.

Control measures. Although research is mixed, there is some evidence that a negative or “difficult” infant temperament may lead to less positive or less sensitive maternal behavior, which may in turn influence outcomes such as attachment security (e.g. Mangelsdorf, Gunnar, Kestenbaum, Lang, & Andreas, 1990; Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996). In order to control for the influence that temperament may have on children’s early parenting experiences, early difficult temperament was explored as a control in the analyses. Mothers responded to items from the Revised Infant Temperament Questionnaire (Carey & McDevitt, 1978, see Appendix E) when participating children were 6 months of age. NICHD researchers collected

responses for 38 items comprising the subscales of activity (amount of physical motion), adaptability (ease/difficulty with which reactions can be modified in a desirable way), approach (nature of initial response to new stimuli), mood (amount of pleasant/friendly or unpleasant/unfriendly behavior in various situations) and intensity (energy level of responses regardless of quality/valence), as these were expected to relate to children's adaptation to child care. Previous research has indicated that temperamental "difficulty" involves high activity, low adaptability, low approach, negative mood, and high intensity (Fullard, McDevitt, & Carey, 1982). Following this pattern, NICHD researchers combined the individual scales into one temperament composite score, with higher scores reflecting a more "difficult" temperament.

Aspects of maternal behavior in mother-child interactions such as positive affect and sensitivity are found to relate to children's developing social competence (e.g. Denham, Renwick, & Holt, 1991; Raikes & Thompson, 2008). In order to examine the influence of attachment security on hostile attribution and social problem solving beyond the influence of generally sensitive and positive parenting, early parenting was included as a control in the analyses. As attachment security assessments in this study were made only with the mother, only maternal parenting variables were used as a control. Mothers and children took part in a 15-minute semi-structured interaction in a lab setting when participant children were 24 months of age. In the first 7-8 minute segment the mother was asked to play with the child as she normally would with toys of her choosing. In the second 7-8 minute segment the mother was asked to engage her child in play with a standard set of toys. Researchers observed video-recordings of these interactions and made 4-point global qualitative ratings of mother behavior. Rating scales included

sensitivity to non-distress ("the extent to which mother-child interaction is characterized by prompt and appropriate responses to the child's social gestures, expressions, and signals, and is generally child-centered"), intrusiveness ("the degree to which the mother imposes her agenda on the child as opposed to interacting in a way that provides a sense of control to the child"), positive regard for the child ("the quality and quantity of expressions to the child that connote the mother's positive feelings toward the child") and negative regard for the child ("the frequency and intensity of negative affect directed to the child").

Lastly, gender is thought to be an important influence in many aspects of children's socialization experiences and social development. In particular, there is some evidence for gender-based differences in patterns of peer relationships and conduct (Patterson, Kupersmidt, & Vaden, 1990). Gender has also been found to interact with attachment security in predicting children's social interactions with peers (Turner, 1991). Thus, child gender was included as a control in all analyses (coded "male" = 1 and "female" = 2 in NICHD dataset).

Results

Data Reduction

Maternal parenting. Descriptive information for the qualitative ratings of sensitivity to non-distress, positive regard for the child, negative regard for the child, and intrusiveness appears in Table 1. These individual ratings were entered in a factor analysis, yielding one factor with individual component loadings greater than .71. Sensitivity to non-distress and positive regard loaded to the factor positively; negative regard for child and intrusiveness loaded to the factor negatively. A maternal parenting

factor score calculated from this analysis was used in later analyses as a control for early maternal sensitivity and positivity.

Negative emotionality and emotion regulation. Descriptive information for the CBQ subscales also appears in Table 1. As a limited number of CBQ subscales were collected by NICHD researchers, the subscale scores were entered into factor analyses to ensure that they sufficiently loaded onto factors representing the scales in the larger measure. The effortful control subscales of inhibitory control and attentional focus yielded one factor with component loadings above .87. A factor score calculated from this analysis served as an emotion regulation score. The negative affectivity subscales of anger/frustration, fear and sadness scales yielded one factor with component loadings of .70 and above. A factor score calculated from this analysis served as a negative emotionality score.

Social problem solving. Children's social problem solving solutions were recorded and coded by the NICHD research teams. Researchers calculated a socially competent social problem solving score for each child across all stories following the coding scheme of the original measure. This was calculated as the sum of the standardized scores for the proportion of prosocial solutions in the object acquisition stories, the proportion of prosocial solutions in the friendship stories, average flexibility in all stories, and total number of categories in all stories. Among participating children, these scores ranged from -6.68 to 5.54, with greater scores indicating more socially competent social problem solving solutions.

Data Analysis

Prediction from Q-sort attachment security. Descriptive information for the

variables in the full sample appears in Table 1. Bivariate relationships among the variables appear in Table 2. (In terms of gender, a positive relationship indicates females had higher scores on the given variable.) Attachment security as measured by the Attachment Q-set did not predict number of hostile attributions. However, effortful control was found to be negatively related to hostile attributions. A hierarchical regression model was built to examine if attachment security had a moderating effect on the relationship between effortful control and hostile attribution (Table 3). Attachment security and effortful control were entered in the first step. An interaction term was calculated for attachment and effortful control, and this was added in the second step. Effortful control made a significant contribution to this model, such that children with higher levels of effortful control endorsed fewer hostile attributions. However, the interaction of attachment Q-sort score and effortful control did not make a significant contribution to the model, thus this moderation was not explored further. Gender was also found to be negatively related to hostile attributions, thus a regression model was built to examine the contribution of the control variables in predicting hostile attributions (Table 4). Gender, early difficult temperament, and maternal parenting were added in the first step, and Q-sort attachment security was added in the second step. The model predicting hostile attributions from these variables was not significant ($R^2 = .01, p > .05$), though gender marginally predicted social problem solving ($\beta = -.05, p = .09$).

Attachment security was found to predict socially competent social problem solving solutions in the bivariate relationships. Testing for effortful control mediation of this relationship was also possible, as attachment security predicted effortful control and effortful control predicted socially competent social problem solving solutions. However,

attachment security did not predict negative affectivity, and this was not further explored as a mediator. A hierarchical multiple regression model was built to predict socially competent social problem solving solutions (Table 5). This test of mediation was performed following Baron & Kenny (1986). Attachment security was entered in the first step of the model, and made a significant contribution at this step. Effortful control was added to the second step and made a significant contribution to the model, though attachment security remained a significant contributor to the model at this step as well. Thus, the data do not indicate that effortful control fully mediated the relationship between attachment security and social problem solving. However, the effect of attachment security on socially competent social problem solving was reduced from the first step ($\beta = .15$) to the second step ($\beta = .11$). Thus a Sobel test was run on the model to examine if the addition of effortful control led to a significant drop in the contribution of attachment security. The Sobel z value of 3.95 ($p < .001$) indicates that effortful control partially mediated the relationship between Q-sort attachment security and social problem solving, such that 18% of the total effect of Q-sort attachment security was mediated by effortful control.

However, as attachment Q-sort security and effortful control both made a significant contribution to the model predicting socially competent social problem solving, a hierarchical multiple regression model was also built to explore the moderating effect of effortful control (Table 6). Attachment Q-sort security and effortful control were added in the first step of the model. The interaction term for attachment and effortful control was added in the second step. The interaction of attachment and effortful control made a significant contribution to the model predicting social problem solving.

Additional testing found that effortful control made a significant contribution to the model predicting social problem solving for children below the mean of attachment security ($\beta = .23, p < .001$) and at the mean of attachment security ($\beta = .13, p < .001$). However, effortful control did not make a significant contribution to the model predicting social problem solving for children above the mean of attachment security ($\beta = .04, p > .05$). Figure 1 provides an illustration of this pattern. Children with high levels of attachment security were found to have more socially competent social problem solving than children with lower levels of attachment security. Further, effortful control did not predict increases in social problem solving in children with high levels of attachment security. However, in children with moderate to low levels of attachment security, greater levels of effortful control lead to significantly more competent social problem solving. Thus, the data suggest a protective influence of effortful control for children at or below the mean of attachment security.

Gender, early difficult temperament (negatively) and maternal parenting were found to predict competent social problem solving in the bivariate relationships, thus an additional hierarchical regression model was built to explore the interaction of attachment and effortful control with the control variables included (Table 7). In addition to the influence of attachment and effortful control, gender and maternal parenting variables both made a significant contribution to the final model. Thus, a series of additional hierarchical multiple regression models were built to examine the interaction of attachment and early maternal parenting, effortful control and early maternal parenting, attachment and gender, and early maternal parenting and gender respectively. The separate predictors (e.g. attachment and early maternal parenting) were entered in the first

step of each model, and the interaction term (e.g. attachment and early maternal parenting interaction term) was entered in the second step of each model. However, none of these interaction terms made a significant contribution to their respective models even before controlling for the other independent predictors, and thus these moderations were not examined further.

Effect of Strange Situation classification. Descriptive statistics for the variables separated by Strange Situation classification appear in Table 8. A one-way analyses of variance (ANOVA) was run with Strange Situation attachment security as the independent variable (three levels: A/insecure-avoidant, B/secure, and C/insecure-ambivalent) and hostile attribution as the dependent variable. Strange Situation classification groups did not differ significantly in hostile attribution, $F(2, 973) = 1.34, p > .05$. A second one-way ANOVA was run with Strange Situation attachment security as the independent variable (three levels: A/insecure-avoidant, B/secure, and C/insecure-ambivalent) and socially competent social problem solving as the dependent variable. Strange Situation classification groups did not differ significantly in social problem solving, $F(2, 1007) = 1.32, p > .05$. The data indicate that Strange Situation attachment security classification groups did not differ in hostile attribution or in socially competent social problem solving.

As effortful control significantly predicted hostile attribution and social problem solving in the bivariate relationships, a series of hierarchical regression models were built to examine a potential moderating influence of each Strange Situation classification group on the relationship between effortful control and both hostile attribution and social problem solving. A “Secure” variable score was created, with participants with Strange

Situation “B” classifications coded 1 and those with other classifications coded -1. “Insecure-Avoidant” and “Insecure-Ambivalent” variable scores were also created in a similar manner. Interaction terms for effortful control by each classification group were then calculated. A model was built to explore the interaction of each attachment classification and effortful control in predicting hostile attribution and socially competent social problem solving respectively. An attachment classification score and effortful control was entered to the first step of each model, and the interaction term was entered into the second step. Effortful control made a significant contribution to each model, however no attachment classification or interaction term made a significant contribution to its respective model predicting either outcome, and thus these moderations were not examined further.

One-way analyses of covariance (ANCOVA) were also run to examine the influence of the control variables, with Strange Situation attachment security as the independent variable (three levels: A/insecure-avoidant, B/secure, and C/insecure-ambivalent) and gender, early difficult temperament, and maternal parenting as covariates. Similar to the results from Q-sort attachment security, there were no significant effects of early difficult temperament ($F(1, 936) = .19, p > .05$) or maternal parenting ($F(1, 936) = 2.30, p > .05$) in the ANCOVA with hostile attribution as the dependent variable, though gender again had a marginal effect ($F(1, 936) = 3.63, p = .06$). However, there was a significant effect of gender ($F(1, 970) = 13.98, p < .001$), early difficult temperament ($F(1, 970) = 6.05, p < .05$) and maternal parenting ($F(1, 970) = 26.41, p < .001$) in the ANCOVA with socially competent social problem solving as the dependent variable.

Discussion

This study sought to investigate the relationship between attachment security and elements of social cognition highlighted in previous research. One goal was to measure the association of attachment security to hostile attributions of intent and social problem solving skills in a large-scale longitudinal sample, taking into account the existence of controls such as previous temperament and parenting experiences. Another major goal of this study was to examine the differential influences of emotion regulation in later stages of social information processing, as measured by social problem solving skills. This study predicted that attachment security in children would promote fewer attributions of hostile intent to other's ambiguous negative acts, due to more positive cognitive representations of others fostered in the attachment relationship. This study also predicted that attachment security would lead to greater social problem solving skills, but that emotion regulation skills developed within a secure attachment relationship would mediate or moderate this relationship. The data lend support to some of these predictions, and provide interesting perspective to others.

Attachment and Social Problem Solving

One major finding of this study was the interaction of attachment security and effortful control in predicting socially competent social problem solving solutions. Greater attachment security predicted more competent social problem solving in all children. However, rather than fully mediating the relationship between attachment security and social problem solving, effortful control had a moderating effect. Attachment security generally predicted greater levels of socially competent social problem solving. However, effortful control was a significant predictor of increases in

socially competent social problem solving for children with moderate to low attachment security.

This moderating effect suggests that attachment-based differences in social problem solving exist not explicitly through children's ability to regulate negative affect in response to social problems. Rather, attachment security provides children with a separate pathway toward this ability. While it is unlikely that securely attached children lack the ability to recall or generate negative social problem solving solutions (Ziv, Oppenheim & Sagi-Schwartz, 2004), perhaps children within a secure attachment relationship simply have a history of generally positive interactions with the caregiver from which to base their responses, and a greater history of positive and prosocial actions bringing about positive social and relationship outcomes. Thus, their "mental store" of social representations and schemas are dominated by positive, rather than negative solutions. Similarly, securely attached children may have a more well-formed understanding of positive or prosocial actions as having positive outcomes. These children may readily recall and endorse positive or prosocial solutions to social problems without first needing to regulate a negative emotional response, as they know these to be the solutions that bring about the most positive social outcomes.

For children with moderate to low levels of attachment security, however, effortful control is a significant predictor of socially competent social problem solving. That is, effortful control may serve as a protective factor in determining children's social problem solving skills when attachment security is not high. These children may not have as consistent a history of positive interactions, and thus a number of positive and negative solutions may be available to them. Regulation, however, may help these children to

come to competent responses as suggested in this study's original hypothesis. There may be multiple antecedents of effortful control in these children. Caregiver responses to the child in times of distress are likely an important contributor to attachment security as well as emotion regulation, but some researchers have described other parental factors that might contribute to children's emotion regulation skills (see Denham, 1998 for a review). Parents may socialize children to express emotions in certain ways, such as using directives like, "We don't laugh when someone falls." They may also suggest certain strategies to their children to use when they anticipate an emotionally-arousing situation, such as bringing a book to read in a situation that might usually bore the child. Although these techniques might not play a part in children's developing attachment security, they may promote competent regulatory capacities that may be used in social problem solving.

There may also be child factors that aid in the development of emotion regulation skills. It has been suggested that emotion regulation has biological or temperamental underpinnings that promote lower levels of negative affect. Children's vagal tone, a measure of heart rate reactivity and regulation in the vagus nerve, has been studied as a physiological measure of children's emotional reactivity and responses (see Porges, Doussard-Roosevelt, & Maiti, 1994 for a review). Infants with low vagal tone are found to experience a lower level of automatic reactivity to stimuli than children with high vagal tone, thus children with lower vagal tone might not require a great deal of regulation to attenuate their negative emotional responses. Similarly, there is evidence for individual differences in vagal suppression such that some children are able to suppress their physical responses at a faster rate. In either case, lowered levels of emotional reactivity through low vagal tone or high vagal suppression may set the stage for

effective regulation of negative emotion, thus promoting more competent social problem solving. This sort of pattern is suggested by the negative relationship between early difficult temperament and social problem solving found in this study.

Similarly, Denham (1998) has discussed the idea that children develop associations over time between the emotional coping strategies they use and the outcomes of these strategies such that they come to know what strategy is most optimal in a given situation. Although research suggests that some level of caregiver-guided regulation is necessary for adaptive regulatory outcomes, some children may have a naturally skilled awareness of their emotional experience and create these associations easily. These children may build a strong repertoire of emotion regulation even with lower levels of sensitive responding from the caregiver. Thus, these children may still develop a level of emotion regulation sufficient to produce socially competent social problem solving.

Given these associations, it appears that children's social problem solving skills are subject to both attachment security and emotion regulation capacities. However, the independent and interacting influences of these variables may require more examination. For example, if emotion regulation does not appear to be the main driving force in securely attached children's competent social problem solving skills, it is not yet certain what influences do in fact account for these abilities. It may be an increased store of positive solutions, an increased desire to maintain positive relationships, or another factor. It would be beneficial for researchers to develop measures that tap into these possible mediating influences. Conversely, if effortful control is beneficial for less-secure children, it is important for researchers to continue to explore what parenting influences may promote emotion regulation skills outside the context of a secure attachment, and

which of these influences best predicts competent social problem solving.

Attachment and Hostile Attribution Bias

The data indicate that Q-sort attachment security is not a significant predictor of children's attributions of hostile intent in others' ambiguous negative acts. This may suggest that children's internal working models of others are somehow not related to their tendency toward attribution. Alternatively, it may indicate that other influences may better predict children's responses to the measures used to assess hostile attribution. That is, although internal working models of attachment may lead to more or less negative attribution of others' intent in an automatic sense, there may other intervening processes that influence a child's actual response. One possible influence suggested by the data would be that of temperament. In this study, emotion regulation was found to predict fewer hostile attributions. A child who experiences a negative affective response to a negative social event may in turn attribute this negative reaction to the situation as being a result of the intent of the person precipitating the event. Children who are well-regulated, however, may have the ability to attenuate this negative emotional response to the event, and may be more likely to consider contextual or other factors when evaluating intent. This idea is reflected in research in older children finding that aggressive boys who reported more hostile attributions in response to videotaped vignettes also reported higher levels of anger and lower levels of adaptive regulation (Castro, Merk, Koops, Veerman, & Bosch, 2005).

These considerations suggest two important tasks for future research in hostile attribution bias. First, it is important to explore multiple and/or more precise assessments of hostile attribution in children. Attempts should be made to assess children's automatic

responding prior to later social processing or temperamental influences, in order to examine the contribution of automatic cognitive processing and other factors in predicting earlier rather than later stages of social information processing. Recent advances in neuroscience and neuroimaging techniques may be helpful in this process. Secondly, it is important to consider temperamental influences on these responses. While the original hypotheses of this study assumed that emotion regulation would take place after attribution of intent, it seems that this process may in fact intervene before children produce responses to the hostile attribution assessment measure. A negative emotional response to a social situation may lead to hostile attribution of intent, while emotion regulation may attenuate this initial negative emotional response and lead to more benign attribution of intent. While these questions extend beyond the focus of attachment security adopted by this study, consideration of temperamental factors appears to be an important next step in clarifying the antecedents of hostile attribution in children.

Remaining Concerns and Future Directions

The data reflect several remaining concerns in the study of hostile attribution and social problem solving. The first of these are methodological. One important concern is the different pattern of results for each assessment of attachment security. The attachment Q-sort was created as a valid measure of attachment security comparable to assessments like the Strange Situation assessment (Waters & Deane, 1985). However, there have been some differences found among the correlates of Q-sort attachment as compared to Strange Situation. Seifer et al. (1996) found that infant temperament related to both Q-sort attachment security and Strange Situation classification. Alternatively, quality and appropriateness of mother sensitivity was found to relate only to the Q-sort assessments.

This suggests that the meaningful aspects of children's secure-base behavior assessed in these two measures may be differentially related to or influenced by maternal sensitivity.

While neither assessment of attachment indicated differences in terms of hostile attribution bias, Q-sort attachment security predicted socially competent social problem solving and Strange Situation classifications did not. Further, maternal parenting was found to have a significant effect on social problem solving in the analyses for either attachment assessment. Perhaps, similar to maternal sensitivity, the constructs embodied in the maternal sensitivity variable are related to Q-sort attachment security and not to Strange Situation classification. In fact, Seifer et al. (1996) used assessments of mother sensitivity that included ratings of responsiveness, control, positive statements and negative statements. These elements are quite similar to the elements used to construct the maternal parenting variable in this study. This might suggest that social problem solving is an outcome in which differential Q-sort and Strange Situations assessments of attachment security may lead to different patterns in the data. Given the small number of studies examining the relationship between attachment security and social problem solving, it may be beneficial to compare the relationship of these attachment security assessments to social problem solving in other samples or through other measures.

A second methodological concern is in the use of hypothetical situations in assessing the major outcome variables of hostile attribution and social problem solving solutions. These data were drawn from assessments in which children were presented with hypothetical situations and asked to generate associated hypothetical responses. While children's responses are thought to be a reflection of those which they would produce in realistic situations, it is possible that these responses may be subject to other

influences. As mentioned in the discussion of hostile attribution, it seems that temperamental variation may contribute to these responses. If negative emotion elicited by a real-life ambiguous negative social experience varies from that which the child expects when considering hypothetically, then children's real-life responses will likely vary from their responses to a similar hypothetical situation. In terms of social problem solving, there may be a difference between the social problem solving solutions children suggest when they are considering a hypothetical situation, as compared to their responses when they are actively experiencing and solving a social "problem." Rubin & Rose-Krasnor (1992) emphasized that although social problem solving research typical involves the presentation of hypothetical situations, there are many advantages to using observations. These advantages are not just in terms of comparing children's real-life responses to their hypothetical reasoning, but also in the ability to examine the contextual influences that coincide with or bring about adaptive or maladaptive responses. Taken together, it seems it would be advantageous for future researchers to continue to expand and improve observational measures of these variables in children.

Another important consideration in interpreting these results is the use of effortful control as a representation of emotion regulation. Many researchers (e.g. Eisenberg) assume that effortful control serves as a useful indication of children's abilities to regulate emotions, as it should predict children's ability to regulate their emotion-related attention, behavior and motivation (Eisenberg, Smith, Sadovsky, & Spinrad, 2004). However, effortful control may represent a generally ability to inhibit and redirect responses of many kinds, including but not limited to emotion. If a measure of effortful control reflects overall self-regulation rather than emotion regulation specifically, the

independent or interactive influence of emotion regulation in this study may perhaps be due to some elements of non-emotion-related regulation. For example, a child who enacts a social problem solving solution such as pushing another child and taking a toy of interest may have done so because of unregulated anger or frustration. Some emotion researchers (e.g. Denham, 1998) maintain that emotion regulation has a behavioral component, and thus behavior may reflect emotion coping. However, self-regulation may help children to avoid physical aggression without necessarily reducing experienced levels of negative affect. Given the close relationship of emotion regulation and overall self-regulation, it may help to continue to explore these relationships using a variety of methods of emotion regulation not just limited to effortful control.

Another consideration in the assessment of emotion regulation in this study is the use of a global measure of emotion regulation, rather than a measure examining specific emotion regulation strategies. While the theoretical basis of the hypotheses suggests that emotion regulation generally promotes better outcomes for children in terms of social competence, certain types of emotion regulation may be better suited to certain types of social interactions that children encounter than others. As mentioned, Silk et al. (2006) found that among other emotion regulation strategies, positive reward expectation was a meaningful predictor of reduced internalizing problems in at-risk children. Similar relationships may be found between specific kinds of emotion regulation strategies and specific social interactions in predicting greater social competence. For example, the ability to shift attention may best help a child to focus on alternative options, such as choosing other toys to play with when another child is playing with his/her favorite toy. Alternatively, active attempts to downgrade an emotional response through techniques

like “taking a breath” may better help a child to attenuate negative emotions in lieu of other options, such as choosing to forgive to a child who runs into him/her on the playground rather than shoving the child in return. Comparing the influence of various emotion regulation techniques children use in different social situations may provide a more thorough perspective regarding the prediction of hostile attribution of intent and socially competent social problem solving in children.

Although this study sought to examine the independent influence of attachment security in predicting these outcomes, the data also suggest that the variables selected for use as controls may be important to explore in future research in hostile attribution and social problem solving. Early parenting made an important contribution to the analyses predicting social problem solving. This variable, reflecting mother sensitivity in non-distressful situations, high levels of positive regard, low levels of negative regard, and low intrusiveness may be a key to understanding how parents socialize their children toward competence in social problem solving. As suggested earlier, a history of positive interactions with the caregiver may set the stage for the child accessing primarily positive and prosocial solutions in future social interactions. Similarly, competent social problem solving involves sensitivity to others’ needs and feelings when considering possible solutions and their outcomes (Krasnor & Rubin, 1983; Rubin & Rose-Krasnor, 1992). Although mother sensitivity in times of distress may relate to attachment influences on social problem solving, a general environment of mother sensitivity and responsiveness may still influence the child to have greater sensitivity for others’ needs in other ways. Thus, this may account for some variability in children’s social problem solving skills apart from the influence of attachment security.

Another control variable that appears to have an influence is that of gender. Gender related to differences in both hostile attributions (marginally) and in socially competent social problem solving. There is some evidence that males and females differ in the types of aggression they display, such that boys may tend toward overt displays of aggression, while girls tend toward relational aggression (Crick, Bigbee, & Howes, 1996; Crick & Grotpeter, 1995). However, males tend to be overrepresented and females underrepresented in studies of hostile attribution bias and aggression, and thus gender differences in hostile attribution bias are difficult to interpret (Castro, Veerman, Koops, Bosch, & Monshouwer, 2002). However, it has been found that gender differences in aggression relate to differences in perceived provocation (Bettencourt & Miller, 1996). That is, when one gender perceives provocation more than the other, then gender differences in aggression appear. Gender differences in hostile attribution might be related to these differences in perceived provocation. Some gender differences in social problem solving have been found in the past, suggesting that girls tend to display more socially competent solutions overall, and that children generally produce more competent solutions in an interaction with a same-gender rather than different-gender peer (e.g. Walker, Irving, & Berthelson, 2002). This may speak to a general difference in boys' tendencies toward and/or against aggressive and/or prosocial responses, and to differences in children's perceptions of same- or different-gender peers. One caveat to note in these interpretations is that gender was also related to other measures in the sample, such that girls also tended to have greater attachment security, effortful control, and maternal parenting scores (see Table 3). It is difficult to assume directionality of these effects in terms of gender, as a number of ratings were concurrent with one another.

Future research may identify and explore these and other influences in predicting gender differences children's social cognition. It is possible that the data in this study speak to a larger picture of gender socialization outcomes in which gender increasingly influences children's developing social cognition.

This study provides the basis for a renewed perspective on the relationship between attachment security and social-cognitive outcomes of hostile attribution bias and social problem solving. While past research has focused on the influences of cognitive representation on these outcomes, the results of this study indicate that temperamental influences may also play an important role. While attachment security did not relate to hostile attribution, there is evidence that emotion regulation may account for some differences in this processing. Attachment and effortful control interacted to predict social problem solving, such that high attachment security predicted socially competent social problem solving solutions across effortful control levels, while effortful control predicted greater socially competent social problem solving in children with moderate to low levels of attachment security. Positive cognitive representations of social interaction may provide a basis for positive and prosocial interactions in securely attached children, while effortful control may increase the tendency toward this type of problem solving in children with lower attachment security. In both cases, this study lends support and motivation to future research on temperament and social cognition. Similarly, the data provide evidence for possible links with maternal behavior and gender. Although a number of factors may determine variation in children's competent social cognition, this study lends support to continued examination of mother-child relationships and temperament in influencing these outcomes.

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Table 1

Descriptive Statistics for Variables in the Full Sample

Variable	Mean	Standard Deviation
Attachment Q-sort Score	.29	.21
Number of Negative Attributions (54 months)	1.72	1.33
Socially Competent Social Problem Solving Responses (54 months)	0.00	2.40
Effortful Control Subscales (54 months)		
Inhibitory Control	4.66	.78
Attentional Focus	4.71	.85
Negative Affectivity Subscales (54 months)		
Anger/Frustration	4.74	.83
Fear	4.09	.85
Sadness	3.96	.71
Difficult Temperament Score (6 months)	3.18	.40
Maternal Parenting Components (24 months)		
Sensitivity to Non-Distress	3.01	.74
Positive Regard for Child	2.82	.70
Negative Regard for Child	1.25	.57
Intrusiveness	1.48	.72

Table 2

Bivariate Relations Among the Variables

Variables	1	2	3	4	5	6	7	8
1. Gender	-----	.13***	-.07*	.14***	.17***	.01	.05	.08**
2. Attachment Q-sort		-----	-.06	.15***	.21***	-.04	-.12***	.23***
3. Negative Attributions			-----	-.03	-.11**	.05	.01	-.06
4. Social Problem Solving				-----	.15***	-.04	-.10**	.19***
5. Effortful Control					-----	-.28***	-.20***	.25***
6. Negative Affectivity						-----	.27***	-.03
7. Early Difficult Temperament							-----	-.14***
8. Maternal Parenting								-----

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

Table 3

*Hierarchical Regression Model Predicting Hostile Attributions from Attachment Q-sort
Security and Effortful Control*

Variables & Steps	β	R ²	ΔR^2
1. Attachment Q-sort Score	-.03	.02**	
Effortful Control	-.11**		
2. Attachment Q-sort Score	-.03	.02**	.00
Effortful Control	-.11**		
Q-sort Score X Effortful Control	-.06		

** $p < .01$

Table 4

*Hierarchical Regression Model Predicting Hostile Attributions from Attachment Q-sort
Security and Control Variables*

Variables & Steps	β in Full Model	R^2	ΔR^2
1. Gender	-.06+	.01	
Early Difficult Temperament	.01		
Maternal Parenting	-.05		
2. Attachment Q-sort Score	-.04	.01	.00

+ $p < .10$

Table 5

Hierarchical Regression Model Predicting Social Problem Solving from Attachment

Q-sort Security and Effortful Control

Variables & Steps	β	R^2	ΔR^2
1. Attachment Q-sort Score	.14***	.02***	
2. Attachment Q-sort Score	.11***	.04***	.02***
Effortful Control	.13***		

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

Table 6

Hierarchical Regression Model Predicting Social Problem Solving Using the Interaction of Attachment and Effortful Control

Variables & Steps	β	R^2	ΔR^2
1. Attachment Q-sort Score	.11***	.04***	
Effortful Control	.13***		
2. Attachment Q-sort Score	.11***	.04***	.01**
Effortful Control	.13***		
Q-sort Score X Effortful Control	-.09**		

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

Table 7

*Hierarchical Regression Model Predicting Social Problem Solving from the Control**Variables and the Interaction of Q-sort Security and Effortful Control*

Variables & Steps	β in Full Model	R ²	Δ R ²
1. Gender	.10**	.05***	
Early Difficult Temperament	-.05		
Maternal Parenting	.14***		
2. Attachment Q-sort Score	.08*	.06***	.01**
Effortful Control	.08*		
3. Q-sort Score X Effortful Control	-.09**	.07***	.01*

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

Table 8

Descriptive Statistics for Strange Situation Classifications

Variable	A <i>M (SD)</i>	B <i>M (SD)</i>	C <i>M (SD)</i>
Number of Negative Attributions	1.75 (1.32)	1.73 (1.32)	1.53 (1.38)
Socially Competent Social Problem Solving Responses	-.24 (2.55)	.09 (2.33)	.11 (2.54)
Effortful Control	.04 (1.01)	.02 (.96)	.02 (.96)
Difficult Temperament Score	3.14 (.42)	3.18 (.40)	3.19 (.38)
Maternal Parenting Score	-.28 (1.18)	.09 (.92)	-.00 (.97)

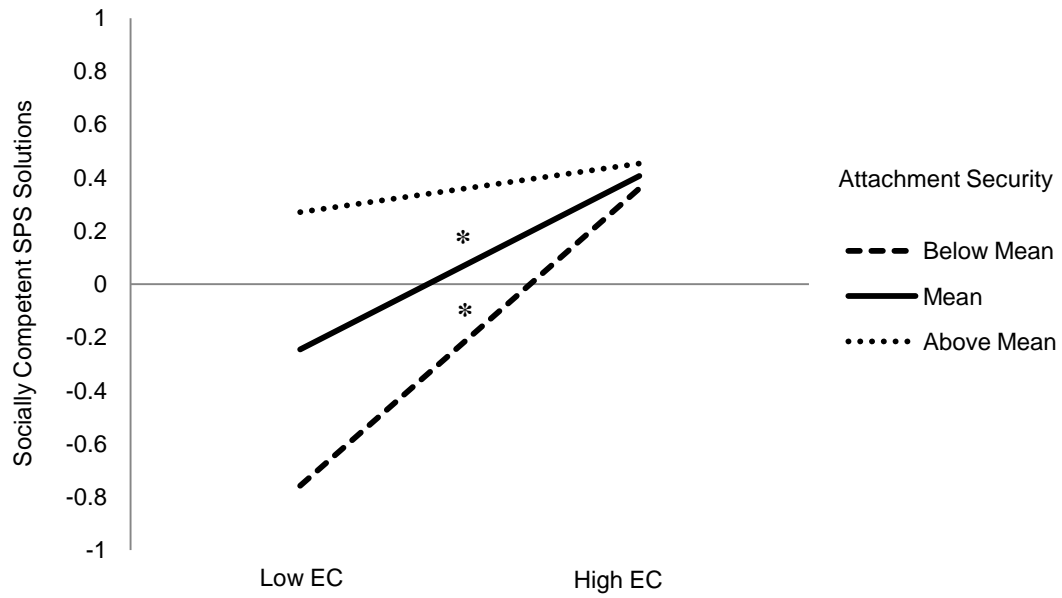


Figure 1. Attachment Q-sort security by effortful control predicting socially competent social problem solving solutions.

Appendix A

Attachment Q-sort Items

1. Child readily shares with mother or lets her hold things if she asks to.
Low: Refuses.
2. When child returns to mother after playing, he is sometimes fussy for no clear reason.
Low: Child is happy or affectionate when he returns to mother between or after play times.
3. When he is upset or injured, child will accept comforting from adults other than mother.
Low: Mother is the only one he allows to comfort him.
4. Child is careful and gentle with toys and pets.
5. Child is more interested in people than in things.
Low: More interested in things than people.
6. When child is near mother and sees something he wants to play with, he fusses or tries to drag mother over to it.
Low: Goes to what he wants without fussing or dragging mother along.
7. Child laughs and smiles easily with a lot of different people.
Low: Mother can get him to smile or laugh more easily than others.
8. When child cries, he cries hard.
Low: Weeps, sobs, doesn't cry hard, or hard crying never lasts very long.
9. Child is lighthearted and playful most of the time.
Low: Child tends to be serious, sad, or annoyed a good deal of the time.
10. Child often cries or resists when mother takes him to bed for naps or at night.
11. Child often hugs or cuddles against mother, without her asking or inviting him to do so.
Low: Child doesn't hug or cuddle much, unless mother hugs him first or asks him to give her a hug.
12. Child quickly gets used to people or things that initially made him shy or frightened him.
Middle: if never shy or afraid.
13. When the child is upset by mother's leaving, he continues to cry or even gets angry after she is gone.
Middle: if not upset by mom leaving.
Low: Cry stops right after mom leaves.
14. When child finds something new to play with, he carries it to mother or shows it to her from across the room.
Low: Plays with the new object quietly or goes where he won't be interrupted.
15. Child is willing to talk to new people, show them toys, or show them.
what he can do, if mother asks him to.
16. Child prefers toys that are modeled after living things (e.g., dolls, stuffed animals).
Low: Prefers balls, blocks, pots and pans, etc.
17. Child quickly loses interest in new adults if they do anything that annoys him.
18. Child follows mother's suggestions readily, even when they are clearly suggestions rather than orders.
Low: Ignores or refuses unless ordered.
19. When mother tells child to bring or give her something, he obeys. (Do not count refusals that are playful or part of a game unless they are clearly disobedient.)
Low: Mother has to take the object or raise her voice to get it away from him.

20. Child ignores most bumps, falls, or startles.
Low: Cries after minor bumps, falls, or startles.
21. Child keeps track of mother's location when he plays around the house. Calls to her now and then, notices her go from room to room, notices if she changes activities.
Middle: if child isn't allowed or doesn't have room, to play away from mom.
Low: Doesn't keep track.
22. Child acts like an affectionate parent toward dolls, pets, or infants.
Middle: if child doesn't play with or have access to dolls, pets, or infants.
Low: Plays with them in other ways.
23. When mother sits with other family members, or is affectionate with them, child tries to get mom's affection for himself.
Low: Lets her be affectionate with others. May join in, but not in a jealous way.
24. When mother speaks firmly or raises her voice at him, child becomes upset, sorry, or ashamed about displeasing her. (Do not score high if child is simply upset by the raised voice or afraid of getting punished.)
25. Child is easy for mother to lose track of when he is playing out of her sight.
Middle: if never plays out of sight.
Low: Talks and calls when out of sight. Easy to find; easy to keep track of what child is doing.
26. Child cries when mother leaves him at home with babysitter, father, or grandparent.
Low: Doesn't cry with any of these.
27. Child laughs when mother teases him.
Middle: If mother never teases child during play or conversations.
Low: Annoyed when mother teases him.
28. Child enjoys relaxing in mother's lap.
Middle: If child never sits still.
Low: Prefers to relax on the floor or on furniture.
29. At times, child attends so deeply to something that he doesn't seem to hear when people speak to him.
Low: Even when deeply involved in play, child notices when people speak to him.
30. Child easily becomes angry with toys.
31. Child wants to be the center of mother's attention. If mom is busy or talking to someone, he interrupts.
Low: Doesn't notice or doesn't mind not being the center of mother's attention.
32. When mother says "No" or punishes him, child stops misbehaving (at least at that time). Doesn't have to be told twice.
33. Child sometimes signals mother (or gives the impression) that he wants to be put down, and then fusses or wants to be picked right back up.
Low: Always ready to go play by the time he signals mother to put him down.
34. When child is upset about mother leaving him, he sits right where he is and cries doesn't go after her.
Middle: If never upset by her leaving.
Low: Actively goes after her if he is upset or crying.
35. Child is independent with mother. Prefers to play on his own; leaves mother easily when he wants to play.
Middle: not allowed or not enough room to play.
Low: Prefers playing with or near mother.
36. Child clearly shows a pattern of using mother as a base from which to explore. Moves out to play; Returns or plays near her; Moves out to play again, etc.
Low: Always away unless retrieved, or always stays near.
37. Child is very active. Always moving around. Prefers active games to quiet ones.

38. Child is demanding and impatient with mother.

Fusses and persists unless she does what he wants right away.

39. Child is often serious and businesslike when playing away from mother or alone with his toys.

Low: Often silly or laughing when playing away from mother or alone with his toys.

40. Child examines new objects or toys in great detail. Tries to use them in different ways or to take them apart.

Low: First look at new objects or toys is usually brief. (May return to them later however.)

41. When mother says to follow her, child does so.

(Do not count refusals or delays that are playful or part of a game unless they clearly become disobedient.)

42. Child recognizes when mother is upset.

Becomes quiet or upset himself. Tries to comfort her. Asks what is wrong, etc.

Low: Doesn't recognize; continues play; behaves toward her as if she were OK.

43. Child stays closer to mother or returns to her more often than the simple task of keeping track of her requires.

Low: Doesn't keep close track of mother's location or behavior.

44. Child asks for and enjoys having mother hold, hug, and cuddle him.

Low: Not especially eager for this. Tolerates it but doesn't seek it; or wiggles to be put down.

45. Child enjoys dancing or singing along with music.

Low: Neither likes nor dislikes music.

46. Child walks and runs around without bumping, dropping, or stumbling.

Low: Bumps, drops, or stumbles happen throughout the day (even if no injuries result).

47. Child will accept and enjoy loud sounds or being bounced around in play, if mother smiles and shows that it is supposed to be fun.

Low: Child gets upset, even if mother indicates the sound or activity is safe or fun.

48. Child readily lets new adults hold or share things he has, if they ask to.

49. Runs to mother with a shy smile when new people visit the home.

Middle: If child doesn't run to mother at all when visitors arrive.

Low: Even if he eventually warms up to visitors, child initially runs to mother with a fret or a cry.

50. Child's initial reaction when people visit the home is to ignore or avoid them, even if he eventually warms up to them.

51. Child enjoys climbing all over visitors when he plays with them.

Middle: if he won't play with visitors.

Low: Doesn't seek close contact with visitors when he plays with them.

52. Child has trouble handling small objects or putting small things together.

Low: Very skillful with small objects, pencils, etc.

53. Child puts his arms around mother or puts his hand on her shoulder when she picks him up.

Low: Accepts being picked up but doesn't especially help or hold on.

54. Child acts like he expects mother to interfere with his activities when she is simply trying to help him with something.

Low: Accepts mother's help readily, unless she is in fact interfering.

55. Child copies a number of behaviors or way of doing things from watching mother's behavior.

Low: Doesn't noticeably copy mother's behavior.

56. Child becomes shy or loses interest when an activity looks like it might be difficult.

Low: Thinks he can do difficult tasks.

57. Child is fearless.

58. Child largely ignores adults who visit the home. Finds his own activities more interesting.

Low: Finds visitors quite interesting, even if he is a bit shy at first.

59. When child finishes with an activity or toy, he generally finds something else to do without returning to mother between activities.

Low: When finished with an activity or toy, he returns to mother for play, affection or help finding more to do.

60. If mother reassures him by saying "It's OK" or "It won't hurt you," child will approach or play with things that initially made him cautious or afraid.

Middle: If never cautious or afraid.

61. Plays roughly with mother. Bumps, scratches, or bites during active play. (Does not necessarily mean to hurt mom.)

Middle: If play is never very active

Low: Plays active games without injuring mother.

62. When child is in a happy mood, he is likely to stay that way all day.

Low: Happy moods are very changeable.

63. Even before trying things himself, child tries to get someone to help him.

64. Child enjoys climbing all over mother when they play.

Low: Doesn't especially want a lot of close contact when they play.

65. Child is easily upset when mother makes him change from one activity to another.

(Even if the new activity is something child often enjoys.)

66. Child easily grows fond of adults who visit his home and are friendly to him.

Low: Doesn't grow fond of new people very easily.

67. When the family has visitors, child wants them to pay a lot of attention to him.

Low: Child is cautious or fearful.

68. On the average, child is a more active type person than mother.

Low: On the average, child is less active type person than mother.

69. Rarely asks mother for help.

Middle: If child is too young to ask.

Low: Often asks mother for help

70. Child quickly greets his mother with a big smile when she enters the room. (Shows her a toy, gestures, or says "Hi, Mommy.")

Low: Doesn't greet mother unless she greets him first.

71. If held in mother's arms, child stops crying and quickly recovers after being frightened or upset.

Low: Not easily comforted.

72. If visitors laugh at or approve of something the child does, he repeats it again and again.

Low: Visitors' reactions don't influence child this way.

73. Child has a cuddly toy or security blanket that he carries around, takes it to bed, or holds when upset. (Do not include bottle or pacifier if child is under two years old.)

Low: Can take such things or leave them, or has none at all.

74. When mother doesn't do what child wants right away, child behaves as if mom were not going to do it at all. (Fusses, gets angry, walks off to other activities, etc.)

Low: Waits a reasonable time, as if he expects mother will shortly do what he asked.

75. At home, child gets upset or cries when mother walks out of the room. (May or may not follow her.)

76. When given a choice, child would rather play with toys than with adults.

Low: Would rather play with adults than toys.

77. When mother asks child to do something, he readily understands what she wants (May or may not obey.)

Middle: If too young to understand.

Low: Sometimes puzzled or slow to understand what mother wants.

78. Child enjoys being hugged or held by people other than his parents and/or grandparents.

79. Child easily becomes angry at mother.

Low: Doesn't become angry at mother unless she is very intrusive or he is very tired.

80. Child uses mother's facial expressions as good source of information when something looks risky or threatening.

Low: Makes up his own mind without checking mother's expressions first.

81. Child cries as a way of getting mother to what he wants.

Low: Mainly cries because of genuine discomfort (tired, sad, afraid, etc.).

82. Child spends most of his play time with just a few favorite toys or activities.

83. When child is bored, he goes to mother looking for something to do.

Low: Wanders around or just does nothing for a while, until something comes up.

84. Child makes at least some effort to be clean and tidy around the house.

Low: Spills and smears things on himself and on floors all the time.

85. Child is strongly attracted to new activities and new toys.

Low: New things do not attract him away from familiar toys or activities.

86. Child tries to get mother to imitate him, or quickly notices and enjoys it when mom imitates him on her own.

87. If mother laughs at or approves of something the child has done, he repeats again and again.

Low: Child is not particularly influenced this way.

88. When something upsets the child, he stays where he is and cries.

Low: Goes to mother when he cries.

89. Child's facial expressions are strong and clear when he is playing with something.

90. If mother moves very far, child follows along and continues his play in the area she has moved to. (Doesn't have to be called or carried along; doesn't stop play or get upset.)

Middle: if child isn't allowed or doesn't have room to move very far away.

Appendix B
Hostile Attribution Bias Interview

Girls' 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?
 - (1) Did Nancy hit you in the back by accident **or**
 - (2) 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 a while. 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?
 - (1) Did Sarah steal your doll **or**
 - (2) Did Sarah find your doll and not know that 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?
 - (1) Did Jenny want to get you all wet, and so she spilled the grape juice on purpose, **or**
 - (2) 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?
 - (1) Did Mary trip you by accident **or**
 - (2) Did Mary want to trip you?

Boys' 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?
 - (1) Did Tim hit you in the back by accident **or**
 - (2) Did Tim want to hit you in the back?

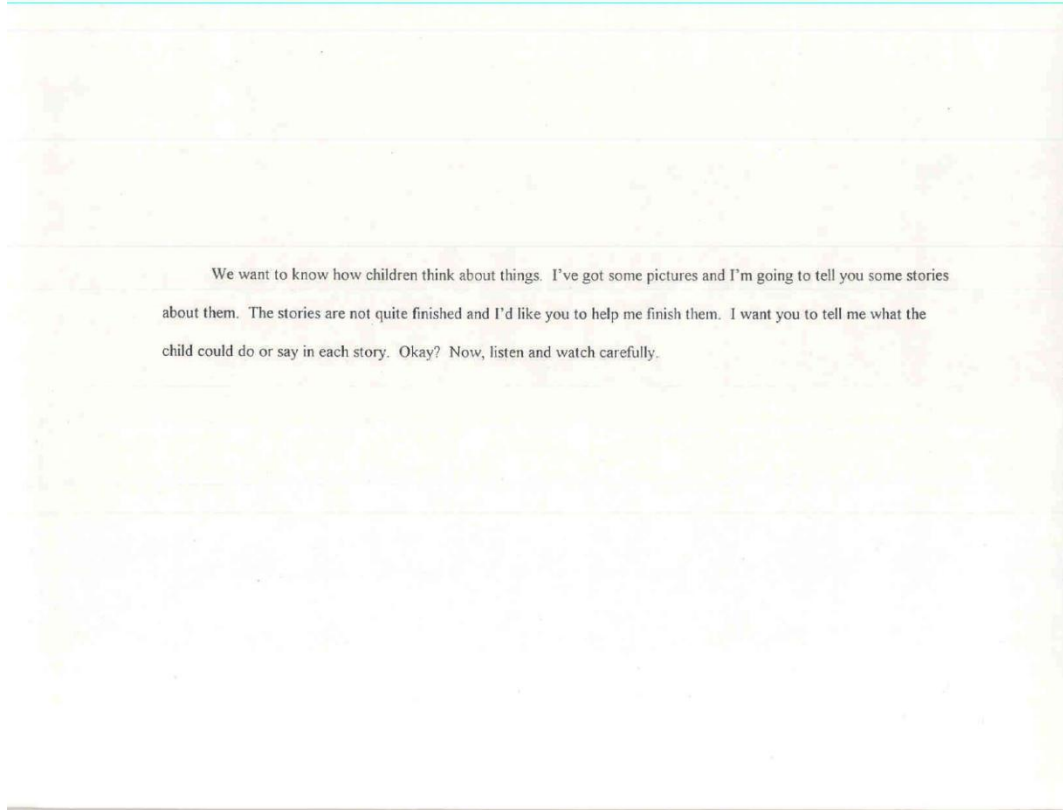
2. Pretend that your mother gives you a brand new toy truck. You go outside and play with it for a while. Then you go back inside and leave the truck outside. Later, you go outside to get your truck and you can't find it. Then you see a boy named Bill playing with your doll. What happened?
 - (1) Did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

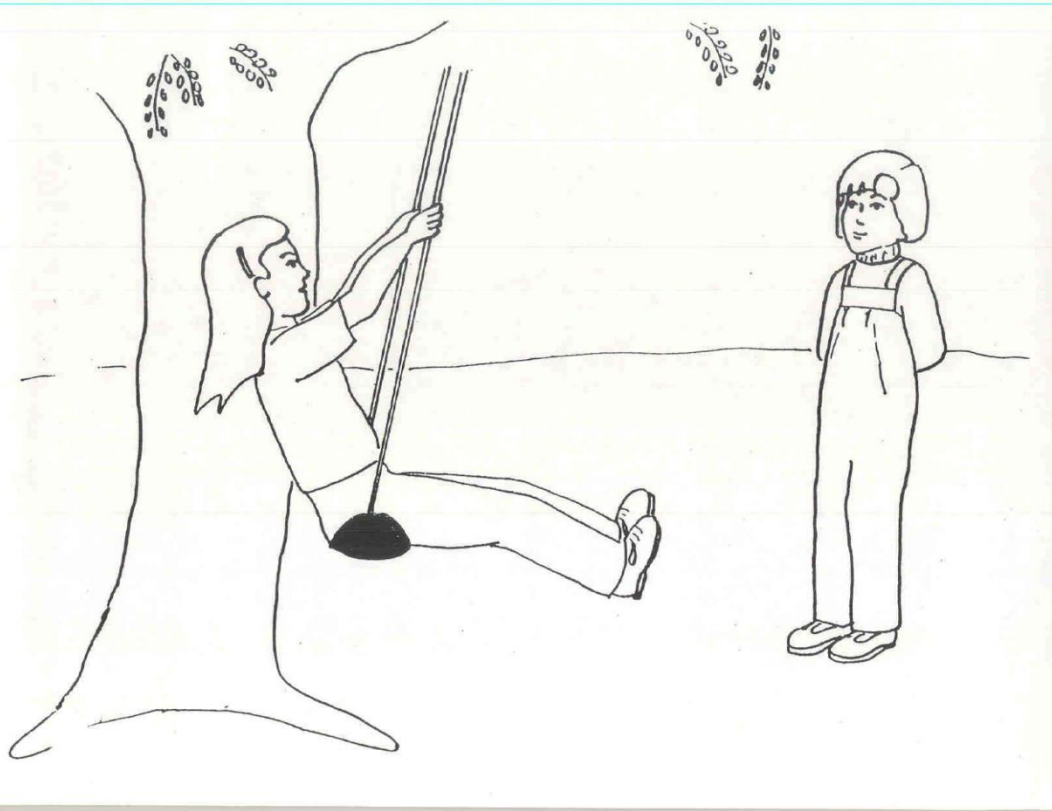
3. Pretend that you are eating a snack quietly with some other kids. John is sitting next to you and he is drinking grape juice. He spills grape juice all over you. What happened?
 - (1) Did John want to get you all wet, and so he spilled the grape juice on purpose, **or**
 - (2) Did John spill the grape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

Appendix C
Social Problem Solving Test

Example test booklet pages for Caucasian female





LAURIE
4 years-old

KATHY
5 years-old

This girl's name is Laurie (left) and this is Kathy (right). Laurie is four-years-old. Kathy is five-years-old. Kathy is older than Laurie. Kathy has been on the swing for a long, long time. Laurie would really like to play on the swing.

What do you think Laurie could say or do so that she could have the swing?

If no response –What could Laurie do or say so that she could have the swing?

* Note first response

If that didn't work, what else could Laurie do or say so that she could play on the swing?

* Note second response

What do you think you would do or say if you wanted to play on the swing?

* Note response



JENNY
4 years-old

KIM
4 years-old

This girl's name is Kim (right) and this is Jenny (left). Kim and Jenny are both four-years-old. They are both the same age. This is Jenny's first day at preschool. Jenny is a new girl in the preschool. Kim would like to be friends with Jenny.

What do you think Kim could say or do to be friends with Jenny?

If no response – repeat the question.

* Note first response

If that didn't work, what else could Kim do or say to be friends with Jenny?

* Note second response

What do you think you would do or say if you wanted to be friends with Jenny?

*Note response



TAMMY
4 years-old

COLLEEN
3 years-old

This girl's name is Tammy (left) and this is Colleen (right). Tammy is four-years-old and Colleen is three-years-old. Tammy is older than Colleen. Colleen has been playing with the balloon for a long, long time. Tammy would really like to play with the balloon.

What do you think Tammy could say or do so that she could play with the balloon?

If no response – repeat the question.

* Note first response

If that didn't work, what else could Tammy do or say so that she could have the balloon?

* Note second response

What do you think you would do or say if you wanted to play with the balloon?

* Note response



TRACEY
4 years-old

MONICA
4 years-old

This girl's name is Tracey (left) and this is Monica (right). Both girls are four years old. They are both the same age. Tracey has had the book for a long, long time. Monica would really like to look at the book. What do you think Monica could say or do so that she could look at the book?

If no response – repeat the question.

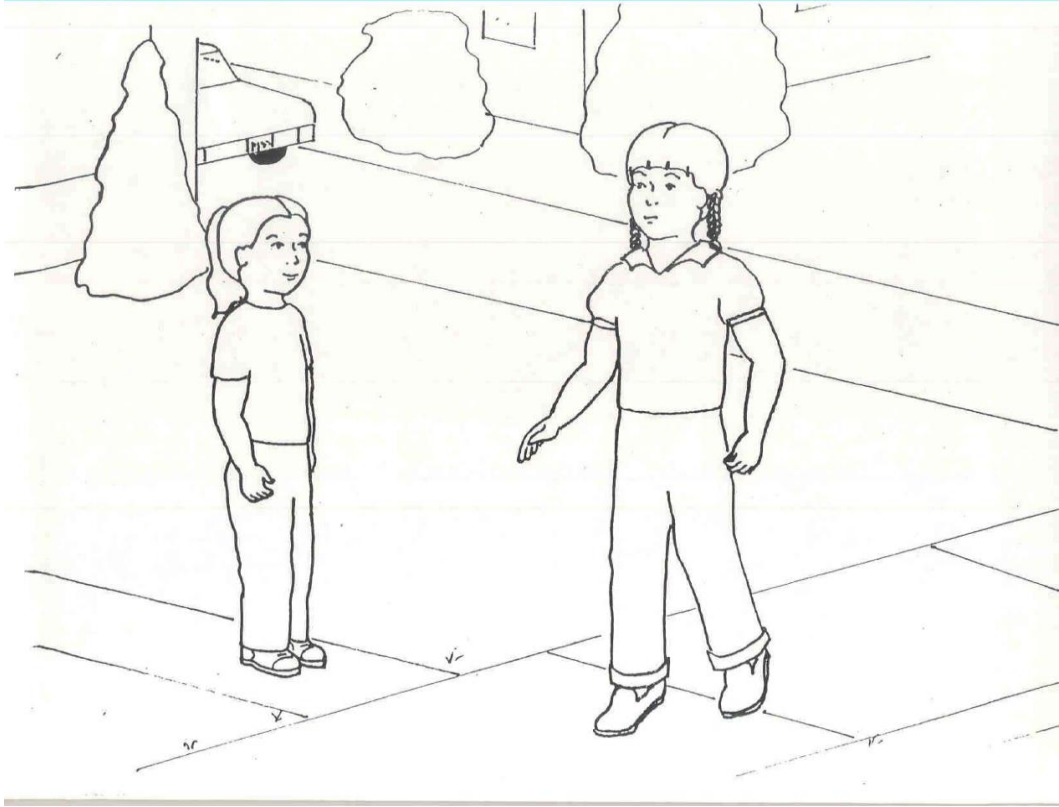
* Note first response

If that didn't work, what else could Monica do or say so that she could have the book?

* Note second response

What do you think you would do or say if you wanted the book?

* Note response



LILY
4 years-old

NINA
3 years-old

This girl's name is Lily (left) and this is Nina (right). Lily is four-years-old and Nina is three. Lily is older than Nina. This is Nina's first day in the neighborhood. Nina is a new girl in the neighborhood. Lily would like to be friends with Nina.

What do you think Lily could say or do to be friends with Nina?

If no response – repeat the question.

* Note first response

If that didn't work, what else could Lily do or say to be friends with Nina?

* Note second response

What do you think you would do or say if you wanted to be friends with Nina?

*Note response

Appendix D
Children's Behavior Questionnaire

On the next several pages you will see a set of statements that describe children's reactions to a number of situations. We would like you to tell us what your 4 1/2 year-old's reaction is likely to be in those situations. Of course, there are no "correct" ways of reacting; children differ widely in their reactions, and it these differences we are trying to learn about.

Please read each statement and decide whether it is a "true" or "untrue" description of your 4 1/2 year-old's reaction within the past six months. Use the following scale to indicate how well a statement describes your 4 1/2 year-old:

Extremely untrue	Quite untrue	Slightly untrue	Neither true no false	Slightly true	Quite true	Extremely true	Not applicable
1	2	3	4	5	6	7	8

If you cannot answer one of the items because you have never seen your 4 1/2 year-old in that situation, for example if the statement is about your 4 1/2 year-old's reaction to your singing and you have never sung to your 4 1/2 year-old, then answer "8" (Not Applicable). Please be sure to put a number for every item.

My 4 1/2-year-old:

- _____ 1. Seems to always be in a big hurry to get from one place to another
- _____ 2. Can lower his/her voice when asked to do so
- _____ 3. Sometimes prefers to watch rather than join other children playing
- _____ 4. Gets so worked up before an exciting event that s/he has trouble sitting still
- _____ 5. Is not afraid of large dogs and/or other animals
- _____ 6. Cries sadly when a favorite toy gets lost or broken
- _____ 7. Rarely gets irritated when s/he makes a mistake
- _____ 8. Seems to be at ease with almost any person
- _____ 9. When s/he sees a toy s/he wants, gets very excited about getting it
- _____ 10. Tends to run rather than walk from room to room
- _____ 11. Has a hard time following instructions
- _____ 12. Has temper tantrums when s/he doesn't get what s/he wants
- _____ 13. When s/he wants to do something, s/he talks about little else
- _____ 14. Gets embarrassed when strangers pay a lot of attention to her/him
- _____ 15. When practicing an activity, has a hard time keeping her/his mind on it

- _____ 16. Tends to feel "down" at the end of an exciting day
- _____ 17. When outside, often sits quietly
- _____ 18. Acts very friendly and outgoing with new children
- _____ 19. Will move from one task to another without completing any of them
- _____ 20. Moves about actively (runs, climbs, jumps) when playing in the house
- _____ 21. Is afraid of loud noises
- _____ 22. Joins others quickly and comfortably, even when they are strangers
- _____ 23. Doesn't worry about injections by the doctor
- _____ 24. Gets quite frustrated when prevented from doing something s/he wants to do
- _____ 25. Becomes upset when loved relatives or friends are getting ready to leave following a visit
- _____ 26. Is not afraid of the dark
- _____ 27. Does not usually become tearful when tired
- _____ 28. Is sometimes shy even around people s/he has known a long time
- _____ 29. Can wait before entering into new activities if s/he is asked to
- _____ 30. Gets angry when s/he can't find something s/he wants to play with
- _____ 31. Is afraid of fire
- _____ 32. Her/his feelings are easily hurt by what parents say
- _____ 33. Sometimes seems nervous when talking to adults s/he has just met
- _____ 34. Is very frightened by nightmares
- _____ 35. Has difficulty waiting in line for something
- _____ 36. Becomes tearful when told to do something s/he does not want to do
- _____ 37. Becomes very excited while planning for trips
- _____ 38. Prefers quiet activities to active games
- _____ 39. Acts shy around new people
- _____ 40. Has trouble sitting still when s/he is told to (at movies, church, etc.)

- _____ 41. Rarely cries when s/he hears a sad story
- _____ 42. Rarely becomes upset when watching a sad event in a TV show
- _____ 43. Is able to resist laughing or smiling when it isn't appropriate
- _____ 44. Becomes very excited before an outing (e.g., picnic, party)
- _____ 45. Is comfortable asking other children to play
- _____ 46. Rarely gets upset when told s/he has to go to bed
- _____ 47. When drawing or coloring in a book, shows strong concentration
- _____ 48. Plays games slowly and deliberately
- _____ 49. Sometimes appears downcast for no reason
- _____ 50. Becomes easily frustrated when tired
- _____ 51. Talks easily to new people
- _____ 52. Is afraid of the dark
- _____ 53. Is usually pretty calm before leaving on an outing (e.g., picnic, party)
- _____ 54. Is good at following instructions
- _____ 55. Is rarely frightened by "monsters" seen on TV or at movies
- _____ 56. When building or putting something together, becomes very involved in what s/he is doing, and works for long periods
- _____ 57. Sits quietly in the bath
- _____ 58. Approaches places s/he has been told are dangerous slowly and cautiously
- _____ 59. Gets very enthusiastic about the things s/he does
- _____ 60. Rarely becomes discouraged when s/he has trouble making something work
- _____ 61. Rarely protests when another child takes his/her toy away
- _____ 62. Has difficulty leaving a project s/he has begun
- _____ 63. Is not afraid of heights
- _____ 64. Shows great excitement when opening a present
- _____ 65. Can easily stop an activity when s/he is told "no"

- _____ 66. Is easily distracted when listening to a story
- _____ 67. Is full of energy, even in the evening
- _____ 68. Easily gets irritated when s/he has trouble with some task (e.g., building, drawing, dressing)
- _____ 69. Doesn't become very excited about upcoming television programs
- _____ 70. Is rarely afraid of sleeping alone in a room
- _____ 71. Gets angry when called in from play before s/he is ready to quit
- _____ 72. Is usually able to resist temptation when told s/he is not supposed to do something
- _____ 73. Sometimes becomes absorbed in a picture book and looks at it for a long time
- _____ 74. Has difficulty sitting still at dinner
- _____ 75. Remains pretty calm about upcoming desserts like ice cream
- _____ 76. Likes to sit quietly and watch people do things
- _____ 77. Gets mad when provoked by other children
- _____ 78. Has a hard time concentrating on an activity when there are distracting noises
- _____ 79. Often doesn't seem to hear me when s/he is working on something
- _____ 80. Sometimes asks for help in things s/he is able to do, e.g., cutting up food

SUBSCALES - MEAN OF ITEMS LISTED

NEGATIVE AFFECTIVITY

Fear: -5, 21, -23, -26, 31, 34, 52, -55, -63, -70

Anger/Frustration: -7, 12, 24, 30, -46, 50, -61, 68, 71, 77

Sadness: 6, 16, 25, -27, 32, 36, -41, -42, 49, -60

EFFORTFUL CONTROL

Inhibitory Control: 2, -11, 29, -35, -40, 43, 54, 58, 65, 72

Attentional Focusing: -15, -19, 47, 56, 62, -66, 73, -78

Appendix E
Revised Infant Temperament Questionnaire
“My Baby”

Using the scale shown below, please completely mark the space that tells how often your baby's behavior has been like the behavior described by each statement.

IF YOUR BABY HAS NOT EXPERIENCED A SITUATION, MARK CA (for Can't Answer).

- | Almost
never
1 | Rarely
2 | Usually
does not
3 | Usually
does
4 | Frequently
5 | Almost
always
6 | Can't
Answer
CA | | |
|-------------------------------|---------------------|-----------------------------------|-------------------------------|-------------------------|--------------------------------|--------------------------------|-----|--|
| _____ | | | | | | | 1. | My baby accepts face washing at any time without protest. |
| _____ | | | | | | | 2. | My baby's hunger cry is a scream rather than a whimper. |
| _____ | | | | | | | 3. | My baby cries when awake and left alone. |
| _____ | | | | | | | 4. | My baby lies still (little squirming) when held in my arms between feedings. |
| _____ | | | | | | | 5. | For the first few minutes in a new place or situation (new store or home), my baby is fretful. |
| _____ | | | | | | | 6. | My baby resists (squirms, pulls away) hair brushing. |
| _____ | | | | | | | 7. | My baby vigorously cries when sleepy. |
| _____ | | | | | | | 8. | My baby lies still (little squirming) during hair brushing. |
| _____ | | | | | | | 9. | My baby adjusts to changes in sleep time within 2 or 3 days. |
| _____ | | | | | | | 10. | My baby displays much feeling (vigorous smile or cry) when dressing and undressing. |
| _____ | | | | | | | 11. | My baby is pleasant (coos, smiles) during face washing. |
| _____ | | | | | | | 12. | My baby moves about much (kicks, waves arms, squirms) during dressing and undressing. |
| _____ | | | | | | | 13. | My baby adjusts to changes in place of sleeping within 2 or 3 days. |
| _____ | | | | | | | 14. | My baby objects (cries, frets) if someone other than myself gives care. |
| _____ | | | | | | | 15. | My baby lies still (little kicking, splashing) in bath. |
| _____ | | | | | | | 16. | My baby displays much feeling (vigorous smile or cry) during diapering. |

- _____ 17. My baby is fussy (cries, frowns) during a bath.
- _____ 18. My baby turns head away and looks for me when held by a new person.
- _____ 19. My baby objects (fusses, squirms) to being bathed by a different person even after 2 or 3 tries.
- _____ 20. My baby moves much (squirms, bounces, kicks) when lying awake in crib.
- _____ 21. My baby resists changes in feeding schedule (1 hour or more) even after two tries.
- _____ 22. My baby is fussy (cries, frets) when put down for sleep.
- _____ 23. My baby accepts his/her bath any time of day without resisting.
- _____ 24. My baby cries during a bowel movement.
- _____ 25. My baby moves about much (kicks, waves arms, squirms) during diapering.
- _____ 26. My baby appears bothered (cries, squirms) when first put down to sleep in a different place than usual.
- _____ 27. My baby is fussy (cries, fusses) when burped during feeding.
- _____ 28. My baby cries loudly when diaper is soiled with bowel movement.
- _____ 29. My baby resists (squirms, fusses) regular nail cutting.
- _____ 30. My baby moves much during feeding (squirms, kicks, waves arms).
- _____ 31. My baby lies quietly, making happy noises upon waking up.
- _____ 32. My baby does not feed well (fusses) when in new situation.
- _____ 33. My baby resists (squirms, fusses) during routine dressing or undressing.
- _____ 34. My baby is noisy (vocalizing loudly) on waking up.
- _____ 35. My baby smiles or coos during nail cutting.
- _____ 36. My baby accepts right away a change in time of feeding.
- _____ 37. My baby accepts routine washing of diaper area.
- _____ 38. My baby lies still during nail cutting.
- _____ 39. My baby cries for less than one minute when given an injection.

- _____ 40. My baby is still wary or frightened of strangers after 15 minutes.
- _____ 41. My baby's initial reaction at home to approach by strangers is acceptance.
- _____ 42. My baby reacts mildly (quiet smiles or no response) to meeting familiar people.
- _____ 43. My baby lies still and moves little while playing with toys.
- _____ 44. My baby is fussy or moody throughout a cold or an intestinal virus.
- _____ 45. My baby requires introduction of a new food on 3 or more occasions before he/she will accept (swallow) it.
- _____ 46. My baby lies still during procedures like hair brushing or nail cutting.
- _____ 47. My baby plays quietly and calmly (little vocalization or other noise) with toys.
- _____ 48. My baby accepts within a few minutes a change in place of bath or person giving it.
- _____ 49. My baby remains pleasant or calm with minor injuries (bumps, pinches).
- _____ 50. My baby moves much (kicking, waving arms and bouncing) and for several minutes or more when playing by self.
- _____ 51. My baby's initial reaction is withdrawal (turns head, spits out) when consistency, flavor, or temperature of solid foods is changed.
- _____ 52. My baby is calm in the bath. Like or dislike is mildly expressed (smiles/frowns).
- _____ 53. My baby accepts changes in solid food feedings (type, amount, timing) within 1 or 2 tries.
- _____ 54. My baby appears bothered (cries, squirms) when first put down in a different sleeping place.
- _____ 55. My baby is fussy or cries during the physical examination by the doctor.

Mairin E. Augustine
mea209@lehigh.edu
(440) 865-0429

Department of Psychology
Lehigh University
17 Memorial Drive East
Bethlehem, PA 18015

411 Montclair Ave
Bethlehem, PA 18015

Education

2011	M.S.	Lehigh University, Bethlehem, PA Psychology (Social and Cognitive Development)
2009	B.S.	Lehigh University, Bethlehem, PA Psychology (Developmental Psychology)

Research Interests

Mother-child relationships, emotional development, social development and social competence, attachment, moral development

Professional Presentations

Augustine, M. E., Panfile, T. M., Laible, D. J. (2011, March). *Children's emotional and behavioral responses to a mishap: the influences of negative emotionality and emotion regulation*. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Montreal, QC.

Augustine, M. E., Laible, D. J. (2011, March). *Attachment security and initiation of mother-child conflict*. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Montreal, QC.

Panfile, T. M., Laible, D. J., & **Augustine, M. E.** (2011, March). *Children's emotion regulation and prosocial behavior: the moderating role of attachment*. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Montreal, QC.

Augustine, M. E., & Laible, D. J. (2009, May). *The initiation of conflict in mother-child interactions*. Paper presented at the Lehigh Valley Association of Independent Colleges Psychology Conference, Saucon Valley, PA.

Research Experience

- Spring 2011 Graduate Research Assistant
Department of Psychology, Lehigh University
Assist in coordination of a study of proactive regulation in mother-toddler dyads, and bullying and moral development in adolescents
Supervisor: Dr. Deborah Laible, Ph.D.
- 2010-2011 Thesis Project
Department of Psychology, Lehigh University
Attachment security and social cognition: Representations or emotion regulation?
Analysis of data from the NICHD Study of Early Child Care & Youth Development
Committee: Deborah Laible, Ph.D., Michael Gill, Ph.D., Susan Barrett, Ph.D.
- 2009-2010 First Year Research Project
Department of Psychology, Lehigh University
The influence of emotion regulation and negative emotionality on children's guilt responses
Analysis of observational and mother report data from 64 children
Supervisor: Dr. Deborah Laible, Ph.D.
- 2008-2009 Honors Thesis Project
Department of Psychology, Lehigh University
The initiation of conflict in mother-child interactions
Analysis of observational and mother report data from 60 mother-toddler dyads
Supervisor: Dr. Deborah Laible, Ph.D.
- 2008-2009 Undergraduate Research Assistant
Department of Psychology, Lehigh University
Assisted in observational data collection and coding for developmental research
Supervisor: Dr. Deborah Laible, Ph.D.
- 2008-2009 Undergraduate Research Assistant
Center for Promoting Research to Practice, Lehigh University
Administered early literacy measures to participants in area preschools and elementary schools
Supervisor: Dr. Gini Hampton, Ph.D.
- 2008 Undergraduate Research Assistant
Center for Promoting Research to Practice, Lehigh University
Organized materials and data collected in early literacy research
Supervisor: Dr. Karen Gisclar, Ph.D.

Teaching Experience

- Fall 2010 Graduate Teaching Assistant, Lehigh University
Course: Experimental Research Methods and Laboratory (20 students)
Instructor: Dr. Barbara Malt, Ph.D.
- Spring 2010 Graduate Teaching Assistant, Lehigh University
Course: Introduction to Cognitive Science (28 students)
Instructor: Dr. Barbara Malt, Ph.D.
- Fall 2009 Graduate Teaching Assistant, Lehigh University
Course: Introduction to Psychology (150 students)
Instructor: Dr. Dominic Packer, Ph.D.

Professional Service

- 2010-2011 Brown Bag Coordinator
Department of Psychology, Lehigh University

Honors & Awards

- 2009-2010 Presidential Scholar, Lehigh University
- 2009 Degree with High Honors, Lehigh University
- 2009 Degree with Psychology Department Honors, Lehigh University
- 2005-2009 Dean's List, Lehigh University
- 2005-2009 Lehigh Scholar, Lehigh University

Professional Affiliations

Society for Research in Child Development

Psi Chi, Psychology Honor Society