MOTHER-CHILD ATTACHMENT IN EARLY CHILDHOOD AND ANXIETY SYMPTOMS IN PREADOLESCENCE: THE ROLE OF PEER COMPETENCE AND EMOTION REGULATION

A dissertation submitted to Kent State University in partial fulfillment of the requirements for the degree of Doctor of Philosophy

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August, 2010
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AKNOWLEDGEMENTS

This document is dedicated to my family. I would like to thank my grandparents, Maria and Mihai Zavate, for being my “safe haven”. Grandpa, I still remember you inquiring throughout my childhood if I have good grades and encouraging me to do well in school. I know that from Heaven you are watching my path in life. Grandma, thank you for your unwavering faith in me and for all your prayers. I would like to thank my parents, Doina and Ion Cucolas. I truly believe that I am walking this path because of the values that they instilled in me. I would also like to thank my brother, Alex, for just being my brother. A special thank you deserves Costel Chitimus for his kindness and constant support. I would like to thank my in-laws, Coca and Dudu Brumariu, for their encouragements and generosity. Last but not least, I would like to thank a man I admire and respect, my dear husband, Radu, for his support and unconditional love.

I would like to thank my mentor, Dr. Kathryn Kerns, for her invaluable guidance throughout graduate school in walking me through all research stages, from conceptualization to discussion of findings. Dr. Kerns is an excellent role model and her genuine love for science and dedication to students greatly influenced my career choices.

I am also in debt to Drs. Josefina Grau, Jeffrey Ciesla, David Hussey, and Vera Camden for their service on my dissertation committee. Their questions and comments have contributed greatly to this document.
I would also like to thank my friends from back home, Mariana Zadnipru and Gioni Balan, for teaching me that friendship overcomes distance and for their staggering support. I would also like to thank my many amazing friends with whom I shared incredible moments in graduate school. Special thanks go to Jen Aakre who guided me through the process of accommodation and acculturation to the American culture, and to Aaron Armelie who patiently listened and supported me while I was questioning my decisions.

Last but not least, I would like to thank all families who participated in the NICHD study and the investigators who dedicated their time to this project.
CHAPTER I

INTRODUCTION

Internalizing problems are characterized by covert, inner-directed symptomatology such as social withdrawal, depression, somatic complaints, etc (Achenbach & McConaughy, 1992; Reynolds, 1992). Children with this type of symptomatology experience distress more internally and tend to show overcontrolled behaviors rather than acting them out in the environment (Achenbach, 1988). Although internalizing symptoms are often difficult to observe, they demonstrate long-term negative outcome such as academic difficulties, drug abuse, recurrence of symptoms, and development of other psychiatric problems (Albano, Chorpita, & Barlow, 2003; Hammen & Rudolph, 2003). Because the main symptoms of anxiety (i.e., worries, distress, and fear) occur within the self, it is generally accepted that anxiety is one of the internalizing conditions.

The goal of the current study was to explore, using a longitudinal design, the role of mother-child attachment in the development of preadolescent anxiety symptoms and to identify mediators or mechanisms explaining this relation. Specifically, this study tested if attachment in early childhood affects children’s peer competence and emotion regulation at early school age, which in turn affect anxiety in preadolescence. This study
also considered the effects of temperament, often conceptualized as a major predictor of anxiety (Lonigan & Phillips, 2001). The focus of the study is on anxiety in preadolescence. Preadolescence is a period of profound maturational and psychological transformations as children encounter new challenges such as the transition from elementary to middle school and changes in peer relationships (Richardson, 2005), and it is also a period of time when anxious symptoms are flourishing (Kendall, Hedtke, & Aschenbrand 2006; Öst & Treffers, 2001). Thus, it is important to identify risk factors and mechanisms linking risk factors with anxiety at this age.

Anxiety in Childhood and Adolescence

Anxiety is characterized by an intense fear or worry associated with avoidance behavior (Kendall et al., 2006). It should be noted that, for children and adults alike, the experience of fear is a common emotional response to (potentially) dangerous stimuli which prepares the organism to react (Ollendick, Shortt, & Sander, 2005; Sweeney & Pine, 2004; Warren & Sroufe, 2004). However, anxiety differs from fear in that it refers to fearlike responses that are excessive in terms of duration, frequency, and level of avoidance and subjective distress relative to the degree of danger provoked by fear stimuli (Ollendick et al., 2005; Sweeney & Pine, 2004). Barlow (2000, 2002) suggested that, although both fear and anxiety have defensive motivational functions, fear provokes an immediate fight-or-flight response when facing present and imminent danger, whereas anxiety refers to cognitive-affective structures characterized by a sense of helplessness and perceived uncontrollability over future threats. Further, there are variations in anxiety manifestations from childhood to adolescence due to the cognitive, emotional, and
biological changes that accompany children’s development (Warren & Sroufe, 2004). For example, younger children, more than adolescents, may fail to recognize that their fear and anxiety is unreasonable (American Psychiatric Association, [APA], 2000).

Anxiety is operationalized in the childhood, adolescent, and adulthood literatures as symptoms/syndromes or diagnoses of a disorder (Fonseca & Perrin, 2001). Although these conceptualizations reflect different approaches to measurement, they allow researchers to construe the term anxiety either dimensionally (symptoms/syndromes) or categorically (diagnoses). In the dimensional approach, anxiety symptoms are conceptualized along a continuum of severity. By contrast, anxiety disorders refer to the presence of specific criteria defined by official nosologies, such as experiencing a certain number of anxiety symptoms (i.e., Diagnostic and Statistical Manual of Mental Disorders, 4th edition, text revision, DSM-IV-TR, APA, 2004). The anxiety disorders comprise a wide range of diagnoses such as generalized anxiety disorder, social phobia, specific phobia, obsessive-compulsive disorder, panic disorder, and posttraumatic stress disorder, with separation anxiety as the only anxiety disorder specific to childhood (APA, 2000).

Although transient fears and anxieties are part of normal development during childhood (Bell-Dolan, Last, & Strauss, 1990; Gullone, 2000; Gullone & King, 1993; Last, Perrin, Hersen, & Kazdin, 1996; Ollendick et al., 2005; Sweeney, & Pine, 2004), anxiety can follow a chronic course into adulthood (Silove et al., 1995) or pose a significant risk for the development of other disorders, particularly other anxiety disorders or depression (Bittner, Egger, Erkanli, Costello, Foley, & Angold, 2007; Rabian
& Silverman, 2000). Further, childhood anxiety is associated with adverse outcomes in the cognitive, social-emotional, and behavioral domains (Albano et al., 2003; Fonseca & Perrin 2001; Ollendick et al., 2005). Given the impairments associated with childhood anxiety, several authors have developed models of the development of anxiety (Manassis & Bradley, 1994; Rapee, 2001; Vasey & Dadds, 2001). One major factor associated with later anxiety outlined in these models is early parent-child attachment.

Attachment Theory and Its Implication for the Development of Anxiety

Attachment (in children) is typically defined as an emotional long-lasting bond that a child forms with an attachment figure. According to Bowlby (1969, p. 315), “responsiveness to crying and readiness to interact socially” in the first year are the main variables influencing who is the attachment figure. In most cultures the parents, and especially mothers, serve as primary attachment figures. The attachment figure is never interchangeable with or replaceable by another person (Ainsworth, 1989). The child wishes to maintain proximity to or contact with the attachment figure. The type and extent of contact varies as a function of factors such as age and settings. The attachment relationship is also characterized by “distress upon inexplicable separation, pleasure or joy upon reunion, and grief at loss” (Ainsworth, 1989). The child seeking comfort with or security and closeness to the attachment figure is the unique feature of attachment among other affectional bonds that a child forms with different individuals.

Bowlby (1969, 1973) asserted that securely attached children perceive their caregivers as sensitive to their needs and available, and use them as a secure base for exploration and as a “safe haven” to return to in times of distress. The attachment figure’s
sensitive response alleviates their distress, allowing them to return to their routine and encouraging further competent exploration of the environment. Securely attached children experience caregivers who are responsive to a wide range of both positive and negative emotions. By having their negative emotions ameliorated by their caregivers, they learn to communicate positive and negative emotions openly and flexibly. In addition, through interactions with their caregivers who coach, model, and reinforce strategies of emotion regulation appropriate for different circumstances, securely attached children ultimately develop an ability to regulate emotions themselves. Insecurely attached children cannot depend on their caregivers’ availability and responsiveness, and, consequently, they have difficulty in using the attachment figure as a secure base and haven of safety. They are also are less flexible in regulating their negative affect than securely attached children (Sroufe, 1983).

Mary Ainsworth’s work further enriched Bowlby’s tenets by documenting two types of insecure relationships, ambivalent (C type) and avoidant (A type) (Ainsworth, Blehar, Waters, & Wall, 1978). Although both ambivalent and avoidant patterns of attachment are considered organized strategies that adaptively serve the child to maintain a connection with the caregiver, each is associated with distinct patterns of behaviors, emotion regulation strategies, and caregiving. Ambivalently attached children show increased dependence upon the attachment figure reflecting attempts to gain the attention of their inconsistently available attachment figure (Cassidy & Berlin, 1994; Main & Solomon, 1986). Ambivalently attached children use a heightening strategy and exaggerate their display of negative emotions. This intense negative emotionality keeps
children embroiled with the attachment figure and, at the same time, interferes with children’s exploration of the environment (Cassidy, 1994). Their attachment figure is thought to have difficulty setting limits on children’s behavior and to be inconsistent in responding to the child’s distress (Cassidy, 1994; Cassidy & Berlin, 1994). Further, the attachment figures of ambivalently attached children are more involved at times when their children do not want their attention (e.g., when children play or prefer to explore) and are less involved at times when their children may need their attention. Therefore, these attachment figures tend to undermine children’s autonomy and exploration (Cassidy & Berlin, 1994).

Avoidantly attached children tend to minimize the importance of the attachment figure as a source of comfort, and to use a self-reliance strategy in times of distress (Cassidy, 1994; Main & Solomon, 1986). They engage in direct communication with the attachment figure only when feeling at ease. Avoidantly attached children also tend to minimize their emotions, especially negative emotions, when interacting with their attachment figure (Cassidy, 1994). Instead, they may redirect anger or distress to the environment (Carlson & Sroufe, 1995). Their attachment figure is thought to employ consistent rejection, particularly in times of distress or when the child is expressing negative emotions, and to use a controlling interactional style. Under these circumstances, the self-reliance strategy allows to the child to avoid further rejection that might be triggered by contact attempts (Belsky & Fearon, 2008; Cassidy, 1994). If avoidantly attached children overtly express negative emotions, they risk alienating the attachment figure, and thus masking the negative affect protects the child from rejection
and assures the maintenance of a connection with the attachment figure (Cassidy, 1994).

Main and Solomon (1986) proposed a third type of insecure attachment relationship, disorganized attachment (D type). Children with a disorganized attachment do not have a coherent and organized strategy to cope with distress in the presence of their caregiver. In fact, disorganized attachment may be seen as a fundamental dysregulation of emotion (DeOliveira, Bailey, Moran, & Pederson, 2004). Although they are experiencing overwhelming negative emotions, these children are unable to regulate their emotions within the attachment relationship. They show contradictory, bizarre, and incoherent behaviors as a result of experiencing a paradoxical situation: the caregiver is at the same time a source of apprehension and the secure base (van IJzendoorn, Schuengel, & Bakermans-Kraneburg, 1999; Lyons-Ruth, & Spielman, 2004; Main & Hesse, 1990; Main & Solomon, 1986). Some behaviors indicate that these children are afraid of the attachment figure (e.g., running away when the mother enter the room), while others suggest disorientation (e.g., showing confusion and ceasing all movements when the mother enter the room). Disorganized attachment is thought to arise if children experience a psychologically unavailable attachment figure due to severe maternal psychological problems such as maternal depressive symptoms and other psychiatric histories, or extremely hostile-intrusive and abusive caregiving associated with child maltreatment (Lyons-Ruth & Jacobvitz, 2008; Lyons-Ruth, Repacholi, McLeod, & Silva, 1991). Main and Cassidy (1988) proposed the following subgroups of disorganized attachment, reflecting different ways a child may cope with a caregiver who is psychologically unavailable or abusive: controlling-caregiving, including children who
focus on guiding and entertaining the parent; controlling-punitive, including children who manifest hostile behaviors towards the parent; and insecure-others or atypical, encompassing children who do not show a clear A or C pattern, but display a combination of these patterns, confusion, and abnormal behaviors (Main & Cassidy, 1986, cited in Moss, Cyr, & Dubois-Comtois, 2004). These subcategories are more visible at early school age (Moss, St-Laurent, Dubois-Comtois, & Cyr, 2005).

In summary, a major tenet of attachment theory is that attachment is a product of caregiving history (Bowlby, 1969, 1973). Although attachment is a normative event and all children become attached, attachment relationships vary in quality. A second tenet of attachment theory is that the quality of parent-child attachment impacts later development and functioning. Bowlby’s volume “Separation: Anxiety and Anger” provided one of the first comprehensive theoretical frameworks for understanding the development of anxiety such as in the form of phobias, separation anxiety, and agoraphobia. Specifically, Bowlby (1973) emphasized that, based on their previous experience, children learn to predict the availability of the attachment figure. When a child is confident that the attachment figure will fulfill the secure base and safe haven roles, and is readily accessible in times of need, s/he will be less prone to develop anxiety. When a child is unable to predict the attachment figure’s availability, particularly when separated from the attachment figure or when experiencing disturbing situations, s/he will respond with fear and “free floating-anxiety”. Thus, children’s uncertainty about attachment figures’ availability and responsiveness constitutes the basis of anxiety. Bowlby’s writings are the basis for my
first hypothesis, which tested whether more securely attached children show lower levels of anxiety.

In the last two decades, theorists have proposed (and tested) links between attachment and internalizing symptoms in general, and anxiety in particular. Some theorists speculate that specific patterns of insecure attachment, rather than insecurity per se, are related to both internalizing symptoms and anxiety. For example, Rubin and Mills (1991) suggested that ambivalently attached children, rather than avoidantly attached children, are more likely to develop internalizing symptoms. In contrast, they predicted that avoidant children would be more likely to develop externalizing-aggressive behaviors. Their suggestions are based on findings showing that ambivalently but not avoidantly attached children tend to show “wariness” and fearful behavior in unfamiliar settings. Similarly, Perry and colleagues proposed that ambivalent attachment, but not avoidant attachment, is relevant for the development of internalizing symptomatology (Finnegan, Hodges, & Perry, 1997; Yunger, Corby & Perry, 2005). Their reasoning stems from the fact that ambivalent attachment is characterized by inhibition of autonomy and exploration and difficulty regulating emotions during minor stressors which promote fear responses and self-perceptions of weakness and helplessness, which in turn are often associated with internalizing symptoms. Carlson & Sroufe (1995) suggested that while both avoidantly and ambivalently attached children may be vulnerable to develop depression, only the latter are at greater risk for anxiety. Their prediction is based on Bowlby’s observations that anxiety symptoms (i.e., school phobia) are often associated with children’s worries about the availability of attachment figures (Bowlby, 1973). By
the nature of their relationship, ambivalently attached children have concerns about the availability of attachment figures, thus, they are likely to experience fears about leaving home, psychosomatic symptoms, and other related fears. More recently, some researchers argued that disorganization may be the attachment pattern most likely to be associated with the development of internalizing symptoms. Children with disorganized attachments may perceive themselves as helpless and vulnerable in the face of frightening situations, and may perceive attachment figures as unable to protect them (e.g., Moss, Rousseau, Parent, St.-Laurent, & Saintonge, 1998).

**Empirical Evidence for the Role of Mother-Child Attachment in the Development of Anxiety**

Many studies have examined the association between attachment quality and internalizing symptoms in children and adolescence, providing evidence that insecurity is linked with this type of symptomatology (for reviews, see Bogels & Brechman-Toussaint, 2006; Brumariu & Kerns, 2010; DeKlyen & Greenberg, 2008). Studies of internalizing symptoms, which included the ABC classifications, showed that ambivalence, rather than avoidance, is most consistently related to internalizing symptoms. When all four attachment patterns were measured, disorganization, but not ambivalence or avoidance, was most consistently associated with internalizing symptoms (Brumariu & Kerns, 2010). Although attachment theory clearly predicts associations between the quality of the parent-child relationship and the development of specifically anxiety, fewer studies tested these links empirically.
Two approaches have been taken in the literature regarding the association between attachment and anxiety. Some studies proposed that lack of security is associated with the development of anxiety. Indeed, seven studies of childhood and/or adolescence anxiety provided evidence for this association, both concurrently and longitudinally (Bohlin, Hagekull, & Rydell, 2000; Costa & Weems, 2005; Papini & Rogman, 1992; Papini, Roggman, & Anderson, 1991; Roelofs, Meester, ter Huurne, Bamelis, & Muris, 2006; Shamir-Essakov, Ungerer, & Rapee, 2005; Wood, 2007). Four studies, however, reported no association between attachment security with mother and anxiety or provided mixed evidence (Bosquet & Egeland, 2006; Dallaire & Weinraub, 2005; 2007; Laible, Carlo, & Raffaelli, 2000; Larose & Boivin, 1997). Overall, these results suggest that variation in attachment security relates to some extent to variation in childhood and adolescence anxiety.

Other studies examined specific patterns of attachment in relation to anxiety in childhood and adolescence. Four studies showed that ambivalent attachment is associated with anxiety in adolescence or preadolescence (Bohlin et al., 2000; Brumariu & Kerns, 2008; Dallaire & Weinraub, 2005. Warren, Huston, Egeland, & Sroufe, 1997). Two other studies provided mixed results. Bar-Haim, Dan, Eshel, and Sagi-Schwartz (2007) showed that children who were ambivalently attached in infancy had at age 11 years higher scores on school phobia, but not on the total anxiety score that included other types of anxiety symptoms, compared with children who were securely attached. Marsh, McFarland, Allen, McElhaney, and Land, (2003) found a marginally significant association between ambivalence and anxiety in adolescence.
Fewer studies included avoidant attachment and did not show a consistent relation with anxiety in childhood and adolescence (Bohlin et al., 2000; Dallaire & Weinraub, 2005). Furthermore, one study reported a negative association between avoidance and anxiety in preadolescence (Brumariu & Kerns, 2008). Nonsignificant differences between the ambivalent and avoidant attachment patterns were reported in one study (Dallaire & Weinraub, 2005). In sum, although there is evidence regarding the association between secure attachment and childhood or adolescent anxiety, the findings regarding ambivalent attachment are mixed, and those regarding avoidant attachment are extremely limited.

One drawback of the literature is that very little is known about associations between disorganized attachment and anxiety. Some studies, especially earlier studies, did not assess this pattern of attachment. Other studies assessed disorganization, but combined this pattern with the other insecure patterns in the statistical analyses, often due to small sample sizes. An exception is a study by Moss and colleagues (2006) in which controlling children were reported to experience high levels of separation anxiety. A second shortcoming of the literature is that little is known about differences, if any, among the insecure attachment patterns in their associations with childhood anxiety. One purpose of the current study was to expand previous literature by testing longitudinally the associations between all four attachment patterns and preadolescent anxiety. As mentioned earlier, it was expected that more securely attached children would manifest lower levels of anxiety. Disorganized children are apprehensive with respect to the attachment figure and do not master a coherent strategy to cope with their distress (van
IJzendoorn et al., 1999; Lyons-Ruth & Spielman, 2004; Main & Hesse, 1990; Main & Solomon, 1986). Therefore, it was expected that more disorganized children would manifest higher levels of anxiety. The literature lacks a clear understanding regarding the associations of ambivalence or avoidance with anxiety, and therefore I did not have specific predictions regarding these relations.

Temperament and Anxiety

Temperament subsumes “relatively consistent, basic dispositions inherent in the person that underlie and modulate the expression of activity, reactivity, emotionality and sociability”, dispositions that “are present early in life and are likely to be strongly influenced by biological factors” (Goldsmith et al., 1987). Two dimensions of temperament, involving heightening psychological arousal and emotional reactivity, have been studied in the literature in relation with internalizing symptoms in general and specifically with anxiety: negative emotionality and behavioral inhibition. Negative emotionality or distress proneness refers to an individual’s propensity to experience intense negative mood, irritability/frustration, and fearfulness as well as soothability-falling reactivity (Rothbart & Bates, 2006; Rothbart, Ellis, & Posner, 2004). Studies of negative emotionality or distress proneness showed a relation with childhood internalizing symptoms, although irritability is less consistently associated with internalizing difficulties than other subdimensions (see reviews by Lonigan & Phillips, 2001; Rothbart & Bates, 2006). In addition, concurrent and longitudinal studies showed a relation between negative emotionality and anxiety symptoms (see Lonigan & Phillips,
In sum, previous research suggests that negative emotionality is important for internalizing symptoms or anxiety.

Behavioral inhibition reflects a low threshold for psychological uncertainty to unfamiliar events and the tendency to exhibit fearfulness, reticence, or restraint in unfamiliar settings and when interacting with unfamiliar people (Kagan, 1994, 1997). Since Kagan’s pioneering work on behavioral inhibition, a variety of studies (studies of children at risk for anxiety disorder, studies of psychopathology in parents of inhibited children, studies of correlates of behavioral inhibition, and retrospective studies of childhood inhibition) provided evidence that behavioral inhibition represents a precursor of anxiety (for reviews, see Hirsfeld-Becker, Biederman, & Rosenbaum, 2004; Lonigan, & Phillips, 2001; Pérez-Edgar & Fox, 2005; Rapee, 2002; Turner, Beidel, & Wolff, 1996).

Behaviorally inhibited children show behaviors consistent with negative emotionality, such as distress, fear, and inhibited approach, and therefore some authors suggest that behavioral inhibition has a negative emotionality component (Lonigan & Phillips, 2001; Muris & Dietvorst, 2006). Further, these temperamental dimensions overlap with the “difficult temperament” pattern proposed earlier by Thomas and Chess (1985) which includes low rhythmicity, low approach, low adaptability, high intensity, and negative mood. Nonetheless, negative emotionality and behavioral inhibition are distinct dimensions of temperament (see Rothbart & Bates, 2006). Overall, there is consistent evidence that temperamental predispositions of early inhibition and negative emotionality relate to later internalizing symptoms or anxiety problems, suggesting that
both are early risk factors that might contribute to the development of anxiety in preadolescence. Thus, my second hypothesis was that negative emotionality and behavioral inhibition would each be related to anxiety (even when controlling for each other or attachment).

Mechanisms Explaining Associations of Attachment and Temperament with Anxiety

A limitation of most of the previous studies of anxiety is reliance on main-effect models, in which attachment or temperament (or some other factor) is conceptualized as a single, direct influence on the later development of anxiety symptoms. Single factor models are almost surely inadequate to explain relations as complex as the ones discussed here. Attachment insecurity by itself is unlikely to be the sole cause of psychopathology (Egeland & Carlson, 2004; DeKlyne & Greenberg, 2008). From a developmental psychopathology perspective, any factor may produce different effects depending on the circumstances under which it functions (the principle of multifinality, Cicchetti & Cohen, 1995). In addition, different combinations of risk factors or multiple pathways may lead to the same outcome (the principle of equifinality). Even if a factor contributes to the development of anxiety, it is important to determine whether its effects are direct or mediated by intermediary mechanisms.

While both attachment and temperament are related to anxiety, there is relatively little research examining what factors might mediate or explain these links (see Bosquet & Egeland, 2006, for an exception). I proposed that one mechanism that may account for these relations is developmental competencies. Specifically, I proposed that social
competence with peers and emotional competence at early school age would partially mediate the relation between early mother-child attachment and anxiety in preadolescence. That is, early attachment may be related to later anxiety because attachment lays the foundation for the development of peer and emotional competencies at school age, which in turn may affect the development of anxiety symptoms in preadolescence. I also proposed that peer competence and emotional competence would partially mediate the relation of negative emotionality with anxiety such that early negative emotionality may lead to poorer peer competence and poorer emotional competence at school age, which in turn influences the development of anxiety symptoms. Peer competence would also partially mediate the relation between behavioral inhibition and anxiety. The following section details why developmental competencies may explain relations of early attachment, negative emotionality, and behavioral inhibition with anxiety symptoms in preadolescence.

Developmental Competencies

Competence refers to successful adaptational outcomes to “the developmental tasks expected of individuals of a given age in a particular cultural and historical context“ (Masten & Curtis, 2000). According to this definition, competence is multidimensional as multiple developmental challenges and responsibilities are relevant for a given age.

Peer Competence

Social competence reflects “the ability to achieve personal goals in social interaction while simultaneously maintaining positive relationships with others over time
and across situations” (Rubin, Bukowski, & Parker, 1998). In childhood, social competence is often reflected in peer competence (Sroufe, 1979). Peer competence plays a special role in children’s current and long-term adjustment as peer interactions are a vital arena for practicing and developing concepts such as sharing, reciprocity, and conflict resolution, and for learning to control inappropriate behaviors, all critical in human adaptation (Hartup, 1980). As mentioned above, different tasks are important for peer competence at each phase of development (early childhood, ages 3-7; middle childhood, ages 8-12; and adolescence, ages 13-17; Booth-LaForce & Kerns, 2008, Gottman & Mettetal, 1986, Sroufe, Egeland, Carlson, 1999; Sroufe, Egeland, Carlson, & Collins, 2005a). One of the key issues in early childhood is to positively connect to the world of peers as shown in engaging in interactions with individual peers and cooperating and participating in group activities as well as maintaining these interactions in highly stimulating or interactive groups (Gottman & Mettetal, 1986; Sroufe et al., 1999, 2005a). The challenges of the peer world are more sophisticated and complex in middle childhood. At this age, children form loyal friendships and need to function and be accepted in more stable and organized groups which are strongly rule oriented (i.e., adherence to group same sex norms). In addition, children in middle childhood face the challenge of successfully coordinating friendships and group functioning (Gottman & Mettetal, 1986; Sroufe et al., 1999, 2005a; Sullivan, 1953). Adolescence brings even more complex tasks. At this age, friendship is characterized by increased intimacy (Gottman & Mettetal, 1986). Adolescents learn to value commitment in peer
relationships, to coordinate multiple relationships, to engage in cross-gender relationships, and to function in multiple relationship networks (Sroufe et al., 1999).

Attachment theorists proposed that peer competence is shaped by the quality of preceding parent-child dyadic regulation (Booth-LaForce & Kerns, 2008; Sroufe et al., 1999, 2005a). Basically, children learn in the attachment relationship a set of specific expectations about relationships and practice interactive skills which will then guide their interactions with peers (Kerns, 1994; Booth-LaForce & Kerns, 2008; Sroufe et al., 2005a).

The Minnesota studies provided the earliest evidence that mother-child attachment is indeed related to later peer functioning at preschool, middle school, and adolescence age (see Sroufe et al., 2005a, Sroufe, Egeland, Carlson, & Collins, 2005b for extensive reviews of findings). For example, securely attached children in infancy consistently showed higher peer competence than insecurely attached children, regardless of the age of the peer competence measurement or type of peer competence measure (i.e., direct observations, adults’ ratings, or interviews with participants; Sroufe et al., 2005a, 2005b). Securely attached children showed more empathy and had more mutual relationships in a series of play peer observation and were less frequently isolated and more involved in peer groups when they reached the preschool years (Kestenbaum, Farber, & Sroufe, 1989; Sroufe, 1983, Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984). In the middle childhood years, children with secure histories in infancy, compared to those with insecure histories, were better able to coordinate friendship with group participation, showed greater maintenance of gender boundaries, had more frequently
reciprocated close friendships, and were rated more popular among peers by teachers (Sroufe, 2005; Sroufe, Bennett, Englund, Urban, & Shulman, 1993; Sroufe et al., 1999; Sroufe et al., 2005b).

Other studies also linked early attachment quality with preschool or middle childhood peer competence (see Booth-LaForce & Kerns, 2008; Kerns, 2008, for reviews). Recent cross-sectional studies show that attachment security is associated with social competence with peers, measured with global ratings or observational coding of peer interactions, in preschool (e.g., Bost, Vaughn, Newell Washington, Cieinski, & Bradbard, 1998) and middle childhood (e.g., Bohlin, Hagekull, & Rydell, 2000; Booth-LaForce, Oh, Kim, Rubin, Rose-Krasnor, & Burges, 2006; Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000; Yunger, Corby, & Perry, 2005; for reviews, see Booth-LaForce & Kerns, 2008). In their meta-analysis, based on 63 studies, Schneider, Atkins, and Tardif (2001) reported a small but significant effect size (.20) for the relation between attachment security and children’s peer relationships. In sum, previous research provided evidence for an association between earlier or concurrent attachment security and peer competence at different ages. Consistent with previous studies, my third hypothesis was that earlier mother-child attachment would predict peer competence at early school age. What is missing from previous literature is a more nuanced analysis of the relations between different insecure attachment patterns and peer competence (Booth-LaForce & Kerns, 2008). Thus, this hypothesis extends previous literature by investigating the relations of all four attachment patterns with peer competence.
Because temperament includes characteristics of the child that are relatively stable over time, it is assumed that they should relate to individual differences in peer competence (Eisenberg, Vaughan, & Hofer, 2008). Negative emotionality is likely to elicit antagonism and rejection from peers, and to interfere with management of conflict resolution and the maintenance of social activity (Eisenberg et al., 2008). Studies of preschoolers and adolescents show that children high on negative emotionality are less accepted by their peers (Faber & Eisenberg, 1992; Stocker & Dunn, 1990), and that children tend to avoid those who show intense negative emotionality (Furr & Funder, 1998). Newcomb, Bukovski, and Pattee’s (1993) met-analysis indicate that a combination of anger/hostility and negative behavior was related to social rejection in childhood. Negative emotionality has been also related to reported and observed peer interaction, and to markers of friendships (e.g., joint pretense, frequency of play, communication failure and success; Eisenberg et al., 2008).

In addition, children who are more behaviorally inhibited are seen by adults as less socially competent and appropriate (Spinrad et al., 2006), are less popular and often rejected by peers, especially as they move through the elementary school years, and have poorer friendship quality than do children who are less behaviorally inhibited (see Rubin et al., 2006; Rubin, Bowker, & Kennedy, 2008 for reviews). Behaviorally inhibited children are less effective in their peer interactions (i.e., have difficulties initiating play with an unknown peer and display avoidant behavior during play; Coplan & Rubin, 1998; Van Brakel, Muris, & Bogels, 2004). In sum, there is evidence that temperamental characteristics of negative emotionality and behavioral inhibition are closely related to
children’s peer competence. Thus, the third hypothesis (that earlier attachment would predict peer competence at school age) was also evaluated after controlling for temperament.

*Emotional Competence/Emotion Regulation*

Emotional competence refers to the emotion-related capacities and abilities an individual needs to function in a changing environment so that s/he emerges as more differentiated, better adapted, effective, and confident (Saarni, 1999). As such, poor emotional competence affects children’s future healthy adjustments (Cole, Michel, & Teti, 1994; Saarni, 1999). As with other areas of development, emotional competence evolves and becomes more sophisticated over time (Saarni, 1999). In infancy, children rely mainly on caregivers for supportive scaffolding during stressful situations. Self-awareness and consciousness of one’s own emotional response (i.e., shame, pride, coyness) emerge in toddlerhood. In the preschool years, communication with others extends children’s evaluation of and awareness of their feelings and of emotion-eliciting events. In the early school years, children start to target self-conscious, negative emotions for regulation and have an understanding of consensually agreed upon emotional scripts. In middle childhood, children have awareness of multiple emotions toward the same event or person and prefer problem-solving as coping strategy. By adolescence, children are able to generate multiple solutions and differentiated strategies for regulating emotions.

One salient dimension of emotional competence is emotion regulation (Saarni, 1998). Broadly defined, emotion regulation refers to successful management and
modulation of emotional reactions and emotion related experiences across time and across situations to accomplish a specific goal (Thompson, 1994; Cole, Martin, & Denis, 2004). According to Thompson, emotion regulation incorporates both external and internal influences. Because one way of regulating emotions is through the interactions with others, parental influences are the primary external process that plays a role in the development of emotion regulation in children, especially at early ages (Contreras & Kerns, 2000; Calkins, 2004; Calkins & Hill, 2007; Thompson & Meyer, 2007; Morris & Silk, 2007). As discussed earlier, emotion regulation is an integral feature of attachment (Kerns, 2008). Securely attached children internalize effective ways to manage negative emotions in stressful situations and are consequently resilient when coping with problems, even in the absence of the caregiver (Contreras & Kerns, 2000; Sroufe, 1983). In other words, secure children are expected to successfully apply emotion regulation skills learned in their relationships with their caregivers in social settings.

Relatively little research has actually investigated how attachment is related to children’s emotional competence or emotion regulation, outside the parent-child dyad, and most often using the secure-insecure or continuous security scores. Studies of preschoolers have shown that securely attached children, compared to insecurely attached children, use more constructive strategies to manage negative emotions in a waiting paradigm (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002), show more positive affect with peers (Park & Waters, 1989; Sroufe et al., 1984), display emotions more openly with an adult (Lutkenhaus, Grossmann, & Grossmann, 1985) and are more advanced in emotion understanding (Laible & Thompson, 1998; see also Thompson,
Laible, & Ontai, 2003; Thompson & Meyer, 2007). Further, studies showed that, by middle childhood, more securely attached children exhibit more positive mood and less negative mood in daily interactions, use more constructive coping strategies, and show better frustration tolerance and emotional adaptation in classrooms (Contreras et al., 2000; Granot & Mayseless, 2001; Kerns, Abraham, Schlegelmilch, & Morgan, 2007). Overall, previous findings are consistent with the conclusion that attachment, especially security, and various dimensions of emotion regulation are closely related.

In this study, emotion regulation is conceptualized as a dimension on a continuum (i.e., regulation to dysregulation). This study focused on children’s ability to regulate the intensity of expressing emotions, an aspect of emotion regulation/dysregulation that was rarely assessed in previous research. Because avoidantly attached children tend to minimize their emotion, this specific dimension of emotion regulation/dysregulation was not expected to relate to avoidant attachment. Thus, the fourth hypothesis investigated whether securely attached children show better ability to regulate emotion or lower emotion dysregulation and whether more ambivalently attached children and those with more disorganized attachments show poorer ability to regulate intense emotions or higher emotion dysregulation at early school age.

Emotion regulation processes are also influenced by temperamental predispositions (Fox & Calkins, 2003; Thompson, 2001). From this perspective, temperament represents an intrinsic influence on emotion regulation (Thompson, 1994; Calkins & Hill, 2007). While temperament includes dispositional emotionality and enduring emotion-response tendencies that are partially biologically based (Cole et al.,
2004), emotion regulation refers to the processes by which these tendencies are shaped to achieve a specific goal (Thompson & Mayer, 2007). Research on the role of temperament in the development of emotion regulation has been investigated mainly in samples of young children (Fox & Calkins, 2003). For example, infants and toddlers who are easily frustrated (i.e., are high in negative emotionality) and exhibit a difficult temperament are less likely to use successful emotion regulation strategies such as distraction or redirection of attention (Calkins & Dedmon, 2000; Calkins, & Johnson, 1998) and more likely to use passive strategies to regulate their emotions such as passive waiting (Feng, et al., 2008; Mangelsdorf, Shapiro, & Marzolf, 1995; Parritz, 1996). Calkins and colleagues also showed that inhibited and uninhibited children differ in parasympathetic and cortical regulation of emotion (Calkins, Fox, & Marshall, 1994). Bosquet and Egeland (2006) found that higher neonatal negative reactivity and regulation was associated with lower levels of emotion regulation in a frustrating situation in the preschool years. Thus, children who have a temperamental tendency toward negative emotionality or high reactivity in stressful situations are likely to show poor emotion regulation in different contexts.

Children’s difficulties regulating the intensity of emotions, the emotion regulation dimension which is the focus of this study, is more likely to be associated with negative emotionality than with behavioral inhibition. Specifically, children temperamentally prone to negative emotionality may later show exaggerated ways of displaying their emotions or may respond very emotionally to events, thus, showing emotion dysregulation. Children who are behaviorally inhibited may be actually reticent to show
the intensity of experienced emotions. They may falsely appear to be able to regulate the intensity of expressing emotions, when in fact they may just not express their strong emotions. Although temperamental predispositions lay the foundation for emotion regulation, emotion regulation strategies go beyond temperament, as they are also shaped by the socialization process, mainly through the quality of the parent-child relationship (Rothbart & Sheese, 2007; Calkins & Hill, 2007). More important, parent-child attachment and negative emotionality are thought to have independent contributions, since security of attachment is not hypothesized to be associated strongly with measures of temperament such as emotionality (Vaughn, Bost, & van IJzendoorn, 2008). Thus, the fourth hypothesis - that attachment predicts later emotion dysregulation - was also evaluated after controlling for negative emotionality.

**Developmental Competencies and Anxiety**

Developmental psychopathology principles suggest that anxiety may arise (as do many other forms of psychopathology) from multiple maladaptive pathways, depending on successful adaptation on tasks specific to a given age (Cicchetti, Cohen, 1995, Vasey & Dadds, 2001). Therefore, developmental competence may play a major role in the development of childhood anxiety. Children who fail a key developmental task may fear future failure and worry about successful adaptation to other related tasks. It seems entirely plausible that a child who has peer difficulties may worry about his or her future social performances and ability to be overall successful when facing other challenges, conditions associated to some extent with anxiety. Concurrent associations of peer competence with internalizing symptoms, global anxiety, and social anxiety are reported
in the literature (Greco & Morris, 2005; Grover, Ginsburg, & Ialongo, 2005; Ialongo, Edelsohn, Werthamer-Larsson, Crockett, Kellam, 1996; Inderbitzen, Walters, & Bukowski, 1997; La Greca & Lopez, 1998; La Greca & Stone, 1993; Muris, Schouten, Meesters, & Gijsbers, 2003; Rubin et al., 2004; Smári, Pétursdóttir, Porsteinsdóttir, 2001; Strauss, Frame, & Forehand, 1987; Verduin & Kendall, 2008). In addition, studies showed that peer-rated unpopularity and rejection, poor peer acceptance, social isolation from peers, and low self-perceptions of social competence with peers at early school years predict later internalizing symptoms (Bowen, Vitaro, Kerr, & Pelletier, 1995; Hymel, Rubin, Rowden, & LeMare, 1990; Rubin, Hymel, & Mills, 1989). Unfortunately, only a few studies longitudinally assessed links between peer incompetence and later anxiety and indicated that child’s effectiveness in the peer group - and less consistently, peer rejection - measured at earlier ages predicted later anxiety symptoms (Bosquet, & Egeland, 2006; Grover et al., 2005; Vernberg, Abwender, Ewell, & Beery, 1992). Overall, evidence suggests that peer competence may play an important role in the development of childhood anxiety.

Anxiety is often conceptualized as a disorder of emotion (Barlow, 1991). Thayer and Lane (2000) asserted that anxiety represents a failure to either elect an adaptive response or to inhibit a maladaptive response given a situation. For example, the core emotion in anxiety is excessive and dysfunctional (anticipatory) fear, which signals a failure of emotion regulation process (Brady & Kendall, 1992; Ollendick et al., 2005). Although theorists acknowledge that emotion regulation plays an important role in the development of anxiety (Amstadter, 2008; Vasey & Dadds, 2001), the literature
examining these links is relatively new and scant (see Southam-Gerow & Kendall, 2002 for a review). Children with an anxiety disorder, compared with children without an anxiety disorder, experience their emotions more intensely and have dysregulated expressions of emotions, difficulty managing sad, worry or anger experiences, and lower self-efficacy in their ability to regulate their mood (Suveg & Zeman, 2004). In another study children aged 7-15 years diagnosed with DSM-IV anxiety disorders, compared to nonreferred youths without anxiety, displayed a poorer understanding of how to hide and change emotions (Southam-Gerow & Kendall; 2000). Children experiencing high levels of anxiety are also less aware of their emotional state, have difficulty expressing emotions, and use less constructive strategies to regulate negative emotions or to cope with stressors (Brumariu, Kerns, & Seibert 2009; Penza-Clyve & Zeman, 2002; Zeman, Shipman, & Penza-Clyve, 2002; Zeman, Shipman, & Suveg, 2002; see also Clarke, 2006; Compas, Connor-Smith, Saltzman, Harding Thomsen, & Wadsworth, 2001 for reviews of the relation between the broader concept of coping with stressors and anxiety). The fifth hypothesis investigated whether peer competence and children’s ability to regulate intense emotions at early school age are each related to anxiety in preadolescence.

Despite proposed theoretical and empirical links between earlier attachment or temperament, later developmental competencies or emotion regulation, and subsequent anxiety, I found only one study testing these complex relations longitudinally. Specifically, Bosquet and Egeland (2006) found that early attachment security affects childhood anxiety through effects on preschool emotion regulation, and affects
adolescent anxiety through effects on middle childhood competence and peer relationship representations. Neonatal temperament was also linked with emotion regulation. The sixth hypothesis extended the previous literature by investigating whether peer competence and emotion regulation partially mediate the relation between earlier mother-child attachments and preadolescent anxiety symptoms, (after controlling for temperament). Although this study focuses on mother-child attachment, I also predicted that emotion regulation and peer competence would partially mediate the relation between negative emotionality and anxiety, and that peer competence would partially mediate the relation between behavioral inhibition and anxiety.

Hypotheses

To summarize, the present study tested six hypotheses regarding the associations of early attachment to mother and temperament with anxiety symptoms in preadolescence. This study also tested specific mediators (peer competence and emotion regulation) that may explain these relations, using a longitudinal design, which has been relatively rarely used in previous studies. The theoretical model for these hypotheses is presented in Figure 1. Dotted lines represent relations among constructs for which I do not have specific predictions.

The first hypothesis was that earlier mother-child attachment would be related to anxiety symptoms in preadolescence. Specifically, I predicted a negative association between early security and later anxiety and a positive association between early disorganization and later anxiety. Due to mixed previous findings, especially when
Figure 1. Theoretical model for the study hypotheses.
disorganization is measured, I did not have a specific hypothesis regarding the relations between earlier avoidance or ambivalence and later anxiety symptoms.

The second hypothesis was that negative emotionality and behavioral inhibition would be each related to anxiety (even when controlling for each other or attachment).

The third hypothesis was that earlier mother-child attachment would predict peer competence at early school age. This hypothesis was also evaluated after controlling for temperament (negative emotionality and behavioral inhibition).

The fourth hypothesis was that earlier secure, ambivalent, and disorganized mother-child attachments would predict emotion regulation (i.e., the ability to manage the expression of intense emotions) at early school age. It was also predicted that avoidant attachment would not be related to emotion regulation. This hypothesis was also evaluated after controlling for negative emotionality.

The fifth hypothesis was that peer competence and emotion regulation at early school age would be each related to anxiety in preadolescence.

The sixth hypothesis was that peer competence and emotion regulation would partially mediate the relation between earlier attachments and preadolescent anxiety symptoms (after controlling for temperament).

Although not the main focus of this study, I also predicted that peer competence would partially mediate the relations between negative emotionality or behavioral inhibition and anxiety, and that emotion regulation would partially mediate the relation between negative emotionality and anxiety.
CHAPTER II

METHOD

Participants

To investigate these hypotheses, I used The National Institute of Child Health and Human Development Study of Early Child Care (NICHD SECC) dataset. Data collected as part of the common protocol for Phase I (birth to age 3 years), Phase II (age 4.5 years to first grade), Phase III (third grade to sixth grade of school), and Phase IV (ages 14 and 15) are publicly available to qualified investigators. The participants were recruited across 10 locations in United States. Potential participants were selected from among 8,986 mothers giving birth who were screened to determine their eligibility for the study (see NICHD ECCRN, 2001 for extensive details). The exclusion criteria were: 1) the mother was under 18 years; 2) the mother was not fluent in English; 3) the family was about to move to a different location; 4) the child was hospitalized for more than 7 days following birth or had obvious disabilities; 5) the mother experienced a substance-abuse problem; and 6) the family lived too far from the site or in a location that could have been dangerous for home visitors. After applying these criteria, 5265 families agreed to participate in the study. Using a random sampling plan, a total of 1364 participants were enrolled in 1991 (Phase I) in the study. This final sample was diverse: 48% were female,
24% were ethnic minority children, 11% of mother did not complete high-school and 14% of mothers were single parents at the time of child’s birth. In the original design of the study, sample size was determined to allow for a significant dropout over the course of the study (originally the first three years of the child’s life). The initial sampling plan projected the need for a minimum of 900 subjects (a retention rate of 66%) for power to be not less than .85 for the major hypotheses of the study. At Phase 2 and 3, 1226 and 1077 participants, respectively, returned for the study.

At 15 months, 1197 children had attachment data, and at 36 months 1140 children had attachment data. For the purpose of this dissertation, only children who had complete attachment data at both time-points (n = 1097; 555 boys and 542 girls) were retained for the analyses. To evaluate if there are differences between the original sample and the selected sample, a series of statistical analyses were performed. Compared with mothers in the excluded families, mothers of children who have complete attachment data had more education \( r(1361) = -5.37, p < .001, Ms = 13.50 \) and 14.41. Compared with those in the recruitment sample, the children in the selected sample were more likely to be Caucasians and less likely to be Africa-Americans or Other ethnicities \( \chi^2(2) = 18.26, p < .001, 82.7\% \) versus 70.5\% and 72.5\%, respectively\], and were more likely to live in intact or step-father families and less likely to live in single-parent families. \( \chi^2(2) = 23.96, p < .001, 82.6\% \) and 80.8\% versus 67.7\%\], and to have families with a higher income-to-needs ratios at one month, \( t(1271) = -2.85, p < .01, Ms (SDs) = 2.96 (2.58) \) and 2.43 (2.69), respectively. There were no significant gender differences \( \chi^2(1) = 2.68, p = .10 \) or recruitment site differences \( \chi^2(9) = 15.86, p = .07 \) between children in the recruitment
sample and those retained for the analyses. In sum, the selected sample is advantaged regarding socio-economic status (maternal education, family income) and family status relative to the initial sample.

Procedure

Beginning with the time of enrollment (1 month), families were scheduled for extensive periodic data collections until children reached the age 14-15. Mothers (or the alternate primary female caregiver) provided demographic information at the beginning of the study. Children and their mothers were seen in the laboratory for a behavioral observation measure of attachment, when children reached the ages of 15 and 36 months. Mothers completed questionnaires regarding child’s adjustment when children were 54 months, 1\textsuperscript{st} grade, 3\textsuperscript{rd} grade, 5\textsuperscript{th} grade and 6\textsuperscript{th} grade. Fathers (or a partner who had a father role for the child) also completed questionnaires when children were in 1\textsuperscript{st} and 3\textsuperscript{rd} grades. The questionnaires were filled out at home or at the laboratory.

Demographic Variables

At one month, mothers provided the following demographic information: child gender (555 boys and 542 girls) and child’s ethnicity, [African-American (n = 124), Caucasian (n = 907), and Other ethnicity (n = 66)]. Mothers also provided information about their levels’ of education, which ranged between 7 and 21 years of education, $M(SD) = 14.41 (2.46)$. Maternal education categories are presented for descriptive purposes: less than 12 years in school, n = 89; high school or GED, n = 223; some college but no degree, associate degree or vocational school beyond high school, n = 368;
bachelor's degree from college or university, n = 240; and graduate degree (master's
degree, law degree, and more than one master's degree or a doctoral degree (M.D., Ph.D.,
Ed.D., etc.), n = 171. Approximately 85.9% (n = 942) of the children lived in an intact
household, 1.9% (n = 21) lived in a two-parent step-father household, and 12.2 % (n =
134) lived in a single parent household at one month.

Finally, mother also provided information about the family income (mother’s and
father/partner income and other income available to the family at 1 month), and the
income-to-needs ratio was computed. This ratio measures income relative to the number
of members in household. Total annual family income was divided by the appropriate
poverty threshold determined by the year in which the income was earned, total
household size, and number of full-time children in household. If income-to-needs ratio is
less than 1, the household is considered poor. The mean of the income-to-needs ratios,
computed based on the available data (n = 1038) was 2.96, SD = 2.58, with 18.7% (n =
194) of the families having an income-to-needs ratio less than 1 and being considered
poor at 1 month of age. Because income is likely to change overtime, the average of the
income-to-needs ratios at 5th and 6th grade was also computed (M = 4.53, SD = 3.74, n =
927). Approximately 7.5% (n = 69) of the families were considered poor at 5th- 6th
grades.

Measures

Mother-Child Attachment. Attachment was assessed at 15 months with the
Strange Situation (Ainsworth et al., 1978) and at 36 months with the modified Strange
Situation (Cassidy, Marvin, & McArthur Working Group on Attachment, 1992). The Strange Situation is a 25-minute laboratory procedure designed for infants (12 to 20 months of age), consisting of a series of eight brief separation and reunion episodes for the child-mother dyad and the introduction of a stranger (Ainsworth et al., 1978). These episodes are designed to moderately increase the child's stress and activate the child's attachment system. Secure infants (B) show signs of missing the parent during separation and seek and accept comfort from the parent upon reunion, after which they return to exploration. Children classified as ambivalent (C) fail to engage in exploration when parent accompanies them, are very unsettled and distressed during separation, but fail to find comfort in the parent when the parent returns. They may oscillate between bids for contact and signs of rejection of the parent. Children classified as avoidant (A) respond with little distress when left alone. At reunion, they actively avoid the parent, turn away, and focus on the environment. Secondary to the ABC classification, disorganized (D) classifications were made. Indices of disorganization included sequential or simultaneous displays of contradictory behavior patterns, stereotypes and anomalous postures, freezing and stilling, and apprehension of the parent. Disorganization was rated on a 9-point scale. When a child received a score higher than 6 on the disorganization scale, s/he received a primary D classification, followed by a secondary ABC classification if the infant's behavior was classifiable in the traditional system (Main & Solomon, 1990). If the infant’s behavior could not receive a secondary ABC classification, a secondary classification of "U" was applied, meaning "unclassifiable in the traditional ABC
system". Infants also received a primary “U” classification if their behavior was not classifiable at all.

The Strange Situation was coded independently by three highly trained coders. Disagreements were resolved by group discussions. Across coding pairs, before conferencing, agreement for the four category ABCD system was 82% (kappa = .70). Of 1097 children with attachment data at two-time points, 144 (13.1%) were classified avoidant, 654 (59.6%) were classified secure, 97 (8.8%) were classified ambivalent, 165 (15%) children were classified disorganized, and 37 (3.4%) children could not be classified. Consistent with other studies using the NICHD data set (e.g., NICHD, 2006), D and U classifications were combined for several reasons. The system for classifying disoriented-disorganized behavior in the Strange Situation relied on using tapes that had initially been considered unclassifiable within the ABC system (Main & Solomon, 1990). The D classification was developed from these cases. Further, Main and Solomon indicated that both classifications are related to lack of resolution of trauma and share behaviors that are inexplicable in respect to organized attachment strategies.

Cassidy et al.’s (1992) system for the preschool age child (24 months to 54 months) consists of a series of two separations and two reunion episodes with the parent. This modified version of the Strange Situation also classifies preschoolers as secure (B) or insecure (A, C, and D). Secure (B) children are able to use the parent for exploration and the reunion behavior is smooth and positive. Children with an avoidant attachment maintain neutrality toward the parent and, even after reunion show a neutral nonchalance, although they do not avoid interaction altogether. Children with an ambivalent
attachment protest separation and show fussy and/or resistant behavior toward the parent. At reunion, they show strong proximity-seeking and babyish behavior. When seeking contact, they find it unsatisfactory. Children with a disorganized attachment show controlling behaviors (punitive or caregiving) or behaviors associated with infant disorganization. A child showing more than one type of controlling behavior is classified as controlling-general. For the purpose of this study, the punitive, caregiving, and controlling-general subcategories were combined. The modified Strange Situation was coded independently by three trained coders. Disagreements were discussed and a consensus code was assigned. Intercoder agreement, based on 867 randomly paired cases before conferencing, was 75.7% (kappa = .58) for the four category ABCD system. Of 1097 children with attachment data at two-time points, 55 (5%) were classified avoidant, 677 (61.7%) were classified secure, were 186 (17%) classified ambivalent, and 179 (16.3%) were classified disorganized.

The overall stability of attachment from infancy to preschool years was modest, but significant, $\chi^2 (9) = 28.51, p = .001$. Infants classified as B were more likely to remain classified as B in the preschool years (64.1%) or to become C (16.1%) or D (15.7%) and less likely to become avoidant (4.1%). Infants classified as avoidant were more likely to become secure (56.9%), ambivalent (16.7%) or disorganized (16%) and less likely to remain avoidant (10.4%) at 36 months. Infants with a C classification were unlikely to become A (1%) or D (8.2%) and more likely to remain C (25.8%) or to become secure (64.9%) in preschool. Finally, infants classified as disorganized were more likely to remain disorganized (22.3%) or to become secure (55.9%) or ambivalent.
(15.8%) rather than avoidant (5.9%). Thus, the most stable group was the secure group.

Recent data suggest that individual differences in attachment organization are more consistent with a dimensional rather than a categorical model (Fraley & Spieker, 2003). For this study, an attachment security score was computed for the children with data at both attachment assessment times by summing the number of times that a child was securely attached (0-2), so that a continuous dimension of the history of security is obtained. The dimensions of ambivalence, avoidance, and disorganization are computed using the same procedure. The procedure was used in previous research (Bosquet & Egeland, 2006). Similar with results from others studies using a dimensional approach of attachment (Brumariu, Kerns, & Seibert, 2009), zero-order correlations indicated that the attachment dimensions are small to moderately correlated. Security was negatively associated with ambivalence ($r = - .46, p < .001$), avoidance ($r = - .41, p < .001$), and disorganization ($r = - .57, p < .001$). Ambivalence was negatively associated with avoidance ($r = - .12, p < .001$) and disorganization ($r = - .20, p < .001$). In addition, avoidance was negatively related to disorganization ($r = - .13, p < .001$).

The Strange Situation is perhaps the most validated attachment measure. Hundreds of studies used the Strange Situation and its version, providing evidence for adequate psychometric properties (for reviews, see Goldberg, 2001; Solomon & George, 2008). Ainsworth’s classification measure has been extensively validated on U.S. and Western European populations. The observational measure for preschoolers also has relatively good reliability and validity, although it appears less robust than the Strange Situation procedure (Solomon & George, 2008).
Negative emotionality and behavioral inhibition. Initially, I intended to use a temperament measure administered at 6 months, but it had low reliability and questionable validity. At 54 months, mothers were asked to complete the Children’s Behavior Questionnaire (CBQ; Rothbart, Ahadir, & Hershey, 1994), designed to measure temperament in children aged 3-8 years. The original measure includes 196 items and 15 scales. In the NICHD study, mothers and alternate caregivers (n=4) completed only 80 items from 8 scales. The 80 items are scored on a 7-point Likert scale that ranges from 1 = “Extremely untrue” to 7 = “Extremely true”. Scales are obtained by averaging the individual scores across the items (after reflecting some items), therefore, a higher score indicates a higher level of a specific temperamental characteristic. Given that the purpose of the current study is to examine specifically negative emotionality and behavioral inhibition as dimensions of temperament, I used the following subscales proposed by Rothbart to be part of negative emotionality: Fear (10 out of 13 original items), Anger/Frustration (10 out of 13 original items), and Sadness (10 out of 12 original items); and the shyness subscale (10 out of 13 original items), which reflects behavioral inhibition (Appendix A, Rothbart, 2007; see also Posner & Rothbart, 2007; Rothbart & Bates, 2006).

The fear scale measures uneasiness related to anticipated pain or distress and/or potentially threatening situations. An example of item from the Fear scale is: “My child is afraid of loud noises”. The Anger/Frustration scale refers to the amount of negative emotions related to interruption of ongoing tasks or goal blocking. An example of item from this scale is: “My child has temper tantrums when s/he doesn’t get what s/he wants.”
The Sadness scale reflects the amount of negative emotions and lowered mood and energy related to exposure to suffering, disappointment, and object loss. An example of an item from this scale is:” My child cries sadly when a favorite toy gets lost or broken”. Alphas for the Fear, Anger/Frustration, and Sadness scales were .61, .77, and .59, respectively. The scales are modestly correlated ($r$ range between .21 and .45, $p$s < .001). These three scales were averaged to obtain an overall score of negative emotionality. The alpha for the combined scale was .77.

The Shyness scale measures slow or inhibited approach in situations involving novelty or uncertainty. An example of item from the Shyness scale is:” My child sometimes prefers to watch rather than join other children playing”. Alpha for this scale is .87. The shyness scale, reflecting behavioral inhibition, is modestly correlated with the negative emotionality scale ($r = .18$, $p < .001$), suggesting that they measure different constructs (i.e., different temperamental aspects).

Previous studies showed that the CBQ has adequate psychometric properties. Rothbart, Ahadi, Hershey, and Fisher (2001) reported internal consistency estimates ranging from .69 to .92 for these scales with a sample of parents of 4- and 5-year-old children. Stability coefficients from 5 to 7 years of age ranged from .63 to .79 for mother reports. In addition, the temperament dimensions are associated with aspects of personality and behavioral problems (for reviews, see Posner & Rothbart, 2007; Rothbart & Bates, 2006).

**Peer competence measure.** Mothers and fathers completed the Social Skills Questionnaire from the Social Skills Rating System (SSRS: Gresham & Elliot, 1990;
copyrighted measure) when the child was in first grade and third grade, thus, each adult rated children’s behavior twice over a 3-year period covering early school age. Raters used a 3-point scale to describe how often a child exhibits a behavior from four areas (cooperation, assertion, responsibility, and self-control), thus continuous dimensions can be obtained by averaging the items. For the NICHD study, an apriori scale of peer competence was created based on the average of 10 items (i.e., child accepts peer’s idea for group activities; child responds appropriately to peer pressure; etc.) from the four areas and that refer to the child’s effectiveness in peer group and in individual peer interaction. This scale, which is not part of the Gresham & Elliott (1990) scoring scheme, was used in the current study as an indicator of the child’s ability to interact appropriately with peers individually and in groups, a developmentally salient aspect of peer competence at this age, as reflected in cooperation, assertion, responsibility, and self-control. The possible range for this variable is 0 to 20, and higher scores indicate a higher positive response from the child to his or her peers or higher competence in peer relationships. Alpha values at the two grades are: .74 and .79 for mother ratings, and .68 and .76 for father ratings of peer competence. Mother ratings at the two grades were moderately to highly correlated \( (r = .69, p < .001) \), and father ratings were moderately correlated \( (r = .56, p < .001) \). The scores of each of the two raters across the two grades were averaged, so that two final scores of peer competence were created, one for each reporter (i.e., mother and father). These two final scales, which are used for analyses, were moderately and positively associated, \( r = .44, p < .001 \).
The validity (content, criterion, and construct) of the SSRS is documented extensively in Gresham and Elliot (1990). The SSRS has been found to be associated with measures of social behaviors, competences, and problem behaviors. Further, reviews of commonly used social skills scales have recommended the use of SSRS after describing it as demonstrating the best psychometric characteristics of the available measures (Bracken, Keith, & Walker, 1994; Demaray & Ruffalo, 1995; Merrell & Gimpel, 1998).

*Emotion dysregulation measure.* Mothers and fathers completed a 10-item questionnaire designed to measure the adult’s perceptions of how their child manages the intensity of emotions (Parent report of children’s reaction, Appendix B). This questionnaire was adapted after Larsen and Diener’s (1987) Affectivity Scale. When children were in the 3rd grade, respondents were asked to rate their child ability to regulate the intensity of expressing emotions using a 5-point scale, with 1 = never and 5 = always. An example of item from this scale is: “my child responds very emotionally to stories, movies, and events”. The child’s inability to manage intense emotions is computed as the sum of individual items, after reflecting items 4, 5, 6, 8, and 10, with higher values indicating greater dysregulation of emotions. Alphas for the current study were .76 for mother report and .69 for father report. Mother reports and father reports of emotion dysregulation are positively associated (r = .38, p < .001). Other studies support the validity of this scale in that it correlates with other measures of regulation, competence, and behavior problems (Eisenberg et al., 1993, 1995).
The peer competence variables (mother reported peer competence and father reported peer competence) were negatively and modestly related to the emotion dysregulation variables (mother reported emotion dysregulation and father reported emotion dysregulation), with correlations ranging from \(-0.11, p < .01\) for the association between mother reported emotion dysregulation and father reported peer competence, to \(-0.25, p < .001\), for the association between father reported peer competence and father reported emotion dysregulation. These results suggest that peer competence and emotion regulation represent distinct constructs.

Anxiety symptoms. The Child Behavior Checklist (CBCL, Achenbach, 1991; copyrighted measure) was administered to mothers when children were in the 5th and 6th grade. The CBCL is the most widely used screening instrument available for tracking the emergence of behavior problems in children aged 2 to 18 years old. At the time of assessment, the versions of the CBCL for the age 2-3 and CBCL for the age 4-18 were available, therefore the CBCL 4-18 is used in the NICHD study. The parent form has good psychometric properties in that it shows high test-retest reliabilities for different problem scales, good validity, and clinical utility (Greenbaum, Dedrick, & Lodi, 2004). The Anxious/Depressed scale showed good construct validity and distinguished children with internalizing disorders (anxieties and depression) from children without such disorders (Kasius, Ferdinand, van den Berg, & Verhulst, 1997; Seligman, Ollendick, Langley, & Bechtold, 2004). Because the purpose of this paper is to assess the relation between attachment and anxiety, not internalizing symptoms, an anxiety scale was created. Based on Wadsworth, Hudziak, Heath, and Achenbach’s (2001)
recommendation, 8 items that distinguish between the anxious and depressive symptoms on the Anxious/Depressed scale, were selected: items 31, 32, 34, 45, 50, 71, 89, and 112. In addition to these items, the following 4 items from other scales of CBCL were included: items 9, 29, 30, 66. Thus, the anxiety scales has 12 items. The same procedure of creating an anxiety scale based on the CBCL items was previously used in research (Bosquet & Egeland, 2006; Feng, Shaw, & Silk, 2008).

The anxious behaviors described by each item are rated on 3 point scales from 0 (not true of the child) to 2 (very true of the child). Mother reported anxiety at grade 5 (alpha = .73) and grade 6 (alpha = .74) were averaged to obtain a final scale of mother reported anxiety (correlation between mother reported anxiety at 5th and 6th grade = .68, p < .001). The CBCL self-report form was not included in this study, but the teacher form was. Initially, I intended to also use the teacher ratings at 5th and 6th grades (alphas = .70 and .69). The teacher’s ratings were not significantly correlated (.06, p = .08), most likely due to different teachers reporting anxiety symptoms at grades 5 and 6. In addition, there is a possibility that 6th grade teachers may not be very familiar with the children’s internal states as they do not spend much time together. Therefore, I decided to use only mother ratings of anxiety.
CHAPTER III

RESULTS

Overview

First, preliminary analyses were conducted to assess whether the demographic variables are related to the main study variables. Second, zero-order correlations among the main study variables were computed. Third, using AMOS, structural equation models were tested to assess mediation. Structural equation modeling analysis (SEM) relies on the maximum likelihood estimation (MLE) with simultaneous estimation of model parameters (for this reason, MLE is considered a full estimation method, Klein, 2004).

Because there are missing data for some variables, for preliminary analyses and correlations I included all participants who had data on the relevant variables. For testing complex mechanisms such as mediation, I made the assumption that the data are missing completely at random. Therefore, I used the full information maximum likelihood method of data analysis, which provides a less biased estimate and is more efficient in handling missing data than are more conventional methods such as listwise deletion or similar response pattern imputation (Craig & Bandalos, 2001; Schafer & Graham, 2002).
Preliminary Analyses

Descriptive statistics for the main variables (means, SDs, minimum, and maximum values) are presented in Table 1.

Statistical analyses were conducted to determine if the demographic variables (mother’s education, family income at one month and in middle childhood, child ethnicity and gender, household type, and site of data collection) were associated with the attachment, emotion dysregulation, peer competence, and anxiety variables. Zero-order correlations, presented in Table 2, indicated that maternal education was related to attachment security, avoidance, and disorganization, and to peer competence rated by mothers and fathers. Family income at one month or in middle childhood was associated with avoidance and peer competence rated by mothers and fathers. In addition, family income in middle childhood was related to father-reported emotion dysregulation and child anxiety.

For child ethnicity I computed one-way ANOVAs to compare Caucasian children, African-American children, and children of other ethnicities. As shown in Table 3, the groups differed on security, disorganization, and mother rated peer competence. Tukey follow-up comparisons showed that African-American children were less secure than Caucasian children and children of other ethnicities, and more disorganized than Caucasian children. In addition, Caucasian children were rated by their mothers as showing higher peer competence than did African-American children and children of other ethnicities.
Table 1

*Means, Standard Deviations, and Minimum and Maximum Values of the Main Study Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>1097</td>
<td>1.21</td>
<td>.71</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>1097</td>
<td>.26</td>
<td>.49</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Avoidance</td>
<td>1097</td>
<td>.18</td>
<td>.42</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Disorganization</td>
<td>1097</td>
<td>.35</td>
<td>.56</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Negative emotionality</td>
<td>984</td>
<td>4.29</td>
<td>.63</td>
<td>2.10</td>
<td>6.25</td>
</tr>
<tr>
<td>Behavioral inhibition</td>
<td>978</td>
<td>6.60</td>
<td>3.52</td>
<td>1</td>
<td>6.60</td>
</tr>
<tr>
<td>Peer competence (mother report)</td>
<td>988</td>
<td>15.77</td>
<td>2.66</td>
<td>4.50</td>
<td>20</td>
</tr>
<tr>
<td>Peer competence (father report)</td>
<td>811</td>
<td>15.40</td>
<td>2.51</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Emotion regulation (mother report)</td>
<td>922</td>
<td>33.91</td>
<td>5.62</td>
<td>13</td>
<td>49</td>
</tr>
<tr>
<td>Emotion regulation (father report)</td>
<td>678</td>
<td>32.60</td>
<td>4.90</td>
<td>18</td>
<td>46</td>
</tr>
<tr>
<td>Child anxiety</td>
<td>949</td>
<td>.20</td>
<td>.20</td>
<td>0</td>
<td>1.50</td>
</tr>
</tbody>
</table>
Table 2

Associations of the Main Variables with Mother’s Education and Family Income

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Maternal education</th>
<th>Income at 1 month</th>
<th>Income in middle childhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>1097</td>
<td>.14***</td>
<td>.05</td>
<td>.11***</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>1097</td>
<td>-.01</td>
<td>-.01</td>
<td>.01</td>
</tr>
<tr>
<td>Avoidance</td>
<td>1097</td>
<td>-.10**</td>
<td>-.08**</td>
<td>-.11***</td>
</tr>
<tr>
<td>Disorganization</td>
<td>1097</td>
<td>-.09**</td>
<td>-.01</td>
<td>-.05</td>
</tr>
<tr>
<td>Negative emotionality</td>
<td>984</td>
<td>-.02</td>
<td>-.03</td>
<td>-.03</td>
</tr>
<tr>
<td>Behavioral inhibition</td>
<td>978</td>
<td>.02</td>
<td>.01</td>
<td>.01</td>
</tr>
<tr>
<td>Peer competence (mother report)</td>
<td>988</td>
<td>.23***</td>
<td>.13**</td>
<td>.22***</td>
</tr>
<tr>
<td>Peer competence (father report)</td>
<td>811</td>
<td>.18***</td>
<td>.11**</td>
<td>.16**</td>
</tr>
<tr>
<td>Emotion regulation (mother report)</td>
<td>922</td>
<td>-.03</td>
<td>.01</td>
<td>-.03</td>
</tr>
<tr>
<td>Emotion regulation (father report)</td>
<td>678</td>
<td>-.05</td>
<td>.01</td>
<td>-.08*</td>
</tr>
<tr>
<td>Child anxiety (mother report)</td>
<td>949</td>
<td>-.04</td>
<td>-.03</td>
<td>-.10**</td>
</tr>
</tbody>
</table>

Note. * p < .05. ** p < .01. *** p < .001.
Table 3

**Mean Scores and Standard Deviations on the Main Variables as a Function of Child’s Ethnicity**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Caucasian (1)</th>
<th>African American (2)</th>
<th>Others (3)</th>
<th>F (df)</th>
<th>Post hoc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>1.24 (.70)</td>
<td>1.00 (.74)</td>
<td>1.29 (.72)</td>
<td>(2, 1094) = 6.04*</td>
<td>2 &lt; 1**, 3*</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>.27 (.49)</td>
<td>.22 (.49)</td>
<td>.20 (.44)</td>
<td>(2, 1094) = 1.13</td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>.17 (.41)</td>
<td>.27 (.48)</td>
<td>.15 (.36)</td>
<td>(2, 1094) = 2.93</td>
<td></td>
</tr>
<tr>
<td>Disorganization</td>
<td>.32 (.54)</td>
<td>.51 (.63)</td>
<td>.36 (.62)</td>
<td>(2, 1094) = 6.06*</td>
<td>2 &gt; 1**</td>
</tr>
<tr>
<td>Negative emotionality</td>
<td>4.30 (.64)</td>
<td>4.35 (.54)</td>
<td>4.25 (.73)</td>
<td>(2, 981) = .48</td>
<td></td>
</tr>
<tr>
<td>Behavioral inhibition</td>
<td>3.52 (1.11)</td>
<td>3.47 (.93)</td>
<td>3.75 (1.09)</td>
<td>(2, 975) = 1.24</td>
<td></td>
</tr>
<tr>
<td>Peer competence (mother report)</td>
<td>16.07 (2.46)</td>
<td>14.01 (2.98)</td>
<td>14.81 (3.14)</td>
<td>(2, 985) = 35.70***</td>
<td>1 &gt; 2, 3***</td>
</tr>
<tr>
<td>Peer competence (father report)</td>
<td>15.46 (2.48)</td>
<td>14.92 (2.68)</td>
<td>15.20 (2.78)</td>
<td>(2, 808) = 1.42</td>
<td></td>
</tr>
<tr>
<td>Emotion regulation (mother report)</td>
<td>34.04 (5.75)</td>
<td>33.09 (4.30)</td>
<td>33.58 (6.02)</td>
<td>(2, 919) = 1.38</td>
<td></td>
</tr>
<tr>
<td>Emotion regulation (father report)</td>
<td>32.63 (4.96)</td>
<td>32.85 (4.52)</td>
<td>31.49 (4.52)</td>
<td>(2, 675) = .97</td>
<td></td>
</tr>
<tr>
<td>Child anxiety</td>
<td>.20 (.20)</td>
<td>.17 (.17)</td>
<td>.20 (.21)</td>
<td>(2, 946) = 1.63</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* *p < .05, **p < .01, ***p < .001.*
There were also differences on household type at 1 month. For this variable, I compared intact families (n = 942) to stepfather families (n = 21) and single parent families (n =134). As shown in Table 4, the groups differed on security, avoidance, disorganization, and mother rated peer competence. Children from intact family compared to children from single parent families were more secure, less avoidant, less disorganized, and showed higher peer competence as rated by their mothers. They also showed higher peer competence as rated by their mothers than did children from stepfather families.

T-tests revealed several gender differences (Table 5). Boys were more avoidant than girls, and girls were more disorganized, more behaviorally inhibited, and received higher scores on peer competence rated by fathers than did boys. No differences were found based on data collection site, thus the results are not discussed in text or tables.

Associations between attachment variables and temperament variables were computed, with zero-order correlations indicating that they are not significantly related ($r$s ranged between .01 and .04). Because the demographic variables were significantly associated with the main variables of the study, the zero-order correlation analyses reported below were repeated using partial correlation analyses in which I controlled for the demographic variables. None of the results changed significantly, so I evaluated the hypotheses 1 through 5 in terms of zero-order correlations, without controlling for other variables.
Table 4

Mean Scores and Standard Deviations on the Main Variables as a Function of Family Status

<table>
<thead>
<tr>
<th>Variables</th>
<th>Intact (1)</th>
<th>Stepfather (2)</th>
<th>Single parent (3)</th>
<th>F (df)</th>
<th>Post hoc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>1.24 (.70)</td>
<td>1.33 (.66)</td>
<td>.99 (.79)</td>
<td>(2, 1094) = 8.13***</td>
<td>1 &gt; 3***</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>.27 (.49)</td>
<td>.24 (.44)</td>
<td>.21 (.46)</td>
<td>(2, 1094) = .81</td>
<td></td>
</tr>
<tr>
<td>Avoidance</td>
<td>.16 (.39)</td>
<td>.20 (.51)</td>
<td>.31 (.54)</td>
<td>(2, 1094) = 7.70***</td>
<td>1 &lt; 3***</td>
</tr>
<tr>
<td>Disorganization</td>
<td>.33 (.54)</td>
<td>.24 (.44)</td>
<td>.49 (.65)</td>
<td>(2, 1094) = 5.53**</td>
<td>1 &lt; 3**</td>
</tr>
<tr>
<td>Negative emotionality</td>
<td>4.29 (.64)</td>
<td>4.44 (.62)</td>
<td>4.32 (.59)</td>
<td>(2, 981) = .49</td>
<td></td>
</tr>
<tr>
<td>Behavioral inhibition</td>
<td>3.55 (1.10)</td>
<td>3.47 (.84)</td>
<td>3.36 (1.06)</td>
<td>(2, 975) = 1.47</td>
<td></td>
</tr>
<tr>
<td>Peer competence (mother report)</td>
<td>16.02 (2.47)</td>
<td>14.45 (3.10)</td>
<td>14.21 (3.23)</td>
<td>(2, 985) = 28.02***</td>
<td>1 &gt; 2*, 3***</td>
</tr>
<tr>
<td>Peer competence (father report)</td>
<td>15.46 (2.47)</td>
<td>.14.37 (2.33)</td>
<td>15.03 (3.01)</td>
<td>(2, 808) = 2.43</td>
<td></td>
</tr>
<tr>
<td>Emotion regulation (mother report)</td>
<td>33.89 (5.71)</td>
<td>34.50 (5.18)</td>
<td>33.93 (5.02)</td>
<td>(2, 919) = .11</td>
<td></td>
</tr>
<tr>
<td>Emotion regulation (father report)</td>
<td>32.55 (4.87)</td>
<td>33.79 (3.79)</td>
<td>32.70 (5.83)</td>
<td>(2, 675) = .44</td>
<td></td>
</tr>
<tr>
<td>Child anxiety</td>
<td>.20 (.20)</td>
<td>.30 (.24)</td>
<td>.21 (.20)</td>
<td>(2, 946) = 2.96</td>
<td></td>
</tr>
</tbody>
</table>

Note. * p < .05. ** p < .01. *** p < .001.
Table 5

*Mean Scores and Standard Deviations on the Main Variables as a Function of Gender*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Boys</th>
<th>Girls</th>
<th>t(df)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>1.22 (.73)</td>
<td>1.21 (.70)</td>
<td>(1095) = .82</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>.26 (.49)</td>
<td>.25 (.48)</td>
<td>(1095) = .73</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.22 (.47)</td>
<td>.14 (.36)</td>
<td>(1035.23) = 3.24**</td>
</tr>
<tr>
<td>Disorganization</td>
<td>.30 (.53)</td>
<td>.40 (.57)</td>
<td>(1085.22) = -3.02**</td>
</tr>
<tr>
<td>Negative emotionality</td>
<td>4.30 (.60)</td>
<td>4.30 (.66)</td>
<td>(982) = -.04</td>
</tr>
<tr>
<td>Behavioral inhibition</td>
<td>3.45 (1.08)</td>
<td>3.60 (1.10)</td>
<td>(976) = -2.18*</td>
</tr>
<tr>
<td>Peer competence (mother report)</td>
<td>15.60 (2.64)</td>
<td>15.93 (2.66)</td>
<td>(986) = -1.94</td>
</tr>
<tr>
<td>Peer competence (father report)</td>
<td>15.16 (2.54)</td>
<td>15.65 (2.46)</td>
<td>(809) = -2.83**</td>
</tr>
<tr>
<td>Emotion regulation (mother report)</td>
<td>33.85 (5.78)</td>
<td>33.97 (5.47)</td>
<td>(920) = -.32</td>
</tr>
<tr>
<td>Emotion regulation (father report)</td>
<td>32.35 (4.98)</td>
<td>32.82 (4.83)</td>
<td>(676) = -1.25</td>
</tr>
<tr>
<td>Child anxiety</td>
<td>.19 (.20)</td>
<td>.21 (.20)</td>
<td>(947) = -.80</td>
</tr>
</tbody>
</table>

*Note.* *p < .05. **p < .01.*
Associations of Attachment and Temperament Variables with Anxiety

As indicated in Table 6, consistent with hypothesis 1, correlations revealed that children who were more secure and less disorganized had lower levels of anxiety. Ambivalence and avoidance were not significantly related to children’s anxiety.

As predicted by hypothesis 2, more行为ally inhibited children and those higher on negative emotionality showed higher levels of anxiety.

Associations of Attachment and Temperament Variables with Children’s Peer Competence and Emotion Dysregulation

As shown in Table 6, consistent with hypothesis 3, more securely attached children had higher levels of mother- and father rated peer competence. More avoidantly attached children and more disorganized children were rated by their mothers and fathers as showing lower levels of peer competence.

In addition, children with higher levels of negative emotionality or higher levels of behaviorally inhibition had lower levels of peer competence as rated by their parents.

Hypothesis 4 was partially confirmed. More securely attached children were rated as less emotionally dysregulated by their mothers and fathers. Children with more disorganized attachments show higher levels of emotion dysregulation based on father reports, but not mother reports. Ambivalence and avoidance were not related to children’s ability to regulate intense emotions.

Further, children with higher levels of negative emotionality had higher levels of emotion dysregulation as reported by their parents. Interestingly, more behaviorally
Table 6

Zero-order Correlations of Attachment and Temperament with Anxiety, and of Attachment, Temperament, and Anxiety with Peer Competence and Emotion Dysregulation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Child anxiety</th>
<th>Peer competence (mother report)</th>
<th>Peer competence (father report)</th>
<th>Emotion dysregulation (mother report)</th>
<th>Emotion dysregulation (father report)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>-.07*</td>
<td>.15***</td>
<td>.13***</td>
<td>-.08*</td>
<td>-.12**</td>
</tr>
<tr>
<td></td>
<td>n = 949</td>
<td>n = 988</td>
<td>n = 811</td>
<td>n = 922</td>
<td>n = 678</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>-.04</td>
<td>-.03</td>
<td>.00</td>
<td>.04</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>n = 949</td>
<td>n = 988</td>
<td>n = 811</td>
<td>n = 922</td>
<td>n = 678</td>
</tr>
<tr>
<td>Avoidance</td>
<td>.02</td>
<td>-.08*</td>
<td>-.11**</td>
<td>.03</td>
<td>.03</td>
</tr>
<tr>
<td></td>
<td>n = 949</td>
<td>n = 988</td>
<td>n = 811</td>
<td>n = 922</td>
<td>n = 678</td>
</tr>
<tr>
<td>Disorganization</td>
<td>.10**</td>
<td>-.10**</td>
<td>-.08*</td>
<td>.05</td>
<td>.12**</td>
</tr>
<tr>
<td></td>
<td>n = 949</td>
<td>n = 988</td>
<td>n = 811</td>
<td>n = 922</td>
<td>n = 678</td>
</tr>
<tr>
<td>Negative emotionality</td>
<td>.25***</td>
<td>-.25***</td>
<td>-.12**</td>
<td>.32***</td>
<td>.15**</td>
</tr>
<tr>
<td></td>
<td>n = 908</td>
<td>n = 948</td>
<td>n = 782</td>
<td>n = 889</td>
<td>n = 657</td>
</tr>
<tr>
<td>Behavioral inhibition</td>
<td>.07*</td>
<td>-.23***</td>
<td>-.13**</td>
<td>-.12**</td>
<td>-.02</td>
</tr>
<tr>
<td></td>
<td>n = 903</td>
<td>n = 942</td>
<td>n = 776</td>
<td>n = 883</td>
<td>n = 651</td>
</tr>
<tr>
<td>Child anxiety</td>
<td>-.25***</td>
<td>-.17***</td>
<td>.27***</td>
<td>.18***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 934</td>
<td>n = 767</td>
<td>n = 902</td>
<td>n = 661</td>
<td></td>
</tr>
</tbody>
</table>

*Note. *p ≤ .05. **p < .01. ***p < .001.*
inhibited children showed less emotion dysregulation as reported by mothers, but not fathers.

**Associations of Peer Competence and Emotion Dysregulation with Childhood Anxiety**

As seen in Table 6, consistent with hypothesis 5, children with higher levels of peer competence as rated by their parents showed lower levels of anxiety. In addition, children rated by their parents as having higher levels of emotion dysregulation showed higher levels of anxiety.

**Structural Equation Modeling Analyses**

This study proposed three different mediation pathways: 1. peer competence and emotion regulation as mediators of the relation between earlier attachment and preadolescent anxiety symptoms; 2. peer competence as a mediator of the relations between negative emotionality or behavioral inhibition and anxiety, and 3. emotion regulation as a mediator of the relation between negative emotionality and anxiety. To test unique effects, controlling for other variables, I conducted structural equation modeling analyses. As mentioned previously, because of missing data, the full information maximum likelihood method (FIML) based on all of the observed data, including the incomplete cases, was used. Because the attachment variables are interdependent (i.e., children who are more securely attached are also by definition more insecurely attached), the model presented in Figure 1 was examined in two separate SEM analyses: one analysis including the secure attachment pattern (Model 1, Figure 2), and the other analysis including the insecure attachment patterns (ambivalent, avoidant, and
Figure 2. Significant path estimates of the model examining peer competence and emotion regulation as mediators between security and anxiety.
disorganized, Model 2, Figure 3). These models assess the mediation effects simultaneously.

In both SEM analyses (one including the secure attachment pattern and the other including the insecure attachment patterns), temperament variables and attachment variable(s) represent the exogenous variables. Peer competence variables, emotion dysregulation variables, and anxiety in preadolescence are the endogenous variables. Two latent variables were created: emotion dysregulation, comprised of mother report and father report of emotion dysregulation; and peer competence, comprised of mother report and father report of peer competence. One indicator of each latent variable was fixed to 1 (mother reported peer competence and mother reported emotion regulation). The rest of the variables are observed variables (variables directly measured, i.e., attachment security). Note that, although not predicted, a path from behavioral inhibition to emotion dysregulation was included to control for the potential effect of behavioral inhibition and for the potential method-shared variance (mother report of both constructs). A path from avoidance to emotion dysregulation was also included in the model to control for this possible effect. In addition, covariances among the predictor variables (attachment variables and temperament variables) and covariances between the indicators of the mediator variables across constructs (mother reported peer competence and emotion regulation/dysregulation; father reported peer competence and emotion regulation/dysregulation) were included. Given the complexity of the models, these covariances are not represented in figures. Because partial correlations controlling for the
Figure 3. Significant path estimates of the model examining peer competence and emotion regulation as mediators between the insecure attachment patterns and anxiety.
Figure 2 and 3 demographic variables did not change the results significantly, I present
the SEM analyses without including the demographic variables as controls.

Both models are estimated to be recursive because causal effects are
unidirectional and disturbances are uncorrelated. Additionally, both proposed models are
estimated to be overidentified, as the number of known parameters exceeds the number of
free parameters, $dfs = 7$ and 12. Klein (2004) suggested that overidentified models are
more appropriate for SEM analyses than just-identified models (the number of free
parameters equals the number of fix parameters) or underidentified models (the models
parameters are infinite).

SEM Analysis Testing the Study Hypotheses with Security of Attachment
Included in the Model (Model 1, Figure 2)

Several model fit indices were examined in order to determine the fit of the
proposed model to the data. The chi-square test was not significant, $\chi^2 (7) = 11.40, p = .13$, suggesting a good fit. The comparative fit index (CFI), incremental fit index (IFI),
and root mean square error of approximation (RMSEA) also were examined to assess
model fit. CFI and IFI values of 0.90 and above indicate an adequate fit, and values of
0.95 and above indicate a good fit (Hu & Bentler, 1995). RMSEA values less than 0.08
indicate adequate fit, and values less than 0.05 indicate a good fit (Browne & Cudeck,
1993). These fit indices for the model indicated good fit: $\text{CFI} = .986$, $\text{IFI} = .995$, and
$\text{RMSEA} = .023$.

The unstandardized and standardized path estimates are presented in Table 7 and
the significant paths are shown in Figure 2. The path estimates in the full model were
Table 7

*SEM Path Estimates of the Model with Security as Predictor*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized</th>
<th>SE</th>
<th>Standardized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security $\rightarrow$ anxiety</td>
<td>-.004</td>
<td>.009</td>
<td>-.015</td>
</tr>
<tr>
<td>Negative emotionality $\rightarrow$ anxiety</td>
<td>.036**</td>
<td>.013</td>
<td>.116</td>
</tr>
<tr>
<td>Behavioral inhibition $\rightarrow$ anxiety</td>
<td>.003</td>
<td>.006</td>
<td>.019</td>
</tr>
<tr>
<td>Security $\rightarrow$ peer competence</td>
<td>.574***</td>
<td>.111</td>
<td>.175</td>
</tr>
<tr>
<td>Negative emotionality $\rightarrow$ peer competence</td>
<td>-.871***</td>
<td>.129</td>
<td>-.236</td>
</tr>
<tr>
<td>Behavioral inhibition $\rightarrow$ peer competence</td>
<td>-.461***</td>
<td>.075</td>
<td>-.216</td>
</tr>
<tr>
<td>Security $\rightarrow$ emotion regulation</td>
<td>-.567*</td>
<td>.242</td>
<td>-.08</td>
</tr>
<tr>
<td>Negative emotionality $\rightarrow$ emotion regulation</td>
<td>3.063***</td>
<td>.280</td>
<td>.387</td>
</tr>
<tr>
<td>Behavioral inhibition $\rightarrow$ emotion regulation</td>
<td>-.873***</td>
<td>.163</td>
<td>-.190</td>
</tr>
<tr>
<td>Peer competence $\rightarrow$ anxiety</td>
<td>-.017***</td>
<td>.004</td>
<td>-.205</td>
</tr>
<tr>
<td>Emotion regulation $\rightarrow$ anxiety</td>
<td>.009***</td>
<td>.002</td>
<td>.226</td>
</tr>
</tbody>
</table>

*Note. $p < .05$. ** $p < .01$. *** $p < .001$*
largely consistent with the correlation results, with two exceptions. Security was not related to child anxiety, after controlling for temperament, peer competence, and emotion regulation. When controlling for each other, only negative emotionality, but not behavioral inhibition, was positively associated with anxiety.

To evaluate the mediation effects (hypothesis 6), the path coefficients of the indirect effects, presented in Table 7, were used to compute the Sobel test (MacKinnon, Lockwood, Hofmann, West, & Sheets, 2002). The Sobel test indicates whether the relations between the predictors (security or temperament variables) and later anxiety are explained by the mediators (peer competence and emotion regulation). Specifically, the Sobel test calculates the product of the paths leading from the independent variables to the mediator(s) and the mediator(s) to the dependent variable, divides this product by its standard error, and then makes a comparison to the normal distribution. To calculate the Sobel test, only the significant paths from the independent variables to the mediators and from the mediators to the outcome are considered. Therefore, based on the results presented in Table 7, I evaluated whether peer competence and emotion dysregulation each mediated the relation of security with anxiety, whether peer competence mediated the relations between negative emotionality or behavioral inhibition and anxiety, and whether emotion dysregulation also mediated the relation between negative emotionality and anxiety.

As predicted (hypothesis 6), the Sobel tests indicated that peer competence and the ability to manage intense emotions each partially mediates the relation of security with child anxiety, $Z = -3.283, p < .001$ and $Z = 3.394, p < .001$, suggesting that more
secure children have higher peer competence and lower levels of emotion dysregulation, which in turn are associated with lower levels of anxiety.

Sobel tests also indicated that peer competence partially mediated the relations between negative emotionality or behavioral inhibition and anxiety, \( Z = 3.596, p < .001 \), and \( Z = 3.495, p < .001 \). Children higher on negative emotionality or behavioral inhibition have lower peer competence, which is associated with higher levels of anxiety. Finally, children’s ability to manage intense emotions also mediated the relation between negative emotionality and anxiety, \( Z = 4.161, p < .001 \), suggesting that children higher on negative emotionality have also higher levels of emotion dysregulation, which in turn influence their anxiety level.

**SEM Analysis Testing the Study Hypotheses with the Insecure Attachment Patterns Included in the Model (Model 2, Figure 3)**

The fit indices for the model indicated good fit: \( \chi^2 (12) = 20.35, p = .06 \), NFI = .977, IFI = .999, and RMSEA = .025. Table 8 includes the unstandardized and standardized path coefficients and Figure 3 illustrates the significant paths. The results were for the most part similar with those based on correlations, except that disorganization did not have a unique, significant effect on child anxiety and behavioral inhibition was not associated with anxiety after controlling for temperament, peer competence, and emotion dysregulation.

The mediation effects tested were the same as those for the model when the secure attachment rather than the insecure attachment patterns was included (see Table 8 for the path estimates). Two significant effects emerged for the insecure attachment
Table 8

*SEM Path Estimates of the Model with the Insecure Attachment Patterns as Predictors*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Unstandardized</th>
<th>SE</th>
<th>Standardized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance → anxiety</td>
<td>-.004</td>
<td>.015</td>
<td>-.008</td>
</tr>
<tr>
<td>Ambivalence → anxiety</td>
<td>-.017</td>
<td>.013</td>
<td>-.042</td>
</tr>
<tr>
<td>Disorganization → anxiety</td>
<td>.018</td>
<td>.012</td>
<td>.051</td>
</tr>
<tr>
<td>Negative emotionality → anxiety</td>
<td>.030*</td>
<td>.013</td>
<td>.097</td>
</tr>
<tr>
<td>Behavioral inhibition → anxiety</td>
<td>.004</td>
<td>.006</td>
<td>.020</td>
</tr>
<tr>
<td>Avoidance → peer competence</td>
<td>-.757***</td>
<td>.190</td>
<td>-.138</td>
</tr>
<tr>
<td>Ambivalence → peer competence</td>
<td>-.321*</td>
<td>.166</td>
<td>-.068</td>
</tr>
<tr>
<td>Disorganization → peer competence</td>
<td>-.674***</td>
<td>.146</td>
<td>-.163</td>
</tr>
<tr>
<td>Negative emotionality → peer competence</td>
<td>-.875***</td>
<td>.128</td>
<td>-.241</td>
</tr>
<tr>
<td>Behavioral inhibition → peer competence</td>
<td>-.467***</td>
<td>.074</td>
<td>-.222</td>
</tr>
<tr>
<td>Avoidance → emotion regulation</td>
<td>-.509</td>
<td>.417</td>
<td>.044</td>
</tr>
<tr>
<td>Ambivalence → emotion regulation</td>
<td>-.504</td>
<td>.363</td>
<td>.050</td>
</tr>
<tr>
<td>Disorganization → emotion regulation</td>
<td>.671*</td>
<td>.319</td>
<td>.076</td>
</tr>
<tr>
<td>Negative emotionality → emotion regulation</td>
<td>3.051***</td>
<td>.279</td>
<td>.396</td>
</tr>
<tr>
<td>Behavioral inhibition → emotion regulation</td>
<td>-.867***</td>
<td>.162</td>
<td>-.194</td>
</tr>
<tr>
<td>Peer competence → anxiety</td>
<td>-.020***</td>
<td>.004</td>
<td>-.230</td>
</tr>
<tr>
<td>Emotion regulation → anxiety</td>
<td>.010***</td>
<td>.003</td>
<td>.255</td>
</tr>
</tbody>
</table>

*Note.* *p < .05. **p < .01. ***p < .001.*
patterns. Specifically, peer competence partially mediated the relations of avoidance or disorganization with anxiety, $Z = 3.115, p < .01$, and $Z = 3.391, p < .001$. The Sobel test investigating whether children’s ability to manage intense emotions partially mediates the relation of disorganization with anxiety revealed a marginally significant effect, $Z = 1.778, p = .075$.

The results of the mediation tests related to the temperament variables were similar with those from Model 1. Specifically, peer competence partially mediated the relations of negative emotionality and behavioral inhibition with anxiety, $Z = 4.035, p < .001$, and $Z = 3.919, p < .001$, and the ability to manage the intensity of emotions also mediated the relation between negative emotionality and anxiety, $Z = 3.188, p < .01$. 
CHAPTER IV

DISCUSSION

This study investigated relations of early mother-child attachment with anxiety symptoms in preadolescence. Strengths of this study included a longitudinal design and the examination of the relations of all four attachment patterns (secure, ambivalent, avoidant, and disorganized) with anxiety symptoms. Although there is a need of investigating mediating mechanisms of the relation between parent-child attachment and childhood anxiety, very few studies addressed this issue. Another strength of this study is that it extends the previous research by attempting to explain why early parent-child attachment and later anxiety are associated and exploring peer competence and emotion regulation as mediators. The temporal order of the constructs provides some confidence regarding the direction of effects.

This study extends earlier work and suggests that children experiencing the absence of a secure base or paradoxical feelings regarding the attachment figure may be at risk for anxiety symptoms. These ideas are in agreement with conclusions based on previous studies (reviewed in Brumariu & Kerns, 2010) showing that security is modestly but significantly associated with anxiety in childhood and adolescence. This study also extends previous literature by showing that early disorganization is also associated with later anxiety. In Brumariu and Kerns’ review of the literature, it was also concluded that
previous literature provide some, but limited support for Carlson and Sroufe’s suggestion that ambivalence rather than avoidance is related to anxiety, but only when the ABC classifications are considered and when anxiety is assessed in adolescence. The current study extends these findings and shows that, when disorganization is included, ambivalence is not related to anxiety in preadolescence. Consistent with Carlson and Sroufe’s (1995) suggestion, avoidant attachment was not significantly related to anxiety symptoms.

Despite evidence that mother-child attachment is associated to some extent with childhood anxiety, the question of how to explain this association has been neglected (for an exception, see Bosquet & Egeland, 2006). Another purpose of this study was to investigate whether anxiety arises directly as a function of lack of the secure base, or whether attachment promotes developmental competences that might explain relations between attachment and anxiety. As a first step, I examined how attachment is associated with two developmental competences, peer competence and emotion regulation. As hypothesized, and consistent with previous literature (Booth-LaForce & Kerns, 2008), more securely attached children were rated by their parents higher on peer competence. Further, more avoidantly attached children and those with more disorganized attachments were less efficacious with peers. These relations remained significant after controlling for temperament, suggesting that attachment is related with peer competence even when other risk factors are considered. Interestingly, more ambivalently attached children did not have difficulty with peer efficacy as shown in a lack of cooperation, assertion, responsibility, or self-control when interacting with peers. It is possible that they may
have other peer competence difficulties, such as low quality friendships. Schneider et al. (2001) concluded that the attachment – peer relationship association is stronger for studies of children’s friendships than for studies of relationships with other peers. Given that ambivalently attached children are preoccupied with gaining their parents’ attention and show limited exploratory behavior (Cassidy & Berlin, 1994), they may have fewer opportunities to engage in meaningful exchanges that allow for effectively engaging, maintaining, and solidifying friendships. The investigation of the relations between different insecure attachment patterns and peer competence adds to the scarcity of data in this area and underscores the importance of considering the peer competence associations of each attachment pattern (Booth-LaForce & Kerns, 2008).

As expected, more securely attached children demonstrated lower emotion dysregulation (e.g., better management of the intensity of their emotions). This finding extends previous work showing that more securely attached children have better frustration tolerance and use more constructive coping strategies (Contreras et al., 2000; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Kerns et al., 2007; Sroufe, 2005). Among the insecure attachment patterns, only disorganization was related to children’s emotion regulation. Specifically, children with more disorganized attachments in early childhood were more intense when expressing emotions even after accounting for temperament. This finding complements studies showing that disorganized infants have difficulty regulating their emotions in times of acute stress (e.g., show high cardiac activation when left alone in the room, are emotionally aroused up to 30 minutes after the Strange Situation when other children return to the initial level of arousal; Spangler &
Grossmann, 1993, 1999). Since avoidant attachment is characterized by restriction in affective expression (Cassidy, 1994), as expected, avoidant attachment was not associated with children’s ability to regulate the intensity of expressing emotions. Contrary to prediction, ambivalence also was not associated with this aspect of emotion regulation.

Emotion regulation, however, is a complex, multidimensional construct epitomized in Thompson’s (1994) definition as processes by which emotional responses are modified to accomplish individual goals. Such processes include not only one’s ability to regulate the intensity of emotions, but also one’s ability to monitor and evaluate his or her emotional reactions. There is a need for research investigating whether other dimensions of emotion regulation are related to the attachment patterns. For example, given that securely attached children have greater emotion knowledge (Raikes & Thompson, 2006), it is likely that they would have less difficulty monitoring their own emotional states and reappraising emotionally arousing events. Disorganized children have difficulty in activities that require planning and anticipation of outcomes (Jacobsen, Edelstein, & Hofmann, 1994; Moss & St.-Laurent, 2001), thus, they may be challenged when required to modify their emotional state. Children with ambivalent or avoidant attachments may not have difficulties with regulating the intensity of their emotions, but they may have other emotion regulation difficulties. Ambivalently attached children’s tendency to exaggerate emotions may interfere with their ability to understand their emotional states. Because they suppress and mask their affect, avoidantly attached
children also may have difficulty understanding their own and others’ emotions. Future studies have the task of investigating these hypotheses.

Each of the two developmental competencies, peer competence and emotion regulation at early school age, were expected to predict anxiety in preadolescence. As hypothesized, children with lower peer efficacy at early school age had higher levels of anxiety in preadolescence. It is likely that children who are less efficacious with their peers may fear future failure and worry when facing challenges, especially related to the social environment and interpersonal relationships, conditions associated with anxiety. In addition, children with higher dysregulation of intense emotions at early school age also had higher levels of anxiety in preadolescence. This result is in agreement with previous findings showing that anxious children have emotion regulation difficulties (e.g., Penza-Clyve & Zeman, 2002; Weems et al., 2007; Compas et al., 2001). Overall, these results extend the literature by showing that developmental competencies are longitudinally related to anxiety symptoms.

Although this study is not experimental and therefore cannot test causal connections, it nevertheless highlights the importance of investigating specific mechanisms that may explain relations of mother-child attachment with anxiety symptoms. This study further suggests that there are some similarities in the paths from various attachment patterns to anxiety symptoms. Peer competence partially mediated the relations of security, avoidance, or disorganization with anxiety. Peer competence, as reflected in peer efficacy, is a key step in attempts to manage the social world. Securely attached children internalize effective ways of interacting with peers and show peer
efficacy at early school age, which is likely to translate into fewer anxiety symptoms later. By contrast, children with more disorganized or avoidant attachments show poorer peer efficacy, which in turn is more likely to promote anxiety. The ability to regulate the intensity of emotions also partially mediated the relation between security and later anxiety. Notably, modulating emotional intensity explained only the relations of security with anxiety symptoms, but not of other attachment patterns, suggesting that this path is specific to security.

It is likely that other dimensions of peer competence or emotion regulation processes not studied here, or other developmental competencies, may also account for the associations between attachment and anxiety. For example, Cassidy (1995) argued that individuals with insecure attachments, like anxious individuals, show an attentional bias to threat. Insecure children’s minimal opportunities for exploration may also foster a reduced sense of autonomy, control, or self-efficacy as insecurely attached children lack opportunities to develop new skills or to explore the environment as well as to rely on the parent in times of need (Chorpita & Barlow, 1998; Chorpita, Brown, & Barlow 1998). Attentional bias to threat and perceived poor self-efficacy, especially emotional self-efficacy, are in turn associated with higher levels of anxiety (Landon, Ehrenreich, & Pincus, 2007; Vasey & MacLeod, 2001), and may therefore provide an additional explanation for why insecurely attached children are more prone to develop anxiety symptoms.

This study also investigated longitudinally the relations of two dimensions of temperament, negative emotionality and behavioral inhibition, with preadolescent
anxiety. Consistent with previous studies (e.g., Rothbart & Bates, 2006), children higher on negative emotionality in the preschool years had higher levels of anxiety in preadolescence, even after controlling for behavioral inhibition and attachment. The findings indicated a weaker effect for behavioral inhibition. Specifically, although there was a significant relation between behavioral inhibition and preadolescent anxiety, this association was diminished when controlling for negative emotionality and other factors, suggesting that it is important to simultaneously consider both dimensions of temperament. The effects of behavioral inhibition might be stronger if a categorical rather a continuous approach was used (Kagan, 1994). This study included a dimensional rather than a categorical approach to assess temperament, which may dilute the effect of high inhibition. The results of Kagan’s studies and those of the Australian Temperament Project (reviewed in Sanson, Hemphill, and Smart, 2004) stressed that behavioral inhibition is associated with internalizing problems when behavioral inhibition persists over time, and that many children who are inhibited early in life do not show later internalizing problems. Unfortunately, persistency of temperamental characteristics over time was not assessed in the NICHD sample, and thus these suggestions were not evaluated.

Temperamental dimensions of negative emotionality and behavioral inhibition were also linked to peer competence and emotion regulation. Children high on negative emotionality or behavioral inhibition were rated lower by their parents on peer competence. Whether negative emotionality triggers peer rejection (Newcomb et al., 1993) or behavioral inhibition gives the child fewer opportunities to interact with others
(Rubin et al., 2008), children higher in negative emotionality or behavioral inhibition are less likely to learn how to interact effectively with peers and show poor peer efficacy. Consistent with the infant literature (Calkins et al., 1994; Calkins & Dedmon, 2000), children higher on negative reactivity had lower abilities to regulate intense emotions. Interestingly, more behaviorally inhibited children were rated by mothers as expressing less intense emotions. While this could suggest better emotion regulation by behaviorally inhibited children, it is also possible that behaviorally inhibited children have difficulty expressing their strong emotions. In addition, this study showed that peer efficacy and the ability to manage the intensity of emotions partially explained the relation of negative emotionality with anxiety. Further, peer efficacy partially accounted for the relation between behavioral inhibition and anxiety, suggesting that developmental competencies are important when explaining why temperament is related to anxiety.

The present findings complement the study of Bosquet and Egeland (2006) which examined risk factors for anxiety symptoms in a longitudinal high-risk community sample. Like in the Bosquet and Egeland study, in the present study of children from more advantaged families, attachment increased the risk for anxiety difficulties through its impacts on child’s peer competence and emotion regulation. Like in the Bosquet and Egeland study, in this study emotion regulation mediated the relation of temperament with anxiety. In addition, this study found that peer competence explains the relation of temperament with anxiety. While the present study showed that attachment security or disorganization and temperament are associated with anxiety in preadolescence, Bosquet and Egeland reported that insecure attachment was significantly related to anxiety.
symptoms at age 16 but not age 11. In addition, behavioral reactivity in infancy was not significantly related to preadolescent anxiety.

The different findings for the two studies may be related to the timing of the attachment assessments (12 and 18 months vs. 15 and 36 months). Attachment is moderately stable across childhood (Fraley, 2002), and insecure attachment in infancy would not be expected to predict later anxiety if children became more secure over time. The different findings may also stem from the fact that the distinctions among insecure patterns were not examined in Bosquet and Egeland’s study, and from assessing different aspects of temperament in the two studies (reactivity v. negative emotionality and behavioral inhibition) at different ages (neonatal period vs. 54 months). The literature would benefit from longitudinal studies assessing the stability or change of attachment patterns and persistency of temperamental traits over time in relation to later anxiety.

Overall, the magnitude of the effects suggests that attachment patterns and temperamental aspects of negative emotionality and behavioral inhibition may each make a relatively small contribution to later anxiety. Thus, to fully explain the development of anxiety, it would be important to examine other risk factors and possible interactive effects among them that may account for the development of anxiety. For example, the literature supports a moderate genetic risk for anxiety (Eley, 2001). A recent meta-analysis found that both parental acceptance and parental control are related to anxiety, with stronger effects for control than for acceptance (McLeod, Wood, & Weisz, 2007). Parents may also contribute to the development of their child anxiety through modeling of anxious behavior and inadvertent reinforcement of anxious behavior (Dadds & Roth,
In addition, childhood anxiety is associated with negative life-events (Rapee & Spence, 2004) and with a variety of cognitive biases and distortion such as threatening interpretations of ambiguity and enhanced attention to threat (Vasey & MacLeod, 2001). Brumariu and Kerns (2010) proposed an integrative model of the development of childhood anxiety in which attachment is embedded within this broader set of factors. For example, they propose that transactions between insecure attachment and overcontrolling and overprotective parenting may lead to maladaptive cognitions, emotion regulation processes, and self-concepts. These may signal a risk for anxiety when children experience stress associated with anticipated danger or parental anxiety. To further make progress in the understanding of the development of anxiety, it is important to target empirical investigation of these proposed links.

The results of the current study have implications for case conceptualization, prevention programs, or treatment processes when working with children at risk for developing anxiety symptoms. Traditionally, the cognitive behavioral approach with the focus on changing children’s anxious cognitions and behavior is the treatment of choice for anxious children (Kendall et al., 2006). Family-focused interventions, or combinations of family intervention and cognitive-behavioral intervention, also show that parent psycho-education (e.g., teaching parents to reward their children’s non-anxious behavior while modeling desirable behaviors and coping strategies) is also worthwhile (Kendall et al., 2006). The current results underscore the importance of also focusing on evaluating the attachment relationship between the caregiver and the child. Indeed, more recent interventions have targeted more general parenting behaviors such as warmth and
responsiveness in an effort to enhance the security and overall positive qualities of the parent-child relationship (Pincus, Eyberg, & Choate, 2005). In addition, anxiety interventions often address emotion regulation of anxiety (e.g., coping with anxiety-provoking situations) and increasing the employment of social problem solving in anxiety-provoking situations (Kendall et al., 2006). The current findings suggest that programs may do well to target developmental competencies more broadly (e.g., increasing peer efficacy in general circumstances, increasing the ability to manage intense emotions even if not specifically related to an anxiety provoking situation). Thus, targeting both the parent-child relationship and the child’s competencies may increase the efficacy of the interventions.

Some limitations of the current study should be noted. One limitation pertains to the relatively small range of attachment scores that might have precluded finding some significant effects. There is a possibility that the similar findings for security and disorganization are due to attachment variables being inter-dependent, although this would imply that similar findings should have been found for ambivalence and avoidance, which was not the case. Statistically, this study tested one theoretical model. Although the data fit the model well, it is likely that other models could fit the data just as well. Another limitation concerns the assessment of anxiety symptoms (questionnaires completed only by mothers). Although the literature lacks a clear understanding of whether parent or child reports can be treated as the “gold standard” for measuring anxiety, especially because these reports often do not co-vary very highly (Silverman & Ollendick, 2005), it would have been beneficial to include reports from both sources or
clinical interviews allowing the assessment of anxiety disorder diagnoses. Unfortunately, child reports of anxiety and clinical interviews were not available in the NICHD study. In addition, attachment with mothers only was examined, given mothers’ caregiver roles in Western cultures. However, father’s involvement in children’s lives has been associated with an internal locus of control and social competence (Amato, 1994). Future research should evaluate whether attachment to father, in addition to attachment to mother, may affect the development of anxiety symptoms when children face changes in their social life (e.g., changing schools and experiencing disruptions in peer relationships) that require social competences in order to make successful adjustments (Hardy, Bukowski, & Sippola, 2002). It is likely that anxiety may also affect children’s developmental competencies and their relationship with their mothers (e.g., Vernberg, Abwender, Ewell, & Beery, 1992), and studies assessing possible bidirectional relations between anxiety and developmental competencies or attachment also are warranted.

In conclusion, the present study suggests that both early attachment and temperament predict anxiety in early adolescence. This study also indicates that broad indices of peer competence and emotion regulation are responsible for explaining relations between (some) attachment patterns or temperament and later anxiety. As future directions, it will be important to examine models of the development of anxiety that incorporate other risk factors (e.g., parenting) and other mechanisms (e.g., attentional bias to threat) that may explain these relations. Embedding parent-child attachment within a broader context will further clarify its role in the development of childhood anxiety.
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APPENDIX A

CHILDREN’S BEHAVIOR QUESTIONNAIRE
(CBQ: Rothbart, Ahadir, & Hershey, 1994)

MOTHER REPORT
On the next several pages you will see a set of statements that describe children's reactions to a number of situations.

We would like you to tell us what your 4 1/2 year-old's reaction is likely to be in those situations. Of course, there are no "correct" ways of reacting; children differ widely in their reactions, and it these differences we are trying to learn about. Please read each statement and decide whether it is a "true" or "untrue" description of your 4 1/2 year-old's reaction within the past six months. Use the following scale to indicate how well a statement describes your 4 1/2 year-old:

Circle # if the statement is:

1 ......................extremely untrue of your 4 1/2 year-old
2 ......................quite untrue of your 4 1/2 year-old
3 ......................slightly untrue of your 4 1/2 year-old
4 ......................neither true nor false of your 4 1/2 year-old
5 ......................slightly true of your 4 1/2 year-old
6 ......................quite true of your 4 1/2 year-old
7 ......................extremely true of your 4 1/2 year-old

If you cannot answer one of the items because you have never seen your 4 1/2 year-old in that situation, for example

if the statement is about your 4 1/2 year-old's reaction to your singing and you have never sung to your 4 1/2 year-old, then circle 8 (Not Applicable). Please be sure to circle a number for every item.
Shyness/Behavioral inhibition items

1. Sometimes prefers to watch rather than join other children playing 1 2 3 4 5 6 7 8
2. Seems to be at ease with almost any person 1 2 3 4 5 6 7 8
3. Gets embarrassed when strangers pay a lot of attention to her/him 1 2 3 4 5 6 7 8
4. Acts very friendly and outgoing with new children 1 2 3 4 5 6 7 8
5. Joins others quickly and comfortably, even when they are strangers 1 2 3 4 5 6 7 8
6. Is sometimes shy even around people s/he has known a long time 1 2 3 4 5 6 7 8
7. Sometimes seems nervous when talking to adults s/he has just met 1 2 3 4 5 6 7 8
8. Acts shy around new people 1 2 3 4 5 6 7 8
9. Is comfortable asking other children to play 1 2 3 4 5 6 7 8
10. Talks easily to new people 1 2 3 4 5 6 7 8

Fear items

1. Is not afraid of large dogs and/or other animals 1 2 3 4 5 6 7 8
2. Is afraid of loud noises 1 2 3 4 5 6 7 8
3. Doesn't worry about injections by the doctor 1 2 3 4 5 6 7 8
4. Is not afraid of the dark 1 2 3 4 5 6 7 8
5. Is afraid of fire 1 2 3 4 5 6 7 8
6. Is very frightened by nightmares 1 2 3 4 5 6 7 8
7. Is afraid of the dark 1 2 3 4 5 6 7 8
8. Is rarely frightened by "monsters" seen on TV or at movies 1 2 3 4 5 6 7 8
9. Is not afraid of heights 1 2 3 4 5 6 7 8
10. Is rarely afraid of sleeping alone in a room 1 2 3 4 5 6 7 8

Anger/Frustration items

1. Rarely gets irritated when s/he makes a mistake 1 2 3 4 5 6 7 8
2. Has temper tantrums when s/he doesn't get what s/he wants 1 2 3 4 5 6 7 8
3. Gets quite frustrated when prevented from doing something s/he wants to do 1 2 3 4 5 6 7 8
4. Gets angry when s/he can't find something s/he wants to play with

5. Rarely gets upset when told s/he has to go to bed

6. Becomes easily frustrated when tired

7. Rarely protests when another child takes his/her toy away

8. Easily gets irritated when s/he has trouble with some task (e.g., building, drawing, dressing)

9. Gets angry when called in from play before s/he is ready to quit

10. Gets mad when provoked by other children

Sadness items

1. Cries sadly when a favorite toy gets lost or broken

2. Tends to feel "down" at the end of an exciting day

3. Becomes upset when loved relatives or friends are getting ready to leave following a visit

4. Does not usually become tearful when tired

5. Her/his feelings are easily hurt by what parents say

6. Becomes tearful when told to do something s/he does not want to do

7. Rarely cries when s/he hears a sad story

8. Rarely becomes upset when watching a sad event in a TV show

9. Sometimes appears downcast for no reason

10. Rarely becomes discouraged when s/he has trouble making something work
APPENDIX B

PARENT REPORT OF CHILDREN REACTIONS
PARENT REPORT OF CHILDREN REACTIONS

Emotion Regulation Questionnaire, adapted after Larsen and Diener’s (1987) Affectivity Scale for the NICHD Study of Early Care and Youth Development

MOTHER and FATHER REPORT

Children differ in the ways that they respond to events and in their expression of emotion. Please indicate how your child reacts to events by circling the number above the scale shown below each statement. Please describe how your child reacts, not how you think a child should react or how you think other children react.

Please think about when your child feels emotions, even if your child does not get emotional very often.

1. When my child feels an emotion, either positive or negative, my child feels it strongly.
   1  2  3  4  5
   Never Occasionally About Half the Time Usually Always

2. After finishing a difficult task, my child feels delighted or elated.
   1  2  3  4  5
   Never Occasionally About Half the Time Usually Always

3. My child responds very emotionally to stories, movies and events.
   1  2  3  4  5
   Never Occasionally About Half the Time Usually Always

4. My child is calm and not easily aroused.
   1  2  3  4  5
   Never Occasionally About Half the Time Usually Always

5. When angry, it is easy for my child to still be rational and not overreact.
   1  2  3  4  5
   Never Occasionally About Half the Time Usually Always
6. When happy, my child is contented and calm rather than exhilarated and excited.

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<td>About Half the Time</td>
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7. When my child experiences anxiety, the anxiety is normally very strong.

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8. Even when happy, sad, or upset, my child does not get highly emotional.

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9. When happy, my child is bursting with joy.

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10. My child is slow to become angry, nervous or upset.

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