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There has been little investigation of the relational and behavioral mechanisms that explain the association between early attachment security and later peer outcomes. The present study longitudinally examined the child characteristics of emotional competence, prosocial behaviors and disruptive behaviors as potential intervening processes. In addition, these relational and behavioral processes were investigated within the context of ongoing mother-child interactions. The study examined 165 boys and girls at ages two, four, and five. Mothers completed the Attachment Q-sort (Waters, 1987) when the children were two. At age four, preschool teachers completed behavioral questionnaires. Measures of maternal positive and controlling behaviors and child noncompliance were also obtained during laboratory observations. At age five, classmates made sociometric nominations to determine social preference. A multiple mediation model was tested, and the joint effect of emotional competence, prosocial behaviors, and disruptive behaviors mediated the relation of attachment security and kindergarten social preference. Mediation of the attachment-social preference relation by the child characteristics was moderated by maternal behaviors, particularly maternal control. The findings suggest that early attachment history fosters the development of certain child behavioral and relational competencies. The interaction of these child

characteristics with particular maternal behaviors over time explains the relation of attachment security to later peer outcomes.

THE RELATION OF EARLY ATTACHMENT WITH KINDERGARTEN SOCIAL  
PREFERENCE: AN EXAMINATION OF INTERVENING  
RELATIONAL AND BEHAVIORAL PROCESSES

by

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Approved by

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Committee Chair

To my mother, Donna Lea Balentine (1944-2002)

By your example, you taught me the importance of loving others well.

APPROVAL PAGE

This Dissertation has been approved by the following committee of the  
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## CHAPTER I

### INTRODUCTION

There is little argument that developing successful relationships with peers is a fundamental task of early childhood. A large body of literature supports that children who are rejected from the peer group or have few close friends experience both current and future difficulties such as school withdrawal, criminality, internalizing and externalizing problems (e.g. Kupersmidt, Coie, & Dodge, 1990; Parker & Asher, 1987). In fact, a recent study found that the effects of peer rejection accumulate over time. Children who are rejected continuously over a few years have a much greater likelihood of exacerbated behavior problems (controlling for initial levels) than children who are never rejected (Dodge et al., 2003). Furthermore, the adverse condition of early peer rejection contributes uniquely to the prediction of later antisocial behavior (Cowan & Cowan, 2004). We, therefore, can conceive of peer rejection as a risk factor which has long-term adverse effects in overall adjustment.

As such, it is important to identify the foundational building blocks to success with peers. As children grow older, the factors determining peer interactions become more complex and interventions aimed at improving peer relations become more intensive and difficult to implement. The transition to kindergarten is a time when peer interactions become more organized and sophisticated. This time of change affords an

opportunity to enhance the social and behavioral skills fundamental to success with peers (Bierman & Montminy, 1993). Therefore, the specific aim of this study is to explore attachment security in the toddler years and its influence on the development of peer relationships by kindergarten.

Researchers in the past have established a moderate connection between peer relations and early relations with caregivers, for the quality of early attachments with caregivers predicts the quality of later peer relationships (Elicker, Englund, & Sroufe, 1992; Greenberg, Speltz, & DeKlyen, 1993). Ladd and Le Sieur (1995) propose that attachment security indirectly influences subsequent peer relations through the behavioral and relationship processes learned within caregiver-child dyads. Therefore, the purpose of this study is to examine these intervening processes that assist in explaining attachment security's role in the formation of peer relationships. Hopefully, improved understanding of these intervening processes during early childhood will aid in early identification of those children at risk for peer difficulties at a time when they are more amenable to interventions.

### The Development of Attachment Security

Attachment is an intense reciprocal relationship between a child and his or her caregivers. In early childhood, Bowlby (1969) conceptualized attachment as a dyadic process which cannot be conceptualized as a quality that the child or caregiver possesses independent of the other, for the nature of attachment security varies between caregivers. This attachment relationship appears to serve an evolutionary purpose of maintaining the

proximity of the infant to a caregiver for protection purposes. Through each partner's selection, initiation, and termination of attachment-related behaviors, the child's conflicting needs for protection, exploration, independence, and sociability are met (Bowlby, 1969).

Early caregiver responsiveness to the child's attachment-seeking signals determines the effectiveness of the relationship in maintaining the necessary equilibrium in the child's needs (Bowlby, 1973; Greenberg & Speltz, 1988; NICHD Early Childcare Research Network, 2001). Typically, the recipient of the child's signals is more than one caregiver, so that most children have multiple attachment figures. Nevertheless, by the age of 18 months, most children will preferentially choose a "primary" attachment figure both as a playmate and in times of stress (Marvin & Britner, 1999). The empirical literature typically identifies mothers as this primary attachment figure. Therefore, the vast majority of the attachment literature has limited their investigation to mother-child dyads.

The first year of life can be viewed as the "sensitive period" in which the primary caregiver and child develop their own unique reciprocal pattern of behaviors and responses. By the beginning of the child's second year, this attachment system is relatively stable. However, the usefulness of these attachment-related behavioral patterns in achieving the goal of providing relief from distress while at the same time maintaining a "secure base" from which the child can explore varies among mother-child dyads (Ainsworth, Blehar, Waters, & Wall, 1978).

Attachment relationships are broadly distinguished as either “secure” or “insecure” depending on the nature of the child’s regulating behaviors. Securely attached infants use their mothers as a safe base for exploring the world, direct behaviors (i.e. crying) towards their parents in times of need, and are comforted by the parent’s subsequent responsiveness (Bowlby, 1969/1982; Speltz, DeKlyen, & Greenberg, 1999; Sroufe & Fleeson, 1986; Weinfield, Sroufe, Egeland, & Carlson, 1999). Children with insecure attachments are unsure about their caregiver’s availability because their mothers demonstrate low or erratic responsiveness. Thus, insecurely attached children do their best to minimize the risk that the attachment figure will be unavailable if a threat arises by exhibiting behaviors such as clinging instead of exploring, crying when no danger is present, becoming withdrawn, or even exhibiting anger (Ainsworth et al., 1978).

#### *Precursors of attachment*

Beyond the validation of the Strange Situation, one of the most important contributions of the Ainsworth et al. (1978) Baltimore study was the attention given to the relation of attachment security to maternal behaviors in the home. Distinctive patterns of attachment security emerge from the repeated, dynamic interchanges between the signaling infant and the responding mother. Thus, the qualities of each partner determine whether secure or insecure attachment-regulating behaviors become characteristic of mother-child interactions.

The mother’s own history of attachment security in conjunction with current circumstances impacts her ability to sensitively respond to her child’s attachment-seeking

behaviors (Crockenberg & Leerkes, 2005; Hesse, 1999; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; van IJzendoorn, 1995). In turn, the mother's overall sensitivity and responsiveness to the child's cues predicts whether the dyad will exhibit secure or insecure attachment patterns (Ainsworth et al., 1978; Bowlby, 1969; De Wolff & van IJzendoorn, 1997). However, the overall contribution of maternal attachment history and sensitivity to the development of attachment security is modest, suggesting that the child's contribution to the development of the attachment relationship must also be considered (De Wolff & van IJzendoorn, 1997).

The most salient contribution of the child to the formation of the attachment relationship is the child's temperament, particularly the intensity and duration of negative emotions (Crockenberg & Leerkes, 2005). For instance, neonates that are more irritable and prone to distress are often later classified as having insecure attachments (Calkins & Fox, 1992). Like maternal contributions, the relation between temperament and the later patterns of attachment security is moderate (Goldsmith & Alansky, 1987; see Vaughn & Bost, 1999 for review).

In light of these findings, the empirical literature supports a dynamic interaction between child temperament and the mother's past attachment history and sensitive responsiveness as the basis of whether the attachment relationship is classified as secure or insecure (Calkins, 2002; Crockenberg & Leerkes, 2005; Goldberg, 2000; Vaughn & Bost, 1999). The temperamental make-up of the child may also determine which particular insecure behaviors are displayed (Goldberg, 2000; Vaughn & Bost, 1999).



According to Bowlby (1969) and other attachment theorists, these attachment patterns that develop in the first year of life have life-long implications, particularly in the development of relationships outside the family. At the same time, these patterns need to be flexible and adapt to maturational and environmental changes. Major fluctuations in attachment security over the course of development will weaken its predictive nature. Therefore, the relative stability of individual differences in attachment security will influence the strength of their association with later peer outcomes.

#### *Stability of attachment beyond infancy*

Attachment stability refers to the enduring quality of security or insecurity through the different developmental periods. Around the child's third birthday, a shift is made as the child becomes more dependent on mental representations of their attachment partner's availability rather than maintaining physical proximity, so they are more comfortable spending longer amounts of time with non-family members (Bretherton, 1992; Marvin & Britner, 1999; Thompson & Raikes, 2003). These mental representations, or *internal working models*, become increasingly generalized to other relationships beyond the child and various caregivers. By late childhood or early adolescence, generalization of attachment security is pervasive, to the extent that rather than being a characteristic of any particular dyad, it is more an individual attribute of the child (Thompson & Raikes, 2003). According to Bowlby (1969), these internal representations are the source of the stability in attachment security over time, as well as

a reason for the relation between attachment and later social outcomes such as peer relations.

Yet, there is heterogeneity in estimates of whether attachment classifications remain stable across early childhood, for they range from approximately 40 to 80%, depending heavily on the amount of time between assessments (Hamilton, 2000). Another issue regarding stability concerns measurement accuracy, for the behaviors associated with secure/insecure attachments change as the child becomes more mature. Therefore, assessment of stability will reflect the validity of the attachment measures at the different developmental stages (Bar-haim, Sutton, Fox, & Marvin, 2000).

Based on the literature, the stability of a secure or insecure attachment classification is a function of the intervening environmental circumstances. Both the maintenance of an insecure attachment style or a change from security to insecurity are related to lower socioeconomic status, lower maternal sensitivity, and negative life events (ex. beginning child care) in the interval between assessments. In a similar fashion, children who change most dramatically between infancy and the preschool period have the most severe disruptions in parenting such as dramatic declines in maternal sensitivity and trauma. Comparatively, children who remain in the secure classification have the least environmental stressors. Finally, changes from insecure to secure classifications are related to increases in maternal sensitivity (Hamilton, 2000; NICHD Early Childcare Research Network, 2001; Moss, Cyr, Bureau, Tarabulsky, & Dubois-Comtois, 2005).

Therefore, in the empirical literature, individual differences in attachment security should be conceived of neither as an inflexible trait nor as being too easily changed

(Weinfield et al., 1999). Changes in attachment security are, for the most part, related to predictable changes in the environment, whereas stability is associated with stable environments. Negative life events, such as divorce or birth of a new sibling often lead to decreases in attachment security either directly or indirectly via changes in maternal responsiveness (Belsky & Fearon, 2002; Moss et al., 2005). It is less clear which intervening circumstances improve attachment security over time, although this is the focus of much of the research in the infant mental health field (Goldberg, 2000).

As Bowlby (1969) proposed, differences in attachment represent different developmental pathways which are shaped and supported by the current environmental context. Thus, at any given time, the developmental outcome is a function of both previous experience (i.e. attachment history) and subsequent/current experience (Sroufe, Carlson, Levy, & Egeland, 1999). This theme of lawful changes based on intervening or current experiences will extend to other developmental outcomes associated with early attachment security, including peer relationships.

### Attachment and Peer Relations

Because of its impact on early emotional and behavioral regulation and subsequent exploration of the environment, Bowlby (1973) conceived that the attachment system in early childhood sets children on different “pathways” to different personality and social outcomes. The more similar the subsequent experiences, the more entrenched these initial behavioral and relational patterns become, strengthening the prediction of later child outcomes from early attachment patterns (Weinfield et al., 1999).

Over twenty years of attachment research has linked secure attachment to positive behavioral and social outcomes, whereas insecure attachment has been linked to negative child outcomes. The range of developmental outcomes connected to early attachment security is expansive. Improved language and cognitive development, closer friendships, and reduced behavior problems are examples of positive outcomes associated with secure attachments, whereas increased anxiety, depression, and aggression are linked to patterns of insecure attachment (Greenberg, 1999; Thompson, 1999). A brief survey of the empirical literature suggests that attachment security is linked to every possible psychosocial outcome (Belsky & Cassidy, 1994). However, most attachment theorists agree that observed associations of attachment security with non-social child outcomes (ex. math achievement) are theoretically distant from Bowlby's (1969, 1973) conceptualization of outcomes of the early mother-child relationship (Belsky & Cassidy, 1994; Thompson & Raikes, 2003).

#### *Attachment and competence with peers*

There is a relatively extensive body of evidence establishing the relation of early attachment with peer competence later in life. Both early and concurrent attachment security predict teacher, parent, and peer ratings of social competence and prosocial play behaviors. In longitudinal studies, securely attached toddlers were rated as being more sociable and as having better social skills and more close friendships across the developmental periods ranging from early childhood to adolescence than children with

insecure attachment histories (Bohlin, Hagekull, & Rydell, 2000; Elicker et al., 1992; Schmidt, DeMulder, & Denham, 2002; Youngeblade & Belsky, 1996).

In a recent meta-analysis, the overall effect size of this association was in the moderate range ( $r = .20$ ), but increased as children grow older (Schneider, Atkinson, & Tardif, 2001). The increase in the magnitude of this association over time suggests that early attachment establishes a developmental pathway which subsequent experiences with peers reinforce over time (Elicker et al., 1992; Sroufe, Egeland, & Carlson, 1999; Sroufe & Fleeson, 1986).

During early childhood, peers serve as an influential source of feedback on a variety of developmental domains such as self-concept, language, personality, and the acceptability of different social behaviors. Not only does the peer group's opinion impact subsequent development of the child, but the group's opinion will determine the nature of future interactions (Cowan & Cowan, 2004; Ladd, 2005). Therefore, in addition to broad band measures of social competence, some researchers have focused on an important measure of success with peers: how well a child is liked by his or her peers as a group.

### *Defining social preference*

Two similar procedures are used to determine the opinion of the peer group: sociometric ratings and sociometric nominations. Sociometric rating procedures ask children to judge their peers on a Likert scale (with at least three points) ranging from "like very much" to "dislike very much." A score is typically derived by averaging the rankings for each child. In sociometric nomination procedures, children are asked to

name the peers that they “like the most” and then asked to nominate the peers they “like the least.”

From these measures, different sociometric constructs can be derived. Social acceptance is the number of “like most” nominations, whereas social rejection is the number of “like the least” nominations. Social preference is calculated from these nominations by subtracting the standardized rejection scores from the standardized acceptance scores. The mean score derived from the sociometric rating procedures is conceptually (and empirically) the same as social preference (Bukowski, Sippola, Hoza, & Newcomb, 2000).

Using these standardized scores within the classroom, each child can be assigned to a sociometric status group reflecting both social preference and social impact. Popular children are highly visible and well liked by their peers, whereas rejected children are highly visible, but not well liked by their peers. Neglected children do not receive much attention from their peers, whereas controversial children are highly visible, but do not differ from the mean for likeableness. Finally, average children don’t fall to the extremes on either social preference or social impact (Coie, Dodge, & Coppotelli, 1982).

Social preference and friendship are distinct constructs. Social preference derived through sociometric nomination procedures is the one-sided perception of the group regarding the likeability of a child. In contrast, most researchers define friendship as a dyadic construct where both partners mutually identify each other as friends (Asher, Parker, & Walker, 1996). The focus of the current of the study will be on social preference in kindergarten rather than on friendship because the primary the social task of

the child during the transition to formal schooling is to become more proficient in a broader group setting. The formation of close friendships is a more relevant developmental task in middle and late childhood (Bierman, 2004; Sroufe et al. 1999). Furthermore, being well-liked by the peer group is a precursor to the development of intimate friendships (Newcomb, Bukowski, & Bagwell, 1999). Because of the influential role of the peer group on social development during the preschool and kindergarten period, the empirical support for the specific relation of early attachment security to social preference will be examined.

#### *Attachment and social preference*

Early attachment history predicts whether a child is liked by his or her peers, and this pattern holds over the course of early childhood. In the literature, studies linking early attachment to sociometric measures are relatively sparse, particularly studies using preschool/kindergarten samples. In the few studies available, preschoolers with secure attachment histories were more likely to receive higher mean sociometric ratings than those with insecure attachment (DeMulder, Denham, Schmidt, & Mitchell, 2000; LaFreniere & Sroufe, 1985). Secure attachment was also correlated with receiving more liking nominations and fewer disliking nominations from peers (Szewczyk-Sokolowski, Bost, & Wainwright, 2005; Wood, Emmerson, & Cowan, 2004). Thus, young children who have secure attachment histories appear to be more well-liked by their classmates than children who are insecurely attached. Thus, insecure attachment appears to be a risk factor for later peer rejection (Cohn, 1990; Granot & Mayseless, 2001). This pattern

is evident in both longitudinal and concurrent associations (LaFreniere & Sroufe, 1985; Szewczyk-Sokolowski et al., 2005; Wood et al., 2004).

In some studies, the association of rejected status and insecure attachment was strongest for boys, suggesting that the influence of attachment on peer ratings is gender-specific (Cohn, 1990; DeMulder et al., 2000). However, this finding is not consistent across the literature, and may be an artifact of the fact that in these particular studies the rejected group was comprised only of boys. Therefore, while there are gender differences in the behavioral outcomes associated with peer preference (prosocial behaviors, aggression), there is not strong support in the literature for a gender-specific influence of attachment security on later peer ratings/nominations (Schneider et al., 2001; Szewczyk-Sokolowski et al., 2005; Wood et al., 2004).

The magnitude of the relation between attachment security and later peer nominations is relatively small across these studies, with only 8-14% of the variance in peer nominations being explained by attachment status. Schneider et al. (2001) calculated the mean effect size of the relation of attachment security specifically to sociometric choices across 13 studies, and found it to be small in magnitude ( $r = .13$ ). Clearly, the association is modest, suggesting (as Bowlby did) that other influences build on the attachment relationship to determine peer preference. Therefore, greater empirical understanding of these influences and how they intervene between the attachment relationship and later social preference is needed.

Current developmental theory encourages conceptualizing early attachment relationships as a risk or protective factor for social outcomes, depending on its nature.



Schneider et al. (2001) propose that “relatively little will be gained with new correlational studies linking child-mother attachment with the mainstays of peer relations assessment” (pg. 96). Since it is the particular constellation of risk/protective factors in conjunction with each other which determines a particular developmental outcome, the processes that intervene between the mother-child attachment relationship and later success with the peer group must be also be considered (Crockenberg & Leerkes, 2005; Greenberg et al., 1993). To date, relatively few empirical studies regarding social preference have taken this risk/protective factor view of attachment despite its consistency with Bowlby’s (1969) and other attachment theorist’s conceptualizations (Sroufe & Fleeson, 1986). Thus, at this time, the interactive and cumulative influences which build on the early attachment relationship to predict later peer preference have not been clearly identified in the literature. Therefore, the main purpose of this study is to empirically illuminate what processes build on the foundation of the early attachment relationship in order to understand why it predicts later social preference.

#### Intervening Relational and Behavioral Patterns

The intervening processes of interest are the patterns of behaving and relating to others that children learn in the context of the mother-child attachment relationship and then repeat in peer interactions (Ladd & Le Sieur, 1995). Attachment theorists have proposed that a secure mother-child relationship fosters the development of: a) positive expectations/ representations of relationships and of the self (i.e. internal working models); b) emotional competence including positive emotions, emotional understanding,

empathy, and affect regulation; and c) behavioral skills such as social initiation, reciprocity, cooperation and low levels of aggression (Elicker et al., 1992; Greenberg et al., 1993; Goldberg, 2000; Sroufe et al. 1999; Sroufe & Fleeson, 1986; Thompson & Raikes, 2003; Weinfield et al. 1999). In a separate field of investigation, these child characteristics, particularly emotional competence and social skills, have been shown to be related to greater peer preference (see Ladd, 2005 for review). Thus, these child characteristics are likely to contribute to the understanding of the relation between early attachment security and social preference in kindergarten.

Emotional competence and behavioral skills are the particular by-products of the attachment relationship of primary interest in this investigation, for they correspond to the skills needed for success with peers during kindergarten. At this particular age, both the child and peer partners are still evolving in their social abilities, with varying degrees of mastery. So for the young child:

...initiating and responding to others and sustaining interactions, especially in highly stimulating group situations, calls upon not only interactive and play skills but a considerable capacity for emotional regulation. In fact, those that who are successful at this phase...are noted to be more affectively positive in bids and responses to peers, to modulate arousal effectively, and maintain behavioral organization in prolonged interactive bids (Sroufe et al., 1999, pg. 243).

To the extent that early attachment influences these behavioral and relational processes it will indirectly influence social preference.

### *Emotional Competence*

In the empirical literature, emotional competence is a proposed intervening mechanism connecting early-parent child interactions and peer sociometric status. The relevant aspects of emotional competence in forming the association between early attachment and later social preference include: 1) the ability to recognize and empathetically respond to another's emotions; and 2) the ability to regulate one's emotional arousal and display positive emotions (Parke, Cassidy, Burks, Carson, & Boyum, 1992).

According to Cassidy (1994), children learn these components of emotional competence within the attachment relationship in order for the infant to maintain proximity to the primary caregiver and safely explore their surroundings. The behavioral manifestations of attachment security/insecurity are the consequence of the mother-child dyad's effectiveness at regulating the emotions associated with separation (Ainsworth et al., 1978; Cassidy, 1994). Emotional competence begins as a dyadic process between mother and child that becomes internalized by the child and generalized to other settings (Calkins, 2004; Kopp, 1989; Sroufe, 1996).

Securely attached children learn to express the entire range of emotions in their interactions with their mother. During the course of early childhood, they gradually increase in their displays of positive emotions and reduce their negative responses (i.e. anger and fear). Conversely, insecurely attached children grow more negative in their emotional expression over time (Kochanska, 2001). Securely attached children also learn emotional understanding and empathy as they experience sensitive, responsive

interactions with their caregivers and have conversations about emotions (Cassidy, 1994; Laible & Thompson, 1998; Raikes & Thompson, 2006; Sroufe & Fleeson, 1986).

During the preschool years through the transition to elementary school, children grow significantly in their ability to understand emotions, respond empathically, and manage their emotional arousal (Bretherton, 1986; Denham et al., 2002). Preschoolers with higher levels of attachment security are more adept at identifying emotions (particularly negative) and display heightened empathic responses to the distress of others (De Rosnay & Harris, 2002; Kestenbaum, Farber, & Sroufe, 1989; Raikes & Thompson, 2006). Conversely, preschool children with insecure attachment may utilize intense displays of negative emotion to regulate their interactions with others, even though by this time they have the verbal skills to negotiate such interactions (Scaramella & Leve, 2004). Early attachment security also predicts greater use of anger-regulating strategies such as distraction, waiting, or seeking information during the preschool period (Gilliom, Shaw, Beck, Shonenberg, & Lukon 2002).

In addition, social preference scores are associated with greater emotional competence (Eisenberg & Fabes, 1992; Eisenberg et al., 1996). Preschoolers who are more adept in their understanding of others' emotions and respond empathically are more likely to have higher social preference scores (Arsenio, Cooperman, & Lover, 2000; Denham, McKinley, Couchand, & Holt, 1990; Eisenberg, Fabes, Murphy, Karbon, Smith, & Mask, 1996; Miller, Gouley, Seifer, Zakriski, Eguia, & Vergnani, 2005; Smith, 2001). Furthermore, Hubbard and Coie (1994) found that higher status boys were more positive and less reactive in their emotions than were lower status boys. Younger

children who have more consistent, positive emotional expressions and less prominent angry emotions also are more well-liked by their peers (Arsenio et al. 2000; Denham et al., 1990).

In conclusion, there is empirical support for the relation of the different dimensions of emotional competence (emotional understanding, empathy, emotional regulation, positive emotions) with both early attachment and social preference. For example, there is preliminary support that attachment security in older children predicts teacher-ratings of peer competence indirectly via emotional coping strategies (Contreras, Kerns, Weiner, Gentzler, & Tomich, 2000). However, despite the theoretical support for the role of emotional competence in preschoolers as an intervening process in establishing the association between early attachment and peer-rated social preference (Calkins, 2004), it has not yet been tested empirically. The current study will directly examine emotional competence as an intervening relational process.

### *Behavioral Skills*

Other child characteristics which connect the attachment relationship and kindergarten social preference are the development of particular behavioral skills such as prosocial behaviors and a reduction in aggression. As a mother and child interact, the securely attached child learns the rules of reciprocity, or social give and take which transfers to interactions with peers in behaviors such as taking turns (Elicker et al., 1992; Sroufe et al., 1999; Weinfield et al., 1999). Conversely, children with insecure attachments do not learn this reciprocity in social interactions, and may react to

caregivers in an antagonistic fashion, directing hostility, aggression, and oppositional behavior/noncompliance towards a non-responsive caregiver (Bowlby, 1973; Crockenberg & Leerkes, 2005; Greenberg & Speltz, 1988; Weinfield et al., 1999). There is evidence that prosocial and externalizing behaviors uniquely predict social preference, for not all aggressive children show a lack of prosocial skills (Ladd, 2005).

In the literature, measures of prosocial behaviors and/or aggression are typically outcome measures in studies investigating attachment security's relationship to later social competence (DeMulder et al., 2000; Granot & Maylesses, 2001; Schneider et al., 2001; Schmidt et al., 2002). Yet, these behavioral processes have rarely been investigated empirically as an intervening mechanism despite the rather robust theoretical foundation for this view (Elicker et al., 1992; Greenberg et al., 1993; Weinfield et al., 1999).

*Prosocial Behaviors.* Prosocial behaviors include cooperation with others during play (e.g. giving/receiving help, sharing, and turn-taking) and social initiation skills (Rydell, Hagekull, & Bohlin, 1997). These prosocial behaviors, or overall sociability, have been linked to early attachment security. In classroom and laboratory observations, greater attachment security is positively correlated to increased friendly play behaviors with peers (Bohlin et al., 2000; Booth, Rose-Krasnor, McKinnon, & Rubin, 1994; Elicker et al., 1992; Schneider et al., 2001; Youngeblade & Belsky, 1996). Children with secure attachment histories are also more likely to be rated by parents and teachers as demonstrating greater cooperative behaviors and as making more social initiations (Bohlin

et al., 2000; Cohn, 1990; LaFreniere & Sroufe, 1985; Rydell, Bohlin, & Thorell, 2005; Marcus & Kramer, 2001; Verschueren & Marcoen, 1999).

The association between social preference/status and prosocial behaviors has been well-documented in the literature in both older children and preschoolers (Coie et al., 1990; Ladd, Price, & Hart, 1990). Friendly, cooperative behaviors and positive social initiations differentiate children according to social status, with popular children showing more of these behaviors and rejected children showing less compared to those average status children (Coie et al., 1990; Ladd, 2005; Newcomb, Bukowski, & Pattee, 1993). Furthermore, teacher ratings of cooperative play behaviors remain relatively stable over the course of preschool, and these behaviors are positively associated with positive nominations and social preference (Denham et al., 1990; Ladd et al., 1990). This relationship between prosocial behaviors and social preference extends to what the peers themselves report, for peer nominations of prosocial behavior (e.g. sharing) are positively related to concurrent social preference scores for both boys and girls (Keane & Calkins, 2004).

Therefore, there is empirical support in separate lines of inquiry for the connection between prosocial behaviors and social initiation to both early attachment and social preference (Elicker et al., 1992; Coie et al., 1990). What is lacking in the literature at this time is an investigation of whether cooperative behaviors and social initiations explain the relation between attachment security and social preference as many attachment theorists propose (Sroufe et al., 1999; Weinfield et al., 1999).

*Disruptive behavior.* Beginning in early childhood, there is moderate stability of aggression into the elementary school years (see Shaw, Gilliom, Giovanelli, 2005 for review). Like sociability, disruptive behaviors are usually investigated in the research literature as either a product of the infant-child attachment relationship, or as a behavioral precursor to lower social preference. Yet, while there is support for disruptive behaviors as a potential intervening mechanism, it has rarely been tested as such in the literature.

During the toddler period, children with insecure attachments often direct more anger, physical aggression, and noncompliance towards their mothers than children with secure attachments (Londerville & Main, 1981). Thus, both aggression and noncompliance appear to be a strategy that some insecurely attached children use in relationship to their caregivers. Children with this pattern of reacting can also be seen displaying similar behaviors within the peer realm (Main, 1990; McElwain, Cox, Burchinal, & Macfie, 2003; Rubin, Booth, Rose-Krasnor, & Mills, 1996). Children in playgroups that are more emotionally positive and have more positive exchanges typically have histories of secure attachment, whereas those with insecure attachment are more likely to be in playgroups marked by more angry and aggressive exchanges (Denham et al., 2001; MacElwain et al., 2003). Secure attachment has been negatively associated with parent, teacher, and peer reports of disruptive behavior problems (DeMulder et al., 2000; Schneider et al., 2001).

Not only is insecure attachment related to increased anger and aggression with peers, it is also predictive of clinical diagnoses such as oppositional defiant disorder and conduct disorder. While some studies have demonstrated this as a developmental



outcome of the disorganized classification in particular (Lyons-Ruth, 1996), others have found no differences between the insecure attachment classifications (Speltz et al., 1999). Therefore, in the current study, noncompliance and aggression will both be included in the measure of disruptive behaviors, for they are both related to early disruptions in the attachment relationship.

Disruptive behaviors typically result in lower peer acceptance, as other children are not tolerant of these aversive behaviors and exclude them from interactions (Coie et al., 1990). For both boys and girls, preschool teacher ratings of problem behavior predict lower kindergarten social preference (Keane & Calkins, 2004). In his review of the current state of peer relations research, Ladd (2005) suggests that the “cost” of interacting with an aggressive peer are much greater than the benefits, thus the lower peer preference of aggressive, noncompliant children is a relatively consistent finding in the literature.

In a rare study, Wood et al. (2004) found support for externalizing behaviors as a mediator between maternal Q-sort measures of attachment at age 3 and social rejection (i.e. negative nominations) a year later. This study provides preliminary support that disruptive behaviors are a possible intervening mechanism. In the current study, disruptive behaviors are viewed to intervene in the attachment-peer preference relation.

#### *Multiple intervening processes*

Multivariate pathways in developmental psychopathology research are common and the attachment theorists argue that it is unlikely that a single intervening mechanism

(emotional competence, behavioral skills) fully explains the association between early attachment security and later social preference. Rather, most theorists propose these mechanisms work in combination with each other (Goldberg, 2000; Greenberg, Speltz, De Klyen, & Jones, 2001; Weinfield et al., 1999). There may also be considerable overlap between these mechanisms. For example, Parke et al. (1992) suggest that emotional competence is predictive of social preference via the more proximal child behaviors of heightened social skills and reduced aggression. Negative emotionality, lower levels of emotional awareness, and poor regulation skills predict increased aggression and fewer prosocial behaviors in young children (Calkins, Gill, Johnson, & Smith, 1999; Eisenberg, Fabes, Guthrie, & Reiser, 2000). Rydell, Berlin, & Bohlin (2003) found equally strong indications that intensely high emotions, regardless of whether they were positive or negative, in addition to poor regulation led to greater externalizing behaviors and lower prosocial behavior.

Therefore, given the potential intersection of emotional competence and the behavioral patterns of prosocial and disruptive behaviors, these intervening processes need to be evaluated within a single model. Determining both the joint effect of these mechanisms as well as the unique contribution of each is the primary aim of this investigation. However, although the child acts on the environment through these behavioral patterns, there are also influences on the child from the environment, most notably the reaction and interactions with the mother over time.

## The Role of Maternal Behaviors

Just as maternal behaviors and child characteristics interact in the formation of attachment security, the child's emotional competence and behavioral skills do not exist in isolation from ongoing mother-child interactions. Theoretically, the relation between early attachment and later peer preference explained by child behaviors also depends on the quality of intervening maternal behaviors (Erickson, Egeland, & Sroufe, 1985). The empirical attachment literature typically ignores the relevance of the ongoing interaction between child characteristics and maternal behaviors despite Bowlby's (1973) and others' theoretical emphasis (Sroufe et al., 1999; Sroufe & Fleeson, 1986).

Maternal behaviors are roughly distinguished into positive, supportive behaviors and negative, controlling behaviors. The positive dimension includes maternal warmth, attentiveness, sensitivity and responsiveness, facilitation of child-centered goals and overall synchrony with the child. The negative dimension includes frequent use of directives without explanation, focus on adult-oriented goals, threats, hostility, and lack of responsiveness to child's initiations (Calkins, 2002; Ladd & Le Sieur, 1995; Petit, Bates, & Dodge, 1997; Travillion & Snyder, 1993; Youngblade & Belsky, 1996). Positive supportive parenting practices as well as harsh/coercive strategies are uniquely predictive of certain child outcomes, so studies looking at these variables need to include positive as well as negative aspects of the mother-child interaction (Calkins, 2002; Petit et al., 1997).

Little work, however, has been done integrating the literature regarding attachment, maternal sensitivity, and other maternal behaviors that may serve a

behavioral management function. For the most part in the literature, attachment and parenting are conceptualized as part of the same overarching “parenting” construct. Yet, the style of parenting behaviors directed toward the child in both play and discipline situations is related to, but distinct from the attachment relationship. The parenting strategies used during infancy changes in response to developmental changes in the child and different socialization goals of the toddler and preschool years. The time of most change in parenting behaviors occurs during the transition from toddlerhood to preschool as the child rapidly acquires cognitive, language, physical, and emotion regulatory skills. This period is marked by increases in child noncompliance matched by the parent’s increasing need to manage their child’s behavior. Thus, management behaviors emerge during this period and serve a different function (such as teaching compliance, greater independence, and mastery of various skills) from the proximity-regulating behaviors characteristic of the attachment relationship (Bowlby, 1969; Greenberg et al., 1993; Kochanska, 1995; Scaramella & Leve, 2004). Furthermore, an *authoritative* maternal style combines these limit-setting strategies with sensitive responsiveness (Baumrind, 1991).

Nevertheless, early attachment patterns may predict the use of different management strategies. For example, mothers with insecure attachment to their toddlers were more likely to use adult-centered goals or coercive strategies in interactions with the child in preschool than those mothers who had securely attached toddlers (Rubin et al., 1996). In addition, mothers of children with insecure attachment histories use non-optimal strategies in order to manage their child’s expression of negative emotion (Berlin

& Cassidy, 2003). Thus, it is important to investigate both early attachment and *later* maternal behaviors in the same model, for they may both contribute to understanding peer outcomes, particularly as they interact with child characteristics (Greenberg et al., 1993).

*Maternal interactions and peer preference.* Mothers of high sociometric status children tend to interact in a more agreeable, positive manner with their child, whereas mothers of low status children interact with their child in a negative, controlling manner. (Franz & Gross, 2001; Putallaz, 1987). Conversely, preschoolers whose mothers use more inductive (i.e. coaching) methods of discipline rather than power assertive techniques are more likely to be preferred in their peer group (Hart, DeWolf, Wozniak, & Burts, 1992; Ladd, 2005). There appears to be sufficient evidence supporting the relationship between supportive parenting practices and positive peer outcomes, as well as the relationship between more harsh, directive mother-child interactions and negative social outcomes.

There is a growing trend in the attachment literature that investigates these maternal behaviors in relation to outcomes associated with attachment security. Recall that the stability of attachment depends largely on continued stability in sensitive maternal behaviors in relatively stable environments (Belsky & Fearon, 2002; Moss et al., 2005). Furthermore, changes in parenting behaviors over time may exacerbate or improve later peer outcomes depending on the direction of these changes and initial attachment security (NICHD Early Childcare Research Network, 2006).

Therefore, maternal behaviors are related to peer preference indirectly via their impact on the child characteristics of emotional competence and behavioral skills. For example, children who are involved in positive, child-centered interactions with their mothers are more likely to demonstrate similar prosocial behaviors in a dyad. Likewise, children whose mothers display an authoritative style of parenting have fewer difficulties with peers (Baumrind, 1991). Mothers of high social status children focus more on their own and their child's feelings than did the mothers of low status children. (Moore, Maclean, & Keenan, 2000; Putallaz, 1987; Rubin et al., 1996). Thompson (1998, p. 58) observed in his review of social-emotional development that "virtually all attachment theorists agree that the consequences of secure or insecure attachment arise from an interaction between emergent internal representations and personality processes [i.e. emotional competence and behavioral skills] that attachment security may initially influence, and the continuing quality of parental care that fosters later sociopersonality growth."

In the current literature, however, there have been several areas that require some clarification. First there has not been sufficient empirical work which integrates early attachment, child characteristics, subsequent maternal behaviors, and social preference. In addition, much of the recent work integrating attachment and parenting style has limited its scope to measures of maternal positive behaviors (e.g. sensitivity) and conceived of the lack of sensitivity as negative maternal behaviors, while ignoring the other management aspects of parenting that emerge later in development.

*A transactional perspective.* If as Thompson (1998) proposed, maternal behaviors interact with child characteristics in predicting peer preference, then looking at the contribution of maternal parenting practices and child behavior as distinct, unrelated contributors ignores the interactional nature of these relationships. The role of attachment is to establish the context in which these later mother-child interactions take place. In fact, Sroufe (2005, p.349) in summarizing his work regarding the influence of attachment on later outcomes over the past 30 years commented, “understanding the role of attachment entails embracing the organizational nature of the attachment construct and embracing a non-linear transactional model.” The transactional model proposes that social relationships will amplify certain child characteristics and minimize others over time to produce different developmental outcomes (Sameroff & Fiese, 2000; Sameroff & MacKenzie, 2003). There is a dynamic interchange between the child and his or her caregivers. Thus, both past and present experiences between children and their mothers interact to reinforce the development of more or less adaptive behaviors over time (Crockenberg & Leerkes, 2005). A considerable weakness of the majority of the studies in the current literature is that the authors assume the view that attachment security, child characteristics, and maternal behaviors are static, unrelated influences on social preference.

Testing the amplifying or buffering effect of the mother-child relationship on child characteristics over time is somewhat difficult. Essentially, maternal behaviors moderate the relationship between child characteristics and later outcomes. The maternal response changes the relation between the child’s behavior and a later behavioral or

social outcome. Past research on the transactional model has included both micro-analyses of mother-child contingent behaviors and macro-analyses of these interactive processes and their influence on later outcomes (Sameroff & Mackenzie, 2003).

An example of the micro-analytic process is the study of the *coercive cycle*, which is where the parent and child attempt to terminate the aversive behavior of the other by using their own aversive behavior (ex. whining and noncompliance of the child is responded to with a parent's angry threats, which intensifies the child's noncompliance). For both the parent and child, when one partner "gives up" and stops their aversive behavior, it reinforces the other partner's use of increasing levels of angry and aversive behavior (Patterson, Reid, & Dishion, 1992). Similarly, Crockenberg and Litman (1990) found that toddlers whose mothers escalated their control strategies following their child's initial refusal to comply were more likely to persist in their refusal behavior.

More often in the literature, a macro-analytic perspective is taken, as certain child characteristics interact with maternal behaviors over time, which in turn produces changes in both child and maternal outcomes (see Sameroff & MacKenzie, 2003 for review). To illustrate, Brophy and Dunn (2002) found that mothers of "hard to manage" preschool children used more demanding and harsh control strategies and less connected communication than controls. While these mothers did not differ from controls at ages 3-4 in their use of positive directives, they used less positive control statements than controls at ages 5-6. Another example of macro-analysis, this time in terms of a buffering effect, is van den Boom's (1994) test of the transactional model regarding infant temperament and maternal sensitivity over time. In this study, 100 irritable



neonates were identified at birth. Half of the mothers received training on responding sensitively to their infants, whereas the other 50 served as a control group. Nine months later, the infants whose mothers received training were more sociable and cried less than the infants in the control group. In a follow-up study during the preschool years, the mothers who received training were more age-appropriate in their responsiveness, and their children engaged in more appropriate social interactions and had fewer behavioral difficulties than did the control group (van den Boom, 1995).

*Maternal behaviors and emotion regulation.* There has been theoretical and empirical support for the proposal that maternal behaviors and the aspects of child emotional competence interact in predicting behavior with peers, but this work has not yet been extended to include social preference as an outcome (Calkins, 1994). Over the course of development, more sensitive parents should become less involved in the child's emotion regulation efforts, for the child is gaining more autonomy. However, either under-responsive or harsh controlling reactions of the parent may prevent the child from gaining mastery over emotionally distressing events. On the other hand, more supportive, warm parental reactions to the emotional distress will foster the development of emotional regulation because the child will be more able to learn coping strategies as their distress is reduced with their parent's assistance (Calkins, 1994; Calkins & Johnson, 1998; Scaramella & Leve, 2004). Furthermore, a child's lack of emotional regulation (particularly in regard to negative emotions) has been found to elicit greater negative emotions and more controlling behaviors from their mothers (Braungart-Reiker, Garwood, & Stifter, 1997). Thus, as the transactional model suggests, the development

of children's emotional competence is enhanced by sensitive, positive maternal behaviors, but is hindered by harsh, negative parenting styles.

The interaction of maternal behaviors and child emotional competence is predictive of social behaviors with peers (Calkins, 1994; Isley, O'Neil, Clatfelter, & Parke, 1999). Yet, very little work has been done looking at this interaction in terms of predicting social preference or in relation to earlier attachment behaviors. The current study will look at whether maternal behaviors will qualify under which conditions emotional competence will explain the association between early attachment and social preference.

*Maternal behaviors and behavior skills.* Comparatively, there is more empirical support regarding the transactional nature of maternal behaviors and child prosocial and aggressive behaviors. Theoretically, the proposed mechanism is that child disruptive behaviors evoke certain maternal behaviors (more harsh, rejecting, controlling) which in turn lead to further externalizing behaviors, even conduct disorder (Dishion, 1990; Greenberg & Speltz, 1988; Greenberg et al. 1993; Patterson, 1986). In addition, increases in maternal controlling behaviors between ages 2 and 4 were predicted from increases in child noncompliance (Smith, Calkins, Keane, Anastopoulos, & Shelton, 2004). Therefore, it is clear from the above research that these transactional mother-child conflictual patterns begin early in toddlerhood and become relatively stable feature of the parent-child relationship, increasing both negative child behavior and greater maternal rejection, anger, and controlling behaviors (Campbell, Shaw, Gilliom, 2000; Sameroff & Fiese, 2000). Having begun this pattern of coercive exchanges during the toddler years,

the child generalizes this into the realm of peers (via modeling, intermittent negative reinforcement, social cognitions) where they elicit similar responses from others and use increasing levels of aversiveness with peers (Elicker et al., 1992, Hart et al., 1992; Ladd & Le Sieur, 1992; Patterson & Banks, 1989).

On the other hand, positive parenting responses during these early conflicts can reduce the level of future behavior problems. Positive parenting responses, including warmth, support, and lack of hostility reduce the intensity and frequency of externalizing behaviors and other aversive child behaviors (e.g. venting) over time (Calkins, 2002; Denham, Workman, Cole, Weissbrod, Kendziora, and Zahn-Waxlor, 2000). Unfortunately, very little work has focused on whether positive maternal responses buffer the affect of child externalizing behaviors on later social outcomes (Petit et al., 1997).

Therefore, based on these findings, more investigation is needed to determine whether these maternal positive and controlling behaviors moderate the effects of child behaviors on later peer preference. Furthermore, in transactional terms, does the mother-child interaction amplify or minimize the impact of child social behaviors as an intervening factor between early attachment and social preference in kindergarten?

### Summary and Hypotheses

To summarize, previous research has indicated early attachment security is related to social preference, yet this association is moderate in size (Schneider et al., 2001). To date, the majority of the literature regarding attachment security and peer outcomes has taken a correlational view, with little consideration of possible intervening mechanisms.

Nevertheless, this correlational perspective is not consistent with Bowlby's (1973) view that attachment should be considered as the starting point of distinctive developmental pathways reinforced by subsequent experiences. Attachment theorists have proposed that the child characteristics of emotional competence and prosocial/antisocial behaviors intervene between early attachment and outcomes with peers (Sroufe et al., 1999; Weinfield et al., 1999). Indeed, greater attachment security predicts increased emotional competence, improved social skills and reduced aggression. In turn, emotional competence and behavioral skills are predictive of greater social preference scores. However, there is currently no direct test in the literature regarding whether these child characteristics explain the relation of early attachment security with later peer preference.

1) Therefore, it is hypothesized that emotional competence and behavioral skills (i.e. prosocial and disruptive behaviors) are the processes which explain the association of early attachment security to later social preference. In order to test these child characteristics as intervening mechanisms, it will be important to establish their role as mediators using a longitudinal design (Kraemer, Wilson, Fairborn, & Agras, 2002). As Baron and Kenny (1986) outline in their important discussion of mediation, there is evidence of mediation when: the independent variable predicts the intervening mechanism and outcome; the intervening mechanism predicts the outcome; and the independent variable no longer predicts the outcome when the effects of the intervening mechanism are included in the same model. There is support in the empirical literature for most of the necessary relations between early attachment, emotional competence/behavioral skills, and social preference. Yet, the mediational role of these

child characteristics has not been tested explicitly. This study will assess emotional competence and behavioral skills at an intervening time between the predictor and the outcome, lending more validity to them as true mediators (Kraemer et al., 2002).

Given that there are several proposed mediators of the attachment to social preference relation, and evidence of a relatively moderate association between the mediators, the current study will investigate the multiple mediation model presented in Figure 1. When considering several potential mediators, “it is often more convenient, precise, and parsimonious to include them all in the same model” (Preacher & Hayes, 2006, p.32). A multiple mediation model promotes the consideration of whether emotional competence and behavioral skills jointly reduce the direct effect of attachment security on later peer nominations as well as the unique contribution of each mediator while controlling for the others (MacKinnon, 2000).

2) Furthermore, because these emotional competence and behavioral skills are continuously reinforced and modified by the ongoing mother-child relationship, it is hypothesized that their mediational effect will vary in the context of different maternal behaviors (Sameroff & Fiese, 2000; Thompson, 1998). That is, the mediational effect of the emotional competence, prosocial behaviors, and aggression will be moderated by maternal behaviors. A moderated mediation model will be used for each of the potential mediators, and the mediational effect at different levels of positive, controlling, and authoritative maternal behaviors will be determined (Preacher, Rucker, & Hayes, 2005).

In conclusion, it is proposed that early attachment fosters the development of different child characteristics which have been shown in the literature to promote success

with peers. These pathways are then reinforced through interactions between the child and subsequent maternal responses. Ultimately, the resulting behavior patterns are carried into the peer realm where the relative success or failure of these strategies is evaluated in the peer nominations (Sroufe, 2005).

## CHAPTER II

### METHOD

#### Participants

Participants for this study included 307 children obtained from two different cohorts as part of a larger ongoing longitudinal study which began when the children were two-years-old. Participants were initially recruited at two-years of age through child day care centers, the County Health Department, the local Women, Infants, and Children program, and from a longitudinal study that began when the children were six-months of age. In order to obtain a broad, community-based sample of children with a wide range of disruptive behavior, potential participants were screened on the Child Behavior Checklist (CBCL 2-3; Achenbach, Edelbrock, & Howell, 1987).

For Cohort One, 474 children were screened. Sixty-five percent of these families were European American, 30% were African American, and 5% were Asian or Hispanic. Hollingshead (1975) scores classified 61% of the families as middle class, twenty-five as lower class, and fourteen percent as upper class. From this larger sample, 154 children were selected based on their CBCL scores. Forty-four of these children had externalizing scores on the CBCL in the clinical or borderline clinical range (t-scores of 60 or above), twenty-seven of the children had both externalizing and internalizing scores above the clinical or borderline clinical range, and 83 of the children scored below the clinical or borderline clinical range on both externalizing and internalizing subscales. The final

sample of children in Cohort 1 was racially and economically diverse (65% European American; mean Hollingshead score = 39.2), primarily from intact families (77%), and 78 were male and 76 were female.

For Cohort Two, 492 children were screened. Seventy-three percent of these families were European American, twenty-four percent were African American, and three percent were biracial. Seventy-three percent of the families were classified as middle class, fifteen percent as lower class, and twelve percent as upper class. From this larger sample, 153 children were selected. Forty-eight of the children had externalizing scores on the CBCL in the clinical or borderline clinical range (t-scores of 60 or above), twenty-four of the children had both externalizing and internalizing score above the clinical or borderline clinical range, and eighty-one of the children scored below the clinical or borderline clinical range for both internalizing and externalizing subscales. The final sample of children selected for this cohort was racially and economically diverse (68% European American; mean Hollingshead score = 39.7), primarily from intact families (84%), and 71 were male and 82 were female.

Two years following the initial laboratory visits, the parents or guardians of these initial two cohorts were asked via telephone and letters to participate in the follow-up study during the children's preschool. Across both cohorts, 265 mother-child dyads (122 boys, 139 girls) participated in the lab visits which included observations of mother-child interactions. The families participating in this portion of the study did not differ from the children who did not participate in terms of race, original CBCL group, or SES. Reasons for not attending this laboratory visit included moving out of town (11 families),



declining involvement (7 subjects), or inability to locate the family (16 subjects). The mean age of the child at this visit was 4.5 ( $M = 56$  months;  $SD = 2.9$  months). During the laboratory visit, permission was obtained from the parent to contact any preschool teachers for their input. At this time, preschool teacher reports were obtained on 235 of the children.

A year later, 187 of the original sample completed the kindergarten assessments of peer acceptance (86 boys, 101 girls). Attrition at this time point was due to principal or teacher refusal to give permission to interview classmates (14 subjects), parent declining consent (4 subjects), being home schooled (4 subjects), being out of town (5 subjects), or for other unknown reasons (18 subjects).

A final sample of 165 (73 boys and 92 girls) children participated in all aspects of the study: 2 year-old laboratory visits, 4-year old laboratory visits, preschool teacher questionnaires, and kindergarten classroom assessments. These subjects were representative of the surrounding community with regard to socioeconomic status and racial diversity (27% African-American, 68% European American, 4% Other; mean Hollingshead score = 40.5). Comparative analyses of these children remaining in the study and completing all the measures versus those who did not continue through all three data collection times indicated there were no significant differences between the groups in racial diversity, socioeconomic status, or initial CBCL scores.

Families were paid a fee for each part of the assessment, with a bonus for completing all parts of the assessment each year. Preschool teachers were paid a small

fee as well, while classmates participating in sociometric procedures were given a small prize and a cash donation given to each classroom.

## Measures and Procedures

### *Attachment*

In order to assess maternal-child attachment at age two, mothers completed the *Attachment Q-sort* (AQS, Version 3, Waters, 1987) as part of a laboratory visit. The AQS measures common attachment behaviors typically observed in the home (Solomon & George, 1999). The AQS was administered according to the procedures provided by Teti and McGourty (1996) and Waters (1995). Following instruction, mothers sorted the 90 items of the AQS into a fixed distribution of nine piles of ten cards ranging from “most like my child” to “least like my child”. These scores are then correlated with a criterion sort of the “hypothetically most secure child” provided by Everett Waters to produce a security coefficient ranging from  $-1.0$  (least secure) to  $+1.0$  (most secure). This continuous measure of security represents the relative success of the child in balancing attachment seeking behaviors and exploration.

Maternal Q-sorts have demonstrated adequate reliability, construct, and predictive validity in several studies (Seifer, Schiller, Sameroff, Resnick, & Riordan, 1996; Teti & McGourty, 1996; Vaughn & Waters, 1990). Maternal- and observer-completed Q-sorts are moderately correlated, and the magnitude of this association increases with repeated observations, thus indicating mothers are reliable reporters of their child’s attachment security (Teti & McGourty, 1996). Furthermore, AQS scores adequately discriminate

secure (Type B) and insecure (Type A and C) Strange Situation classifications (Seifer et al., 1996; Vaughn & Waters, 1990). Maternal AQS scores also have predictive validity similar to the observer-completed AQS scores in regard to social emotional competence and maternal sensitivity (Van IJzendoorn, Vereijken, Bakermans-Kranenburg & Riksen-Walraven, 2004).

In the current study, the security coefficients ranged from  $-.23$  to  $.79$  with a mean of  $.38$  and standard deviation of  $.20$  (See Table 3). Overall, there was a slight negative skew to the distribution of scores, but this was not significant enough to warrant a transformation.

### *Child Characteristics*

*Emotional Competence.* The 24-item *Emotion Regulation Checklist* (ERC; Shields & Cicchetti, 1998) was completed by the child's preschool teacher as a measure of the emotional competence of the child. These items tap into aspects of emotional competence including the child's affective tone, lability, flexibility, empathy, and emotional understanding. The items are endorsed on a 4-pt Likert scale (1=never to 4=always), and include both positively and negatively weighted items. In their study with 513 maltreated and impoverished children, Shields and Cicchetti (1997, 1998) report the adequate reliability and discriminative, predictive, and construct validity of the ERC. They also report on the two factor structure of the scale. The *Lability/Negativity* factor is comprised of 15 items which tap into aspects of emotionality including mood swings, predominant negative mood, angry reactivity, and under-controlled positive emotions.

The *Emotion Regulation* factor consists of eight items which tap into awareness of others' emotions, appropriate displays of affect, and empathic responding. (Note: the author's selection of the name for this factor may create some confusion). One item ("is whiny and clinging with adults") does not load on either factor.

The Cronbach's alpha reliability for the entire scale was  $\alpha = .73$ , and the two scales were correlated  $-.46$  ( $p < .001$ ). Higher scores on the Lability/Negativity score indicate greater difficulty managing emotional arousal, particularly negative emotions. The mean of this scale was  $1.63$  ( $SD = .47$ ), and the distribution was positively skewed with the large proportion of the scores falling in the lower range. The Emotional Regulation scale (measuring emotional understanding and empathy) had a mean of  $3.18$  ( $SD = .47$ ) and was negatively skewed, for higher scores indicate better functioning. In order to obtain a single indicator of emotional competence, the Lability/Negativity and Emotion Regulation scales were converted to standard  $z$ -scores. Then the inverse of the Lability/Negativity was then added to the Emotion Regulation scale so that higher scores were indicative of more positive behaviors (low negative emotions, greater management of arousal, emotional awareness and empathy). The resulting emotional competence variable was negatively skewed, with the majority of scores falling in the high end of the spectrum, so a square root transformation was performed so that the distribution was normal. The mean and standard deviation are presented in Table 3.

*Prosocial Behavior.* The measure of social behaviors towards peers was created through a factor analysis of individual items from two different measures. These questions were chosen from the *Preschool Play Behavior Scale* (PPBS; Coplan & Rubin,

1998), the *Social Skills Rating System* (SSRS; Gresham & Elliot, 1990) completed by the child's preschool teacher. Table 1 lists the 28 items which were chosen by their similarity to items from other prosocial behavior scales that tap into initiation skills, cooperation, and friendly behavior (Rydell et al. 1997; Tremblay, Vitaro, Gagnon, Piche, & Royer, 1992). Correlations between the items ranged from .13 to .49 (absolute value).

Exploratory factor analyses were then conducted to create the prosocial behavior variables. First, since the distribution of some of the items were skewed, a principal component analysis would overestimate the item loadings. Therefore, an initial common factor analysis of all 24 items was performed using the principal axis extraction method (Costello & Osborne, 2005; Pett, Lackey, & Sullivan, 2003). Initially, 5 factors (unrotated) were extracted accounting for 59% of the common variance between the items using the extraction rule of eigenvalue greater than one.

Using the scree test from this analysis, it was determined that three factors were possibly the best fit for the data (Costello & Osborne, 2005). This is also the number of factors that should be extracted if the rule of thumb in which only factors explaining greater than 5% of variance are retained were used (Pett et al., 2003). Then, a follow-up common factor analysis was conducted on the 24 items in which the extraction of three factors was forced. However, when inspecting the resulting factor loadings, there were no items that loaded strongly (e.g. absolute value  $>.40$ ) on the third factor. Thus, it was determined that the two factor structure was the most parsimonious.

Next, a factor analysis forcing the extraction of two factors was conducted, using the direct oblimin rotation. An oblique rotation was selected because of the theoretical

assumption that the factors might be correlated. If the factors are, in fact, not correlated, then the results will be identical to an orthogonal rotation (Costello & Osbourne, 2005).

The factors, indeed, were intercorrelated (.26). The factor pattern matrix of loadings is listed in Table 2. This matrix represents the loadings while controlling for the correlation between factors (Pett et al., 2003). Fourteen items had loadings greater than .40 on the first factor, and 7 items had moderate to large loadings on the second factor. Fortunately, there were no items that loaded strongly on both factors, thus making interpretation easier. The first factor that was extracted had an initial eigenvalue of 6.5 before rotation and accounted for 24% of the common variance in the items. Post-rotation estimates of variance can not be obtained using an oblimin rotation, because of the intercorrelations of the factors. The second factor had an eigenvalue of 3.10, accounting for an additional 12.8% of the variance shared between the items.

The initial alpha reliability of the 14 questions of the first factor was  $\alpha = .89$ . Removing any of the items did not improve reliability, so all were retained in the creation of the scale. The items loading on this first factor seemed to be congruent with definitions of *social initiation*, so a measure of a child's willingness to engage in social interactions was created by adding the scores on these 14 questions (Pett et. al., 2003). The scores on some items were reversed before adding them, so that all the items scored in the same direction (i.e. high scores indicating greater social initiation). The resulting variable was negatively skewed, so it was transformed by taking the square root in order to make it normally distributed.

In contrast to the initiation of social interactions, the second factor consisted of seven items tapping into cooperative behaviors while engaged in play (ex. “waits for turn”, “compromises in conflict”). The Cronbach’s alpha reliability of the seven items was  $\alpha = .83$ . Therefore, these items were put on the same scale and added to form the *Cooperation* variable. This variable was also transformed by taking the square root to achieve a normal distribution. Means and standard deviations for these prosocial behaviors are listed in Table 3.

The two factor structure of these items fits with the empirical literature that social initiation skills are distinct from cooperative behaviors while engaged in social play (e.g. Rydell et al., 1997). Therefore, as they predict social preference differently in the literature, they will be tested as separate potential mediators.

*Disruptive Behavior.* In order to test the hypothesis regarding whether aggression and noncompliant/oppositional behaviors mediate the attachment-social preference relationship, preschool teachers completed the *Behavior Assessment System for Children: Preschool Version* (BASC; Reynolds & Kamphaus, 1992)

The BASC is a widely used checklist that provides overall internalizing and externalizing indices as well as nine subscales measuring child functioning in both emotional and behavioral domains. The teacher preschool version (ages 2-5) has 109 items. The teacher indicates on a 4-point scale whether the behaviors are never, sometimes, often, or always occurring. The BASC has been shown to have high internal consistency, reliability, and both the teacher and parent versions of the correlated with similar indices on the CBCL (Achenbach et al., 1987). The BASC has well-established

internal consistency. Specifically, Externalizing T-scores (not gender-normed) were used as a measure of disruptive behavior in this study. The T-scores ranged from 36-83 ( $M=49$ ;  $SD=10.97$ ), and the distribution was highly skewed in the positive direction. Therefore, in order to achieve a more normal distribution, a square root transformation was performed.

In addition to the teacher's report, an observational measure of child noncompliance was obtained during laboratory mother-child interactions during the four-year-old visits. During this visit, mother and child completed several tasks analogous to common mother-child interactions. These tasks included a 1) *teaching task* where the mother was instructed to assist the child in replicating a model made of blocks; a 2) *freeplay session* where the mother was instructed to play with her child with age-appropriate toys as she would at home; and a 3) *compliance task* in which the mother-child dyad cleaned up the toys from the freeplay session. In congruence with Smith et al. (2004), a measure of *child noncompliance* was calculated from the clean-up task. When the mother issued a direction, the child's behavior was coded as to whether they complied with, ignored, refused (i.e. whine, say no), or defied (i.e. do the opposite) this instruction. Inter-rater reliability of this coding exceeded .80. The latter three behaviors were averaged and standardized by length of the clean up task as a measure of non-compliance. The scores were normally distributed and ranged from .95 to 2.33 with a mean proportion of noncompliance being 1.38.

In order for the measure of disruptive behavior to encompass both interactions with the attachment figure as well as interactions in the broader social context of school,



the child noncompliance scores and the BASC Externalizing scores were combined. Both scores were standardized and averaged in order to obtain a single score indicating a child's level of aggressive, noncompliant behavior. The resulting distribution of scores was normally distributed, and the mean and standard deviation presented in Table 3.

### *Maternal behaviors*

Maternal statements and behavior were also coded by trained graduate students during the laboratory teaching, play, and compliance tasks described in the previous section. As in Smith et al. (2004) maternal statements were coded as to whether they were a) *child-centered*: where the mother tried to encourage or maintain the child's ongoing behavior or b) *adult-centered*: where the mother tried to stop the child's activity or began a new activity. Maternal behaviors were globally coded for overall *warmth/positive affect, strictness/punitiveness*; and *sensitivity/responsiveness*. Inter-rater reliability between the developer and the trained graduate students was .80. Following the Smith et al. (2004) procedures, these maternal measures were then combined and averaged across tasks creating two factor scores, *maternal positive behaviors* (warmth, child-centered, sensitivity/responsiveness) and *maternal control behaviors* (adult-centered and strictness/punitiveness). A measure of *maternal authoritative behaviors* (Baumrind, 1991) was calculated by multiplying the standardized maternal positive and maternal control behaviors. The means and standard deviations of these maternal behavior measures are listed in Table 3.

### *Social Preference*

In addition to various laboratory measures, the parents of the subjects gave permission to contact the target child's school in order to interview his or her peers. The school was contacted and the principal and classroom teacher gave permission to contact the classmates' parents to obtain consent.

Each classmate was individually interviewed by well-trained graduate assistants based on a modified version of the procedures outlined by Coie et al. (1982). Following a script, practice items were completed to insure that the child understood the procedures prior to obtaining nominations. The classmates were shown pictures of each child in the class participating in the study with the peer's name printed below the appropriate picture. They were asked to name (or point to) those of their peers who they "like the most" and then "like the least". They were allowed to nominate an unlimited number of classmates for each category as well as make cross-gender nominations, for this increases the reliability and reduces measurement error (Terry & Coie, 1991; Terry, 2000). These scores were converted to a standardized score (*z*-score) to control for differences between each classroom in the number of peers making nominations.

Based on these nominations, a *social preference* score was calculated by subtracting like-least nominations from like-most nominations as an index of the relative likeableness of a child by his or her peers (Coie et al., 1982). Thus, a high social preference score indicates that the child was liked more than he or she was disliked, whereas a low social preference score indicates that the child was disliked by his or her classmates more than liked. This measure was used because conceptually, acceptance

and rejection are not polar opposites, but have is a great deal of heterogeneity in the low ends of these dimensions. Simply, not every child with low levels of acceptance is high in rejection, and not every child high in rejection is also low on acceptance. The social preference index accounts for this heterogeneity such that at the high and low levels, the amount of variance in social acceptance and rejection are roughly equal so that it can be used as a relative measure of likeability (Bukowski et al., 2000). According to a recent meta-analysis of 77 studies, the mean short term stability (test-retest reliability) of social preference was .82, whereas the long term stability was .58. In addition, the reliability of social preference was significantly higher than the stability of nomination-based acceptance and rejection scores (Jiang & Cillessen, 2005).

This social preference index will serve as the dependent variable in the study. For the 180 children completing the school assessment, the social preference index was normally distributed, and ranged from  $z = -2.16$  to  $z = 2.16$ . Thus, there was a broad range of scores within the sample. Table 3 lists the mean and standard deviation.

## CHAPTER III

### RESULTS

#### Preliminary Analyses

##### *Early Attachment and Social Preference*

Preliminary analyses between the variables of interest and the demographic variables (gender, race, SES) were performed to investigate any potential covariates that need to be controlled. Table 4 presents these correlations. In regard to the relation between early attachment and later peer nominations, higher maternal reports of attachment security on the AQS were weakly correlated with higher peer reports of social preference ( $r = .21; p < .01$ ).

The correlation between gender and attachment security was not significant, indicating that girls and boys did not differ in their attachment security. In contrast, the association between attachment security and race was significant. Caucasian children were rated as being more securely attached ( $M = .41; SD = .20; t(163) = 3.13; p < .01$ ) than non-Caucasian children ( $M = .31; SD = .20$ ). Children from higher socioeconomic situations were also more likely to be securely attached ( $r = .33; p < .001$ ). When socioeconomic factors were controlled, the association between race and attachment security was not significant (partial  $r = -.14, ns$ ). Therefore, the difference in attachment security between Caucasians and non-Caucasian children could be related to different socio-economic factors.

In regard to the dependent variable social preference, there were no significant relations between gender, race, SES, and the peer ratings. Therefore, no demographic variables will be controlled as covariates in the subsequent analyses.

### *Intervening Mechanisms*

Bivariate correlations between attachment, social preference, and emotional competence were also examined. Demographic variables were also included in these analyses. The correlations are also listed in Table 4. Two-year attachment security was positively associated with emotional competence ( $r = .23; p < .01$ ). The correlation between emotional competence scores and social preference was in the expected direction, for greater emotional competence in preschool was predictive of higher social preference scores ( $r = .30; p < .001$ ). These correlations suggest a potential mediational effect. While the demographic variables of race and SES were unrelated to emotional competence, there was a significant correlation between gender and emotional competence ( $r = -.22; p < .01$ ). Boys tended to have lower overall emotional competence than girls.

Bivariate correlations among attachment, social preference, demographic variables and cooperation are also listed in Table 4. Like emotional competence, cooperation was positively associated with both two-year attachment security ( $r = .27; p < .001$ ) and social preference ( $r = .25; p < .001$ ), suggesting a potential intervening effect. On average, boys received slightly lower ratings of cooperation ( $M = 2.0; SD = .10; t$

(163) = 2.26;  $p < .05$ ) than girls ( $M = 2.1$ ;  $SD = .10$ ), but this association was relatively weak ( $r = -.18$ ;  $p < .05$ ). Race and socioeconomic status were unrelated to cooperation.

More secure attachment was related to increased displays of social initiation ( $r = .25$ ;  $p < .001$ ), but social initiation was not associated to kindergarten social preference, ( $r = .14$ ;  $ns$ ). Given the lack of relation between social initiation and social preference, it is unlikely that this process is a potential mediator, so it will not be included in the multiple mediation model. Social initiation was unrelated to gender or race, but children with higher socioeconomic status were more likely to be rated by their teachers as making more attempts to engage others ( $r = .17$ ;  $p < .05$ ).

Finally, children with lower attachment security were more likely to display higher levels of disruptive, noncompliant behavior ( $r = -.22$ ;  $p < .01$ ). As expected, children with higher levels of disruptive behavior received lower social preference scores in kindergarten ( $r = -.22$ ;  $p < .001$ ). Like emotional competence and cooperation, these associations with attachment security and social preference suggest that disruptive behavior is a potential mediator of the attachment and social preference relation. In regard to demographic variables, girls were more compliant and less aggressive than boys ( $t(160) = -2.58$ ;  $p < .01$ ). Disruptive behavior was unrelated to race or SES in this sample.

As suggested in the literature, the possible intervening mechanisms were related, for the correlations between emotional competence, cooperation, social initiation, and disruptive behaviors (see Table 4) ranged from .26 to .60 (absolute value). These interrelations support the need to use a multiple mediation model which considers both the

total effect of these mediators and the specific indirect effect of a given mechanism controlling for the shared variance with the other possible mediators (Preacher & Hayes, 2005).

### *Maternal Behaviors*

Both maternal controlling and maternal positive behaviors were associated with AQS scores (see Table 4). Mothers who rated their children as being more secure exhibited fewer controlling behaviors ( $r = -.27; p < .001$ ) and more positive, child-centered behaviors ( $r = .29; p < .001$ ) in the laboratory interactions. However, these maternal behaviors were not associated with kindergarten social preference, yet were related to the child characteristics rated by teachers and observed in the laboratory.

There was a weak relationship between gender and maternal control. Mothers of boys displayed a higher frequency of controlling behaviors ( $M = .14; SD = .81; t(164) = 2.03; p < .05$ ) than mothers of girls ( $M = -.11; SD = .76$ ). Other demographic variables were associated with the maternal behaviors. Caucasian mothers exhibited fewer controlling behaviors ( $t(160) = -4.51; p < .001$ ) and greater positive behaviors ( $t(160) = 6.65; p < .001$ ) compared to non-Caucasian mothers. Mothers falling on the higher ends of socioeconomic status also exhibited fewer controlling behaviors ( $r = -.27; p < .001$ ) and more positive behaviors ( $r = .38; p < .01$ ). Finally, there was a weak positive association ( $r = .16; p < .05$ ) between maternal authoritative behaviors and socioeconomic status.

In regard to the relation between maternal behaviors and child characteristics, increased maternal control behaviors were associated with lower emotional competence ( $r = -.27; p < .001$ ), decreased cooperation ( $r = -.27; p < .001$ ), and greater disruptive behaviors ( $r = .48; p < .001$ ). Conversely, higher levels of maternal positive behaviors were positively correlated with cooperation ( $r = .22; p < .01$ ), yet unrelated to disruptive behaviors or emotional competence. Moderated mediation models will determine whether these maternal behaviors qualify the indirect effects of the intervening mechanisms. Given the lack of association between maternal authoritative behaviors and the other variables of interest (see Table 4), it will not be evaluated as a potential moderator of the mediating effect of the child characteristics.

#### Test for Multiple Mediation

Two different questions are answered when evaluating multiple mediation models. First, whether emotional competence, cooperative behavior, and disruptive behaviors jointly reduce the direct effect of attachment security on later peer nominations will be considered. Then, the unique contribution of the individual mediators controlling for the other mediators will be considered (Preacher & Hayes, 2006).

There are several different methods to test for multiple mediation, and each have unique strengths and weaknesses (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). The most widely known is the causal steps procedure outlined by Baron and Kenny (1986) which may be extended to include multiple mediators. To review, according to Baron and Kenny (1986), there are four relationships that must exist to



establish multiple mediation: 1) attachment predicts social preference (the *total effect*); 2) attachment must predict all the proposed intervening mechanisms; 3) the intervening mechanisms serve as predictors of social preference, and 4) the *indirect effect* of the intervening mechanisms combined reduces the *direct effect* of attachment on social preference to zero, for the coefficient of attachment is not significant (i.e. the *direct effect* is zero). This methodology was groundbreaking when it was introduced, and is a foundational mediational modeling technique.

In this study the causal steps approach to multiple mediation analysis used the same series of regression equations suggested by Baron and Kenny (1986) with modifications to the final two regression equations. Table 5 lists the coefficients for the relevant variables for each of the four steps. In the first step, the total effect of attachment on social preference score is significant and is moderate in size (.20). Toddlers who were more securely attached were more likely to receive higher social preference ratings from their peers in kindergarten. The second step, attachment security did predict all three mediators of emotional competence, cooperation, and disruptive behaviors in separate regression analyses. To test the third condition, emotional competence, cooperation and disruptive behaviors were entered simultaneously into a regression equation predicting social preference. Together, the potential mediators explained a significant portion (10%) of the variance in social preference ( $F(4, 157) = 5.88; p < .001$ ). The coefficient of emotional competence was significant ( $t = 1.97; p < .05$ ), but not the coefficients for cooperation and disruptive behaviors. The final step of the causal steps approach in determining multiple mediation was to enter attachment and

the three mediators into a standard regression equation. The entire model was significant ( $F(4, 157) = 5.19; p < .001$ ). Taken together, toddler attachment security and the mediators accounted for 12% of the variance in kindergarten social preference ( $R^2 = .12$ ). There was support for a mediational effect, for the attachment coefficient is reduced (from .20 to .13) by the joint effect of the three mediators. Furthermore, in the final step, the direct effect of attachment is not different than zero.

Mackinnon et al. (2002) as well as others (e.g. Preacher & Hayes, 2004; Shrout & Bolger, 2002) have investigated the various statistical procedures for testing mediation and found that the method outlined by Baron and Kenny (1986) has several weaknesses, particularly models with longitudinal designs. Specifically, the causal steps approach has low statistical power and does not permit a specific test of the size of the indirect effect (Preacher & Hayes, 2004). Furthermore, when entertaining multiple mediators, there is a possibility that one mediator suppresses the effect of another, thus masking the magnitude of indirect effect. Also, in multiple mediator models, the size of the specific indirect effects of the mediators can not be distinguished (MacKinnon, Lockwood, & Williams, 2004; Shrout & Bolger, 2002). However, there are two alternative methods which address these weaknesses of the causal steps approach in evaluating multiple mediation models: the product of the coefficients approach (i.e. Sobel test) and bootstrap estimation.

### *Product of the Coefficients*

MacKinnon et al. (2002) provides an excellent, detailed review of the methodology as well as the exact formula for conducting the Sobel test (Sobel, 1982). Briefly, the indirect effect is calculated by multiplying the coefficients from the regression of the independent variable on the mediator and the regression of the mediator on the dependent variable in the Baron and Kenny (1986) steps and dividing by the standard error of this product term. Using these estimates, confidence intervals can be constructed and tested for statistical significance. Using similar procedures in a multiple mediation model produces an estimate of the total indirect effect as well as an estimate of the specific indirect effect attributable to each of the mediators (Preacher & Hayes, 2006). The total and specific indirect effects ratios should be larger than zero, when using Sobel's (1982) large sample Z-test.

The total indirect effect and the specific indirect effects for each mediator are presented in Table 6 with their associated Z-value. The total indirect effect was .07, with  $Z = 2.46$  ( $p < .01$ ), indicating that together, the three child characteristics do mediate the relation between attachment security and social preference. However, the specific indirect effects of the individual mediators were not significant, although the indirect effect for emotional competence neared significance ( $Z = 1.66$ ;  $p < .10$ ). Using this particular approach, it may be concluded that taken together, the child characteristics established in the early attachment relationship do explain the relation between attachment security and later peer preference. Attachment fosters the development of emotional competence, cooperative behaviors, and reduced disruptive behaviors, which

in turn are related to higher social preference. Attachment is indirectly related to social preference via these mediators. However, no particular mediator contributes uniquely to this indirect effect beyond the influence of the other mediators.

However, the Sobel test assumes the sampling distributions of the total and specific indirect effects are distributed normally. This is a rarely met assumption, especially in small to moderate sample sizes. Furthermore, in multiple mediation, the process of estimating indirect effects produces relatively skewed sampling distributions. The violation of this assumption of normality produces a confidence interval which is wide in the direction of accepting the null hypothesis, but relatively narrow in favor of the alternative, thus reducing the statistical power of this test (MacKinnon et al., 2004; Shrout & Bolger, 2002).

### *Bootstrap Estimates*

Given the weaknesses of the causal steps approach and the Sobel test, Shrout and Bolger (2002) and others (MacKinnon et al., 2004; Mallinckodt, Abraham, Wei, & Russell, 2006; Preacher & Hayes, 2006) provide evidence that bootstrap estimation provides increased statistical power (and a reduction in Type I errors) in detecting significant indirect effects, especially in regard to smaller samples and smaller effect sizes. Bootstrap estimation includes the following four steps: 1) Construct a bootstrap sample of  $N$  cases by randomly sampling (with replacement) observations from an original data set. 2) From this sample, estimate the total and specific indirect effect of the independent variable on dependent variable via the mediators. Save these estimates to a

file. 3) Repeat procedures 1 and 2 a total of  $J$  times (preferably over 1,000). 4) Examine the distribution of the  $J$  estimates, and establish confidence intervals to determine upper and lower bounds at a set  $\alpha$ -level. Using this procedure, if the resulting confidence interval does not include zero, there is evidence of mediation. Because the sampling distribution of the indirect effect is estimated empirically, the benefit of bootstrapping is that there is no need to make assumptions about the normality of its sampling distribution which leads to reduced power (Mallinckodt et al., 2006; Preacher & Hayes, 2006; Shrout & Bolger, 2002).

The novelty of bootstrapping estimation makes it rare in applied psychological research, despite its proven utility in simulation tests (Mallinckodt et al., 2006). Preacher and Hayes (2006) provided the SPSS syntax (available at <http://quantpsy.org>) used to calculate the bootstrap point estimates of the indirect effects as well as the percentile confidence intervals in the current study. These point estimates and confidence intervals are presented in Table 7 for each of the potential mediators within the multiple mediational model of Figure 1 (MacKinnon et al., 2000; Preacher & Hayes, 2006).

The total indirect effect of the three mediators was estimated to be .07. The percentile and bias corrected confidence intervals did not include zero. Thus, the size of the total indirect effect was significant, albeit moderate in size. As with the other approaches, it confirms that emotional competence, cooperation, and disruptive behaviors jointly mediated the relation of attachment security and social preference as predicted. The second benefit of this approach is that it more confidently determined that emotional competence uniquely explained the variance of the total indirect effect compared to

cooperation and disruptive behaviors. Nevertheless, it is not accurate to conclude that cooperation and disruptive behavior are not mediators. Their mediational effects are simply not distinct from the each other.

### Maternal Behaviors as Moderators

To address the second aim of this investigation, the transactional perspective is adopted to determine whether the impact of child characteristics on later social preference is moderated by maternal controlling and positive behaviors. The second hypothesis was that maternal behaviors qualified these particular indirect effects, such that the indirect effect of a particular mediator varies based on the maternal behaviors the children experience. In order to evaluate this hypothesis, moderated mediation models were constructed to test the indirect effects of emotional competence, cooperation, and disruptive behaviors within the context of maternal behaviors.

To test the moderated mediation models, estimates of the *conditional indirect effect* of the mediators (emotional competence, cooperation, and disruptive behavior) at various values of the moderator (i.e. maternal control, maternal positive) were computed and tested for significance (Preacher, Rucker, & Hayes, 2005). All three child characteristics were evaluated at different levels of maternal control behaviors, whereas cooperation was the only child characteristic tested with maternal positive behaviors due to the lack of association between maternal positive behaviors and the other two mediators (Table 4). Following the recommendations of Aiken and West (1991), the conditional indirect effects were tested at average, high and low values of maternal

behaviors (at the mean and +/- 1 SD). At each particular value of the moderator, Z-values were calculated to assess the statistical significance of the indirect effect, assuming a normal distribution of the sampling distribution. In addition, bootstrapping methods (5,000 bootstrap samples) were used to calculate point estimates and 95% confidence intervals of the indirect effect at these predetermined values of the moderator. Furthermore, bootstrapping re-sampling methods were also used to estimate the conditional indirect effect of the mediator at 10 different points throughout the entire range of the moderating variable and Z-values calculated, for there was no theoretical basis for selecting the cutpoints of the mean and +/- 1 SD other than tradition. This procedure permits a determination of the range of values of the moderator in which the indirect effect is meaningful (Preacher et al., 2005). The SPSS syntax used to perform these computations was written by Preacher et al. (2005) and was obtained from <http://www.quantpsy.org>.

*Emotional Competence.* First, given the correlation between maternal behaviors and overall emotional competence, a standard regression model was built with attachment, maternal control, emotional competence, and an interaction term predicting social preference. In order to assist interpretation, maternal control and emotional competence variables were standardized before entering them into the regression equation. The coefficients for this equation are listed in Table 8. Overall, the predictors accounted for 11% of the variance in social preference ( $F(4, 157) = 4.90; p < .001$ ). The interaction term in this equation was not significant between emotional competence and maternal control. Thus, the interaction of emotional competence and maternal control did

not add anything to the prediction of social preference above attachment and emotional competence. However, the statistical significance of this interaction term is not an indication of the presence or lack of moderated mediation (K.J. Preacher, personal communication, December 30, 2006).

Estimates of the indirect effect of emotional competence at the different levels of maternal control (z-scores) are presented in Table 9 with corresponding Z-values. The traditional cut points of the mean and +/- 1 SD of the moderator maternal control are bolded and presented with their 95% confidence intervals constructed from the bootstrapping method. If only these three levels of maternal control are considered, it appears that the indirect effect of emotional competence is only relevant when children experience moderate to high levels of maternal control, for the estimated indirect effect was not significant at low levels of maternal control. However, also listed on Table 9 are ten other points across the entire range of maternal control. From this table, at both low (below -1 SD) *and* extremely high levels (above 1.5 SD) of maternal control, the mediational effect of emotional competence was not significant. Thus, a child's emotional competence mediated the relationship between attachment and social preference when the child's mother displayed controlling behaviors in the moderate range (approximately -.64 to 1.5 SD). The effect of attachment on social preference was explained by the child's emotional competence when the mother displayed moderate controlling behaviors in her interactions with her child.

*Cooperation.* As with emotional competence, social preference was regressed on attachment, standardized cooperation, standardized maternal control, and the interaction



term of cooperation and maternal control. Table 10 lists the unstandardized coefficients and their test for significance. The overall model predicted for 11% of the variance in social preference ( $F(4, 157) = 4.61; p < .01$ ). The interaction term of cooperation and maternal control was marginally significant.

Estimates of the indirect effect of cooperation throughout the range of maternal control (z-scores), including the mean and  $\pm 1$  SD of maternal control are presented in Table 11. Ninety-five percent confidence intervals constructed from the bootstrapping method are also presented for the three traditional cut points (Aiken & West, 1991). The indirect effect of attachment through cooperation was significant for maternal scores ranging just below the mean (-0.383) and above. Thus, cooperation did not mediate the relation between attachment and social preference at lower levels of maternal control. The social preference of children who had mothers who exhibited lower levels of control was not partially determined by the children's cooperative behaviors. Thus, secure attachment predicts higher social preference scores indirectly via the development of cooperative behaviors when these prosocial behaviors are paired with average to above average maternal control behaviors.

Secondly, the regression model presented in Table 12 was built predicting social preference from attachment, standardized cooperation, standardized maternal positive behaviors, and the interaction term created by multiplying cooperation and maternal positive behaviors. The model predicted 9% of the variance in social preference ( $F(4, 157) = 3.93; p < .01$ ), and attachment and cooperation were significant predictors. The estimated indirect effects at various levels of maternal positive behaviors are presented in

Table 13. A surprising finding was that cooperation explained the relation between attachment and social preference when maternal positive behaviors were low to moderate in frequency (-1.278 to .202). Children's cooperative behaviors did not mediate the attachment to social preference relation when maternal positive behaviors were high or extremely low. Within the context of low to moderate maternal positive behaviors, attachment indirectly effects social preference through its influence on cooperative behaviors.

*Disruptive Behaviors.* Finally, a standard regression model was built to test whether attachment, standardized disruptive behaviors, standardized maternal control and the product of disruptive behaviors and maternal control predicted social preference. The coefficients are listed in Table 14 and the total effect of the model was significant ( $F(4, 157) = 4.41; p < .01$ ). The main effects of attachment and disruptive behavior were significant, but maternal control and the interaction of disruptive behaviors and maternal control were not. However, as presented in Table 15, the indirect effect of disruptive behavior did vary according to the different levels of maternal control. At higher levels of maternal control (above approximately 1.0 SD), disruptive behaviors mediated the relation of social preference and attachment. Note that this effect was marginally significant ( $p < .10$ ) when using a normal sampling distribution, but the null hypothesis was more confidently rejected when using the bootstrap estimation procedures. The disruptive behaviors of children explain the relation between attachment and social preference when their mothers display higher than average levels of maternal control. Insecure attachment was related to lower kindergarten social preference because it

promoted the development of aggressive behaviors interacting with higher levels of maternal controlling behaviors (i.e. coercive cycle).

## CHAPTER IV

### DISCUSSION

#### Intervening Relational and Behavioral Patterns

This study investigated the proposal that children develop behavioral and relational competencies within the attachment relationship that facilitate the later development of successful peer relations (Bowlby, 1969; Ladd & Le Sieur, 1995). Specifically, the first prediction tested whether the child characteristics of emotional competence, prosocial behaviors, and reduced disruptive behavior jointly mediated the relation between early attachment and social preference (see Figure 1).

The observed relations between attachment, the child characteristics, and social preference satisfied the initial conditions for establishing the child characteristics as potential mediators (Baron & Kenny, 1986). Greater attachment security in toddlerhood predicted greater peer preference 2 ½ years later in kindergarten. Toddlers with greater attachment security were also more likely to demonstrate increased emotional competence and prosocial behaviors, and fewer disruptive behaviors in preschool. These results converge nicely with the existing research on the associations between these same variables in the attachment literature (Elicker et al., 1992; Schneider et al., 2001). As with previous studies, the association between attachment security and social preference was moderate in size, suggesting its role as a foundation on which subsequent

experiences build, rather than its role as a primary determinant of developmental outcomes (Bowlby, 1973; Schnieder et al., 2001). These relations also confirm the relatively well-established behavioral and social benefit of having a secure attachment to a primary caregiver (Elicker et al., 1992; Weinfeld et al., 1999). Finally, consistent with other studies in the peer relations literature, the behavioral and relational competencies (i.e. emotional competence and behavioral skills) were associated with higher social preference scores in kindergarten (Keane & Calkins, 2004; Ladd, 2005).

The unique contribution of this study was the integration of the different lines of investigation from the peer and attachment literature in a direct test of whether attachment security fosters the emergence of developmental sequelae which subsequently promote beneficial peer outcomes (Sroufe & Fleeson, 1986). Attachment security was no longer predictive of social preference when the combined effect of the child characteristics was considered in the multiple mediation model, thus meeting the final condition of establishing mediation (Baron & Kenny, 1986). In addition, estimates of the magnitude of the indirect effect of attachment on social preference *via the mediators* were significantly large (i.e. greater than zero) using both the Sobel test and bootstrap estimation techniques. Therefore, these results converge on the conclusion that the relation of attachment to later social preference is mediated by the joint contribution of emotional competence, cooperation, and disruptive behaviors. The longitudinal nature of the design gives further support to the view that these child characteristics originate from the attachment relationship and go on to determine later social preference (Kraemer et al., 2002).

In addition, emotional competence appears to play a unique role in explaining the relation between attachment and social competence. Any mediating effects of prosocial behaviors and disruptive behaviors were shared with emotional competence. This finding strengthens the view that one of the by-products of the attachment relationship is the increasing emotional competence of the child (Cassidy, 1994; Kochanska, 2001). The conclusion may be drawn that secure attachment predicts greater social preference because it promotes the development of the ability to regulate emotions as well as acknowledge the emotions of others and respond with empathy. These same emotional skills have been shown in the literature to be precursors to the social behaviors on which peers base their judgments of liking (Eisenberg et al., 2000; Keane & Calkins, 2004; Parke et al., 1992). However, to qualify this particular interpretation of the results, it is important to recognize that the current study did not investigate whether emotional competence preceded the display of these behavioral skills. All measures of the potential mediators were obtained simultaneously via teacher report.

### Maternal Behaviors

The second objective of this study was to test the hypothesis that the mediational effect of emotional competence and behavioral skills vary in the context of different maternal behaviors (Figure 1). This hypothesis was confirmed, particularly in regard to the moderating effect of maternal controlling behaviors such as giving direction, teaching, and initiating play themes. As Thompson (1998) suggested, the on-going interactions between mother and child appear to build on the early attachment history to

determine social outcomes. These outcomes indicate the importance of adopting a transactional perspective when considering the effect of early attachment on later peer outcomes, for this association is best understood in light of the interaction between child characteristics and specific maternal behaviors (Greenberg et al., 1993; Sroufe, 2005).

There was less evidence that maternal positive behaviors served as a moderator during the preschool period. This discrepancy between maternal control and maternal responsiveness has been found in similar studies (Karreman, van Tuijl, van Aken, & Marcel, 2006; Warren, Malik, Lindahl, & Claussen, 2006), and suggests that the warm, child-centered maternal behaviors promoting secure attachments in the first years of life adapt to the child's need in the preschool years to develop proficiencies in various domains such as emotional competence and behavioral skills (Greenberg et al., 1993; Scaramella & Leve, 2004).

Early attachment security was related to improved child emotional competence, which then predicted improved social preference when maternal controlling behaviors were moderate in intensity. Child emotional competence did not explain the relation of attachment to social preference when interacting with either extremely low or high levels of maternal control. This finding is congruent with the literature in which under-responsive or overly controlling maternal behaviors hinder the ability of the child to internalize emotional regulatory skills and displays of appropriate emotions (Calkins, 1994; Calkins & Johnson, 1998; Scaramella & Leve, 2004). Secure attachment appears to be related to positive peer outcomes the growth of emotional competence is enhanced by the presence of ongoing maternal support and direction.

In a similar manner, the effect of attachment on social preference was explained by children's cooperative behaviors when maternal control was in the average to above average range. It appears that cooperative behaviors emerging from the early attachment relationship foster improved peer outcomes when augmented by maternal direction and guidance during play, teaching, and compliance interactions.

Furthermore, cooperative behaviors mediated the association between attachment and social preference at moderate levels of non-directive maternal behaviors (i.e. maternal positive). While the lack of the indirect effect at low levels of maternal positive behaviors was anticipated, it was not expected at the higher levels of maternal positive behaviors. One possible explanation of this unanticipated result is that high levels of maternal positive behaviors may not be contingent on the child's behavior, and thus the discriminated reinforcement of prosocial behaviors does not occur. Also, it is possible that warm maternal responsiveness is particularly important in times of distress, but not as important in play or teaching situations (Claussen & Crittenden, 2000; Davidov & Grusec, 2006). Also, mothers who display high levels of child-directed behaviors may engage in fewer teaching behaviors or limit setting, which means the child's internalization of social rules and norms may be more limited (Lecuyer & Houck, 2006).

When maternal control behaviors were above average in intensity, disruptive behaviors mediated the relation between early attachment and social preference. This result suggests that when insecure attachment patterns promote disruptive behaviors, this negative pattern is amplified through the ongoing maladaptive (i.e. coercive) mother-child interactions (Crockenberg & Litman, 1990; Patterson et al., 1992). Subsequently,



peers find such disruptive behaviors aversive, and are more likely to dislike/reject a child displaying such behaviors (Hart et al., 1992; Ladd, 2005). Furthermore, there was not evidence of the buffering effect of maternal positive behaviors on disruptive behaviors as expected (Calkins, 2002; Denham et al., 2000), for positive maternal behaviors were unrelated to disruptive behaviors. Mothers who have children high in externalizing difficulties did not display a lower frequency of positive, child-directed behaviors. One possible explanation for this finding is that the higher frequency of their adult-centered, intrusive interactions suppressed any potential buffering effect of the warm, positive behaviors.

Overall, attachment security's relation to kindergarten social preference was not mediated by any of the child characteristics when maternal control and positive behaviors were below average. This finding speaks to the importance of maternal involvement/engagement in both the development of attachment security as well as the support of continued development of behavioral and relational competencies (De Wolff & van Ijzendoorn, 1997; Tronick, 1989). Extending this work to the current study, early attachment security may facilitate the emergence of emotional competence, prosocial behavior, and reduced disruptive behavior, yet if the mother is subsequently uninvolved, the child finds it difficult to continue to develop self-regulation or learn new behavioral skills important to peer relationships (Rodriquez, Ayduk, Aber, Mischel, Sethi, & Shoda, 2005). Alternatively, if this lack of involvement is a departure from previous maternal behaviors due to changes in the environmental circumstances of the family, it would be expected that attachment security would be less stable, and thus its predictive power of

later social preference is weakened considerably (Hamilton, 2000; NICHD Early Childcare Research Network, 2001; Moss et al., 2005).

Taken together, the findings of the present study support the proposal that the nature of the early attachment relationship is reinforced by subsequent experiences between mother and child and then carried into the peer realm (Bowlby, 1973; Ladd & LeSieur, 1992). When children are securely attached, maternal control efforts appear to enhance children's ongoing positive social-emotional development and later success with peers. Children become increasingly independent in their emotional competence and prosocial behaviors as mothers build on the child's existing skills and then withdraw their assistance as the child becomes more competent (i.e. "scaffolding"). However, as suggested by the association between maternal control and emotional competence, the benefit of a secure attachment history on peer relations may be attenuated if mothers are unable to appropriately identify when to withdraw their support (Wood, Bruner, & Ross, 1976; Rogoff, 1990). Thus, there appears to be an optimal level of support/structure provided by mothers that extends the influence of the secure attachment relationship into the peer realm.

Unfortunately, when children are insecurely attached, a more maladaptive pattern is reinforced. The same maternal behaviors associated with positive peer outcomes when interacting with positive child characteristics amplify the effects of insecure attachment and disruptive behaviors in predicting lower social preference. On a positive note, low and moderate levels of maternal control in response to the disruptive behavior failed to reinforce the relation between insecure attachment and poor peer outcomes, suggesting a

buffering effect. Taken together, these findings are consistent with the NICHD Early Childcare Research Network (2006) results showing that peer outcomes are improved or worsened based on initial attachment security and changes in maternal sensitivity. The current study extends the work by emphasizing the interaction of characteristics of the child with the stability/change in these maternal behaviors.

In conclusion, the transactional perspective is supported, for the influence of early attachment security is reinforced by similar experiences in the ongoing mother-child relationship (Thompson, 1998; Weinfield et al., 1999). Furthermore, if later interactions between child characteristics and maternal behaviors are dissimilar to those of the attachment relationship, then the association between attachment and peer outcomes is weakened. The moderate size of the relation between early attachment and later social preference in the present and other studies supports the view that variability in this relation depends on the nature of the ongoing relationship between mother and child (Sameroff & Fiese, 2000; Schneider et al., 2001; Sroufe, 2005). The different peer outcomes associated with secure and insecure attachment are a function of the transactions within the ongoing mother-child relationship. Furthermore, these peer outcomes appear amenable to change if these patterns are modified in the time between toddlerhood and kindergarten.

The primary contribution of this study to both the peer relations and attachment fields is that it provides empirical support to the theoretical explanations provided by Bowlby (1969) and others (Elicker et al., 1992; Greenberg et al., 1993; Thompson & Raikes, 2003) regarding the relational and behavioral processes that explain why greater

attachment security is related to improved peer outcomes. The adoption of the transactional perspective expands the traditional correlational methods used in the attachment literature to include more complex relations and consideration of the ongoing mother-child relationship (Schneider et al., 2001). Finally, the current study unites what has been up to this time relatively separate domains of investigation (i.e. peer relations and attachment) in order to provide a preliminary formulation of the complex developmental pathways linking relationships in the home to relationships with peers.

#### Limitations and Future Directions

Before examining the possible implications of the results of this study for applied clinical work, it is important to first discuss the limitations of this study and areas in need of further investigation. First, this study used a multiple mediation model to determine whether the three proposed mediators jointly explained why early attachment predicted social preference. However, the overall effect of attachment and the mediators accounted for a modest (12%) portion of the variance in social preference. There are also other social and behavioral competencies suggested by attachment theory that are potential mediators of the attachment to social preference association, but were not included in this investigation. Nevertheless, future research endeavors must be cautious in considering several established determinants of social preference such as physical appearance, athletic competence and cognitive abilities as potential mediators, for they are theoretically distant from the inherently social nature of the attachment relationship (Bierman, 2004; Ladd, 2005; Thompson & Raikes, 2003). Most notably absent from the

current investigation are the cognitive representations of relationships and of the self (i.e. “internal working models”) which are formed through the repeated interactions between child and caregiver and viewed as the source of attachment security’s relative stability (Bowlby, 1969/1973). At this time, the operational definition of an internal working model is still relatively unformulated in the attachment literature. This conceptual metaphor is also difficult to test empirically, especially in a preschool population, for existing measures of preschooler’s internal representations can be highly impacted by a child’s verbal fluency and cognitive development (Belsky & Cassidy, 1994; Hinde, 1988; Thompson & Raikes, 2003; Solomon & George, 1999). Nevertheless, as the methodology in this domain improves, it may be an especially productive avenue of future research. Investigation of these attachment-related internal representations in regard to later social preference would unite the attachment literature with the substantial work on biases in social cognition characteristic of rejected children (Crick & Dodge, 1994).

Another concern that should be addressed in future research includes the use of mothers to report on their child’s attachment security. Since the mother is an active part of the relationship being rated, she might not be an objective observer. Maternal completed Attachment Q-sorts are also sensitive to differences in child temperament (van Ijzendoorn et al., 2004). Using trained observers to complete the AQS would address this limitation. Another option would be to use the laboratory Strange Situation (Ainsworth et al., 1978) to investigate differences between the four attachment classifications (secure, avoidant, ambivalent, and disorganized). Looking at the relation between the four

classifications rather than using a continuous measure such as the AQS would provide clarification about whether particular attachment styles have different relations to peer outcomes. Assessing the influence of changes in attachment security over time on the nature of ongoing mother-child interactions and social preference would also be a natural extension of the current study.

Another measurement issue limiting the interpretation of the present study is the lack of differentiation in the maternal control variable between appropriate guidance/teaching (positive control) and attempts to assert power (negative control; Crockenberg & Litman, 1990; Karreman et al., 2006). Positive control or gentle guidance includes behaviors such as suggesting, teaching, explaining, or providing choices to the child in order to guide their behavior. Conversely, negative control includes using threats, anger, and criticism to gain compliance (Crockenberg & Leerkes, 2005). Briefly, positive control is associated with greater willingness of the child to comply and internalization of behavior standards and emotion regulation skills. Negative control is associated with short-term compliance, but a lack of internalization of behavior standards and emotional regulatory practices (Karreman et al., 2006; Kochanska & Askan, 1995; Lecuyer & Houck, 2006). Both types of maternal control were collapsed into a single variable in the present study. The next step in investigating the moderating effect of maternal behaviors should investigate the interaction between child characteristics and these two types of maternal control behaviors as separate constructs.

In a related domain, the interaction between child characteristics and maternal control efforts may vary according to the type of activities within which these

interactions occur. There is research indicating that children have more difficulty complying to requests (ex. “clean up”) than to prohibitions (ex. “don’t touch that”; Kochanska & Askan, 1995). Children who receive more teaching-based maternal limit setting in prohibition tasks had greater subsequent emotional regulation and compliance (Lecuyer & Houck, 2006). However, children who exhibit greater noncompliance to maternal negative control efforts during *play* interactions have fewer externalizing problems, whereas greater compliance to maternal negative control is related to increased behavior problems (Warren et al., 2006). While the current study established a preliminary association between these mother-child dynamics, early attachment security, and social preference, there is clearly a need for replication and further refinement of the complex relations between past and current mother-child interactions and peer outcomes.

The understanding gained from this study in regard to the relation of early attachment processes to social preference is limited to the reciprocal influences of mother-child dyads. The transactional processes may be different if other caregivers are considered, for attachment security, especially in the early childhood period, is relationship-specific (Marvin & Britner, 1999). The present study limited its sample to mothers because of the previous lack of attention to fathers in the attachment literature. However, recent research endeavors have found differences between paternal and maternal attachment security and behaviors such as responsiveness and control. In recent study, fathers’ sensitivity and subsequent attachment to children differed depending on the child’s gender. Father-son relations differed from both father-daughter and mother-son relations (Schoppe-Sullivan, Diener, Mangelsdorf, Brown, McHale, &

Frosch, 2006). Fathers also uniquely influence the development of child social acceptance, emotional competence, and behavioral skills through the use of warm positive behaviors and positive and negative control (Crockenberg & Leerkes, 2005; Davidov & Grusec, 2006; Volling, Blanding, & Gorvine, 2006). Thus, preliminary evidence suggests that father-child interactions and attachment security are distinct from mother-child interactions. A future research endeavor should include fathers in the sample in order to examine whether the relations supported in the present study translate to other attachment figures.

The current study found no gender differences in attachment security or social preference; therefore, gender was not addressed in the subsequent analyses. However, there were gender differences in the mediating child characteristics of emotional competence, cooperation, and disruptive behaviors. There is evidence in the literature that the correlates of peer status differ for boys and girls (Keane & Calkins, 2004; Ladd, 2005; Underwood, 2004) and that attachment may predict these intervening processes differently for boys and girls (Cohn, 1990; DeMulder et al., 2000). Taken together, these gender differences in the mediators suggest that the relation between early attachment security and social preference might be explained by different intervening mechanisms for girls and boys. In addition, maternal behaviors may moderate the relation between these child characteristics and social preference uniquely for boys and girls. For example, the same maternal behaviors may serve both a buffering and amplifying function depending on child gender (McFayden-Ketchum, Bates, Dodge, & Petit, 1996). Therefore, future investigations of the intervening behavioral and relational processes



explaining the relation between attachment and social preference should address potential gender differences.

Finally, another limitation of the current study is that it did not take into account the larger community context in which the attachment to social preference relation occurs. In this study there were moderate differences in attachment security between Caucasian and Non-Caucasian children, but these differences disappeared when controlling for socioeconomic status. This finding is consistent with other studies, in which racial differences in attachment were a function of the impact of poverty on maternal sensitivity (Bakermans-Kranenburg, van Ijzendoorn, & Kroonenberg, 2004). Race and socioeconomic status were also related in the current study to displays of maternal positive and maternal controlling behaviors during mother-child interactions. Thus, as suggested by some, parenting practices promoting social competence used by middle- to upper- class parents may not as effective in high-risk neighborhoods characterized by poverty and crime (Simon, Lin, Gordon, Brody, & Conger, 2002). These findings speak to the importance of considering the community and ethnic context in future studies of the association between attachment security, child and maternal characteristics, and social preference.

### Summary and Clinical Implications

The primary aim of this investigation was to identify the early precursors to problematic peer relations at a time when risk factors for poor peer outcomes are relatively amenable to change (Bierman & Montminy, 1993). This study made

preliminary connections between what has previously been separate domains of investigation. It focused on early attachment security as a precursor to the relational and behavioral processes which influence the future development of peer acceptance (Sroufe, 2005; Thompson, 1998). Despite the limitations of the study, there was evidence that the impact of these child characteristics in linking early attachment to later success with peers was affected by the context of the ongoing mother-child interactions. There was confirmation of the transactional processes in which certain maternal behaviors amplified the influence of specific child characteristics, but minimized others.

Therefore, intervention efforts addressing children's peer interactions in early childhood should include teaching both emotional and behavioral competencies while simultaneously addressing current mother-child interactions. Parent Child Interaction Therapy (PCIT; Hembree-Kigin & McNeil, 1995) is an example of a program that includes these two aspects. Preventative programs with younger children such as Circles of Security (Hoffman, Marvin, Cooper, and Powell, 2006) focus efforts on fostering the development of secure attachment. With continued investigation, greater understanding of the relational and behavioral processes linking early attachment to peer outcomes will guide the development of interventions to prevent the negative outcomes associated with peer rejection (Cassidy, Woodhouse, Cooper, Hoffman, Powell, & Rodenberg, 2005).

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APPENDIX  
FIGURE AND TABLES

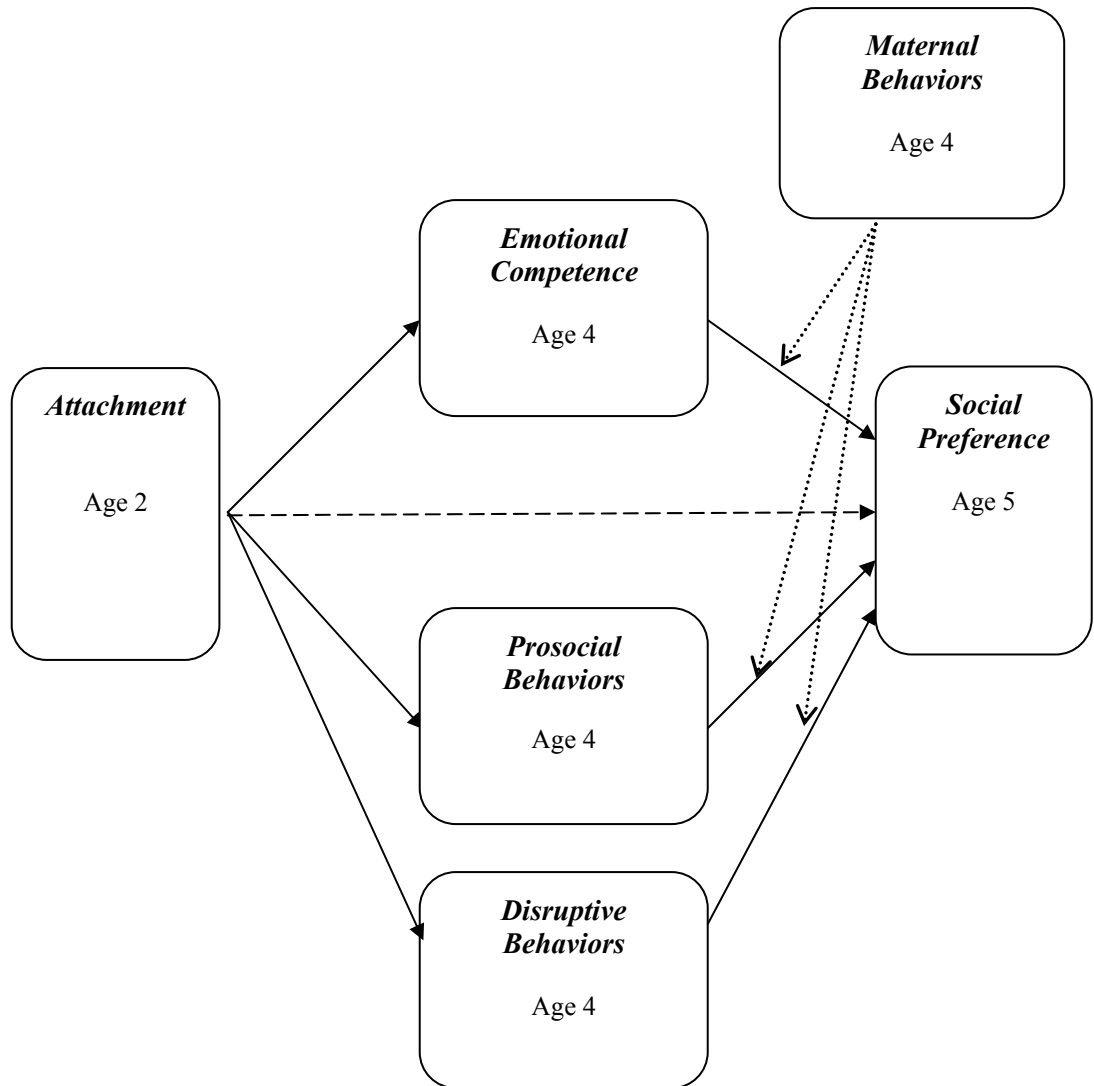


Figure 1. Conceptual Model of Proposed Multiple Mediation of Toddler Attachment to Kindergarten Peer Preference.

*Table 1. Proposed Items for Prosocial Behavior Measures*

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Social Skills Rating System (item #)

- Makes friends (2)
- Gives compliments (8)
- Participates in games (9)
- Introduces self (12)
- Accepts peers' ideas (13)
- Cooperates with peers (14)
- Waits turn (15)
- Controls temper with peers (20)
- Follows rules in games (21)
- Compromises in conflicts (23)
- Initiates conversations with peers (24)
- Invites others (25)
- Joins group (29)
- Volunteers to help peers (30)

Preschool Play Behavior (item #)

- Talks to other children (1)
  - Approaches other children, but avoids joining in (4)
  - Takes the role of onlooker or spectator (5)
  - Hovers around children without joining in (7)
  - Plays "make-believe" with other children (8)
  - Engages in group play (9)
  - Plays in group *with* (not just beside) other children (15)
  - Watches other children without trying to join in (17)
  - Engages in active conversations with other children during play (20)
  - Remains alone and unoccupied, perhaps staring off in space (26)
-

Table 2. Factor Loadings from the Rotated Factor Pattern Matrix for Social Initiation and Cooperation: Principal Axis Factoring with Oblimin Rotation

	<u>Social</u> <u>Initiation</u>	<u>Cooperation</u>
<u>Social Skills Rating System (item #)</u>		
• Makes friends (2)	<b>.535</b>	.181
• Gives compliments (8)	.303	<b>.429</b>
• Participates in games (9)	.047	.065
• Introduces self (12)	.354	.051
• Accepts peers' ideas (13)	.021	<b>.573</b>
• Cooperates with peers (14)	.204	<b>.605</b>
• Waits turn (15)	.204	<b>.605</b>
• Controls temper with peers (20)	-.053	<b>.740</b>
• Follows rules in games (21)	.098	<b>.807</b>
• Compromises in conflicts (23)	.027	<b>.593</b>
• Initiates conversations with peers (24)	<b>.522</b>	.150
• Invites others (25)	<b>.498</b>	.165
• Joins group (29)	<b>.400</b>	.298
• Volunteers to help peers (30)	.331	.239
<u>Preschool Play Behavior (item #)</u>		
• Talks to other children (1)	<b>.835</b>	-.116
• Approaches other children, but avoids joining in (4)	<b>-.664</b>	.105
• Takes the role of onlooker or spectator (5)	<b>-.679</b>	.264
• Hovers around children without joining in (7)	<b>-.682</b>	.145
• Plays "make-believe" with other children (8)	<b>.415</b>	.037
• Engages in group play (9)	<b>.794</b>	.032
• Plays in group <i>with</i> (not just beside) other children (15)	<b>.656</b>	.173
• Watches other children without trying to join in (17)	<b>-.715</b>	.270
• Engages in active conversations with other children during play (20)	<b>.799</b>	.278
• Remains alone and unoccupied, perhaps staring off in space (26)	<b>-.484</b>	-.107

*Table 3. Descriptive Statistics for Attachment, Proposed Mediators and Moderators, and Social Preference.*

Variable	<i>M</i>	<i>SD</i>
Attachment Q-sort	.38	.20
Emotional Competence	2.42	.41
Cooperation	2.09	.10
Social Initiation	1.40	.25
Disruptive Behavior	-.06	.78
Maternal Control	-.01	.80
Maternal Positive	.06	2.20
Maternal Authoritative	-.23	1.07
Social Preference	-.01	.97



Table 4. Bivariate Correlations Between Attachment Security, Potential Mediators and Moderators, Peer Nominations, and Demographic Variables

Variable	2	3	4	5	6	7	8	9	10	11	12
1. 2-year Q-sort	.21**	-.11	-.25***	.33***	.23**	.27***	.25***	-.22**	-.27***	.29***	.02
2. K-social preference	-	-.11	-.11	.11	.30***	.25***	.14	-.22**	-.13	.05	.09
3. Gender		-	.05	.05	-.22**	-.18*	-.01	.17*	.16*	.01	.02
4. Race			-	-.31***	-.13	-.11	-.08	.08	.34***	-.47***	-.09
5. SES				-	.14	.13	.17*	-.06	-.27***	.39***	.16*
6. Emotional Competence					-	.60***	.42***	-.53***	-.27***	.13	.10
7. Cooperation							.26***	-.50***	-.27***	.22**	.11
8. Social Initiation							-	-.02	-.10	.07	.14
9. Disruptive Behavior								-	.48***	-.08	-.11
10. Maternal Control									-	-.23**	-.17*
11. Maternal Positive										-	.16*
12. Maternal Authoritative											-

Note: <sup>a</sup>Gender: boys =1and girls=0; <sup>b</sup>Race: Caucasian=1 and Non-Caucasian =2; <sup>c</sup>SES=Socioeconomic Status. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Table 5. Causal Step Approach for Testing Multiple Mediation of the Relation Between Attachment and Kindergarten Social Preference*

Step	Coefficient <sup>a</sup>	se	t
<u>1. Attachment Predicting Social Preference (Total Effect)</u>			
Attachment	.20	.07	2.71**
<u>2. Attachment Predicting Mediators</u>			
<i>Emotional Competence</i>			
Attachment	.09	.03	2.99**
<i>Cooperation</i>			
Attachment	.25	.07	3.47***
<i>Disruptive Behavior</i>			
Attachment	-.17	.06	-2.81**
<u>3. Mediators Predicting Social Preference (controlling for each other)</u>			
Emotional Competence	.47	.24	1.97*
Cooperation	.07	.11	.71
Disruptive Behavior	-.07	.10	-.60
<u>4. Attachment Predicting Social Preference Controlling for Mediators</u>			
Attachment	.13	.07	1.70†

Note: <sup>a</sup>unstandardized coefficients; †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ , . \*\*\*  $p < .001$ .

*Table 6. Indirect Effects and Sobel Z-test Significance Testing of the Mediation of the Relation of Attachment Security and Social Preference*

Mediator	Indirect Effect	Sobel Z
Emotional Competence	.04	1.66 <sup>†</sup>
Cooperation	.02	.70
Disruptive Behavior	.01	.60
<i>Total</i>	.07	2.46 <sup>**</sup>

Note: <sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .

*Table 7. Bootstrap Estimation for the Total and Specific Indirect Effects of the Proposed Mediators of the Attachment-Social Preference Relation*

Indirect Effect	Point Estimate	95% Confidence Interval	
		<u>Lower</u>	<u>Upper</u>
Emotional Competence	.04	.0035	.1010
Cooperation	.02	-.0289	.0750
Disruptive Behavior	.01	-.0415	.0558
<i>Total</i>	<i>.07</i>	<i>.0156</i>	<i>.1365</i>

*Table 8. Standard Regression Equation Predicting Social Preference from Attachment and the Interaction of Emotional Competence and Maternal Control.*

Predictor	Coefficient <sup>a</sup>	Se	T
Constant	-.03	.07	-.34
Attachment	.13	.08	1.79 <sup>†</sup>
Emotional Competence	.26	.08	3.18 <sup>***</sup>
Maternal Control	-.02	.08	-.26
Emot. Comp. X Mat. Cont	-.02	.07	-.25

Note: <sup>a</sup>unstandardized coefficients; <sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ , . \*\*\*  $p < .001$ .

*Table 9. Conditional Indirect Effects of Emotional Competence at Different Levels of Maternal Control*

Maternal Control (z-score)	Indirect Effect	SE	Sobel Z	95% Confidence Interval	
				Lower	Upper
-1.933	.067	.046	1.45		
-1.416	.065	.039	1.63 <sup>†</sup>		
<b>-1.000</b>	<b>.064</b>	<b>.035</b>	<b>1.80<sup>†</sup></b>	<b>-.009</b>	<b>.146</b>
-0.899	.063	.034	1.84 <sup>†</sup>		
-0.383	.061	.029	2.07 <sup>*</sup>		
<b>0.000</b>	<b>.060</b>	<b>.027</b>	<b>2.22<sup>*</sup></b>	<b>.014</b>	<b>.121</b>
0.133	.059	.026	2.25 <sup>*</sup>		
0.649	.058	.025	2.30 <sup>*</sup>		
<b>1.000</b>	<b>.057</b>	<b>.026</b>	<b>2.23<sup>*</sup></b>	<b>.013</b>	<b>.112</b>
1.166	.056	.026	2.16 <sup>*</sup>		
1.683	.054	.028	1.88 <sup>†</sup>		
2.199	.052	.033	1.57		
2.716	.051	.039	1.39		
3.233	.049	.045	1.09		

Note: <sup>†</sup>  $p < .10$ . <sup>\*</sup>  $p < .05$ . <sup>\*\*</sup>  $p < .01$ .

*Table 10. Standard Regression Equation Predicting Social Preference from Attachment and the Interaction of Cooperation and Maternal Control*

Predictor	Coefficient <sup>a</sup>	Se	t
Constant	.01	.07	.16
Attachment	.14	.08	1.86 <sup>†</sup>
Cooperation	.20	.08	2.49 <sup>**</sup>
Maternal Control	-.01	.08	-.09
Cooperation X Mat. Cont	.13	.07	1.81 <sup>†</sup>

Note: <sup>a</sup>unstandardized coefficients; <sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ , . \*\*\*  $p < .001$ .

Table 11. Conditional Indirect Effects of Cooperation at Different Levels of Maternal Control

Maternal Control (z-score)	Indirect Effect	SE	Sobel Z	95% Confidence Interval	
				Lower	Upper
-1.933	-.008	.043	-.18		
-1.416	.008	.035	.23		
<b>-1.000</b>	<b>.021</b>	<b>.028</b>	<b>.74</b>	<b>-.029</b>	<b>.084</b>
-0.899	.024	.027	.86		
-0.383	.039	.023	1.73 <sup>†</sup>		
<b>0.000</b>	<b>.051</b>	<b>.022</b>	<b>2.32<sup>**</sup></b>	<b>.015</b>	<b>.101</b>
0.133	.055	.022	2.48 <sup>**</sup>		
0.650	.071	.026	2.71 <sup>**</sup>		
<b>1.000</b>	<b>.081</b>	<b>.030</b>	<b>2.65<sup>**</sup></b>	<b>.027</b>	<b>.146</b>
1.166	.086	.033	2.63 <sup>**</sup>		
1.683	.102	.041	2.48 <sup>**</sup>		
2.199	.117	.050	2.34 <sup>**</sup>		
2.716	.133	.059	2.23 <sup>**</sup>		
3.233	.149	.069	2.15 <sup>**</sup>		

Note: <sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .



*Table 12. Standard Regression Equation Predicting Social Preference from Attachment and the Interaction of Cooperation and Maternal Positive*

Predictor	Coefficient <sup>a</sup>	Se	t
Constant	-.02	.07	-.25
Attachment	.16	.08	2.11*
Cooperation	.21	.09	2.49**
Maternal Positive	-.07	.08	-.97
Cooperation X Mat. Posit	-.02	.08	-.22

Note: <sup>a</sup>unstandardized coefficients; †  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ , . \*\*\*  $p < .001$ .

Table 13. Conditional Indirect Effects of Cooperation at Different Levels of Maternal Positive

Maternal Positive (z-score)	Indirect Effect	SE	Sobel Z	95% Confidence Interval	
				Lower	Upper
-2.758	.066	.055	1.19		
-2.265	.064	.046	1.37		
-1.771	.061	.038	1.61 <sup>†</sup>		
-1.278	.059	.031	1.91 <sup>*</sup>		
<b>-1.000</b>	<b>.058</b>	<b>.028</b>	<b>2.07<sup>*</sup></b>	<b>.011</b>	<b>.118</b>
-0.785	.057	.025	2.24 <sup>*</sup>		
-0.291	.055	.023	2.37 <sup>**</sup>		
<b>0.000</b>	<b>.053</b>	<b>.023</b>	<b>2.29<sup>*</sup></b>	<b>.013</b>	<b>.106</b>
0.202	.052	.025	2.12 <sup>*</sup>		
0.696	.050	.030	1.69 <sup>†</sup>		
<b>1.000</b>	<b>.081</b>	<b>.030</b>	<b>1.45</b>	<b>- .012</b>	<b>.122</b>
1.189	.037	.048	1.30		
1.683	.046	.045	1.02		
2.176	.043	.054	0.81		

Note: <sup>†</sup>  $p < .10$ . <sup>\*</sup>  $p < .05$ . <sup>\*\*</sup>  $p < .01$ .

*Table 14. Standard Regression Equation Predicting Social Preference from Attachment and the Interaction of Disruptive Behavior and Maternal Control*

Predictor	Coefficient <sup>a</sup>	se	t
Constant	.01	.08	0.13
Attachment	.16	.08	2.16*
Disruptive Behavior	-.17	.08	-2.00*
Maternal Control	.01	.09	0.14
Disruptive X Mat. Cont	-.06	.06	-1.02

Note: <sup>a</sup>unstandardized coefficients; <sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ , . \*\*\*  $p < .001$ .

Table 15. Conditional Indirect Effects of Disruptive Behavior at Different Levels of Maternal Control

Maternal Control (z-score)	Indirect Effect	SE	Sobel Z	95% Confidence Interval	
				Lower	Upper
-1.933	.012	.035	.33		
-1.416	.018	.031	.58		
<b>-1.000</b>	<b>.023</b>	<b>.027</b>	<b>.83</b>	<b>-.029</b>	<b>.088</b>
-0.899	.024	.027	.89		
-0.383	.030	.024	1.22		
<b>0.000</b>	<b>.034</b>	<b>.023</b>	<b>1.46</b>	<b>-.005</b>	<b>.088</b>
0.133	.036	.023	1.53		
0.650	.042	.024	1.71 <sup>†</sup>		
<b>1.000</b>	<b>.046</b>	<b>.030</b>	<b>1.76<sup>†</sup></b>	<b>.003</b>	<b>.106</b>
1.166	.048	.027	1.77 <sup>†</sup>		
1.683	.054	.031	1.73 <sup>†</sup>		
2.199	.059	.036	1.67 <sup>†</sup>		
2.716	.066	.041	1.60 <sup>†</sup>		
3.233	.072	.047	1.53		

Note: <sup>†</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ .