ATTACHMENT PATTERNS RELATIONSHIP TO INTELLIGENCE AND ACADEMIC ACHIEVEMENT IN SCHOOL-AGE CHILDREN

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ABSTRACT

The purpose of this study was to investigate the links among children's representations of attachment and their intelligence and academic achievement. John Bowlby's attachment theory is the framework used in this study to understand and explain differences in children's intelligence and academic achievement. Bowlby maintained that the quality of children's attachment to their caregivers exerts a strong influence on their ability and interest in investigating their environment. According to attachment theory, the quality of children's attachment to their primary caregivers would be expected to be associated with their intelligence and scholastic achievement. The findings from this study suggest that attachment patterns are significantly related to children's crystallized intelligence, which involves learning, knowledge and skills that are accumulated from past experiences. Attachment patterns were not significantly related to children's global intelligence or their academic achievement. The results of this study are relevant not only to attachment researchers but also school psychologists, parents, and teachers.

CHAPTER 1

INTRODUCTION

Attachment is the bond a child forms to a primary caregiver. This bond endures throughout life and has a profound effect on the individual's development. The impact of this early attachment relationship can be seen in a child's social emotional development, cognitive and language development, school readiness, school success/failure, and overall adjustment to school. For example, children with an insecure attachment to their primary caregivers experience problems regulating their emotions and behaviors, focusing their attention in class, learning, and exploring their environment (Webster-Stratton and Reid, 2004). Similarly, O'Connor and McCartney (2007) found that children with the specific insecure attachment patterns of ambivalent and insecure/other demonstrated low-level communication and attention skills and had difficulty engaging in tasks in school. In contrast, children with secure attachment patterns have been found to exhibit socially appropriate emotional expression and control, engage in more complex play, and show more focused attention in class and greater exploration of their environment (Cassidy, 1994; Jacobsen & Hofman, 1997; O'Connor & McCartney, 2007). Thus, secure early attachment to a primary caregiver serves as a protective factor that leads to success in school and paves the way to school completion. With this in mind, it is important to understand attachment and its relationship to cognitive ability and academic achievement because these variables can predict success in school and beyond.

While there is a large literature base focused on attachment, there is a smaller amount of literature addressing the relationship between attachment and cognitive ability,

and the available literature is limited in two ways. First, researchers have by and large examined the effects of the two major attachment categories, secure and insecure, on cognitive abilities rather than examining how the four *specific* attachment patterns relate to cognitive abilities. Second, the research lacks agreement about whether there is a correlation between attachment and cognitive ability. Nine studies have found a relationship between attachment and cognitive abilities while two studies did not find a relationship (Crandell & Hobson, 1999; Foss, Hirose & Barnard, 1999; Hazen & Durrett, 1982; Jacobsen, Edelstein, & Hofman, 1994; Karrass & Braungart-Rieker, 2004; Kirsh & Cassidy, 1997; Van Bakel & Riksen-Walraven, 2002; Van Ijzendoorn, Dijkstra, & Bus, 1995; Van Ijzendoorn & Van Vliet-Visser, 1986; Vorria et al, 2006; Wintgens et al, 1998). Among the studies, only four specifically examined the relationship between attachment and intelligence (IQ) (Crandell & Hobson, 1999; Foss, Hirose & Barnard, 1999; Van Ijzendoorn, Dijkstra, & Bus, 1995; Van Ijzendoorn & Van Vliet-Visser, 1986). The remaining studies analyzed the relationship between attachment and cognitive skills such as memory, attention, verbal and deductive reasoning and spatial abilities (Hazen & Durrett, 1982; Jacobsen, Edelstein, & Hofman, 1994; Kirsh & Cassidy, 1997; Van Bakel & Riksen-Walraven, 2002; Vorria et al, 2006). The particular findings of the different studies will be detailed in the literature review provided in Chapter 2.

In the more widely studied area of attachment and academic achievement, the predominant findings in the literature indicate that the attachment bond between the child and the primary caregiver is associated with academic achievement and general school

performance. Studies have linked the different patterns of attachment to school failure and dropout, school readiness and overall adjustment to school (Jimerson, Egeland, Sroufe, & Carlson, 2000; Marcus & Sanders-Reio, 2001; Webster-Stratton & Reid, 2004). Furthermore, research shows that attachment to parents contributes to students' motivation, and high motivation is one of the key variables affecting school achievement (Wong, Wiest & Cusick, 2002).

Based on the principles of attachment theory (Bowlby, 1979/1988), the mother-figure serves as a secure base, allowing the child to explore the environment and to become knowledgeable and competent. Without this secure base, the child's exploration is inhibited as well as his or her competence. This occurs because the child is focused on maintaining proximity to the attachment figure and consequently does not explore the environment. It would be expected that the child's lack of exploration would also negatively impact his or her overall intelligence and performance in school. Therefore, the present study examined school aged children's attachment to their primary caregivers and how these patterns of attachment relate to the children's cognitive abilities and academic achievement. The remainder of this chapter focuses on the problem, the purpose, and the research questions addressed in this study. Definitions of significant terms used throughout the study are also provided.

Statement of the Problem

This study examined the relationship between children's attachment patterns to their primary caregivers and their cognitive ability and academic achievement. Specifically, differences in levels of intelligence and academic achievement that can be

associated with the four attachment patterns (secure, anxious-ambivalent, anxious-avoidant, and disorganized) were measured. This problem was explored in school-age children who attend public elementary schools in New Jersey and New York. Although previous studies have examined the impact of attachment on intelligence, the findings are inconclusive. Some results indicate a significant relationship between attachment and IQ while others show a weak correlation or none at all. Additionally, among the studies which have investigated the relationship between attachment and IQ, few have included all four attachment patterns as variables. In terms of academic achievement, the literature reflects a consensus that there is a correlation between the early attachment relationship with a mother-figure and academic achievement. Based on empirical evidence, researchers have associated attachment patterns to school readiness, overall adjustment to school, scholastic competence, and school failure and dropout (Jimerson et al., 2000; Marcus & Sanders-Reio, 2001; Schwartz & Davis, 2006).

Purpose of the Study

The purpose of this study is to determine if a child's attachment bond to a primary caregiver is associated with his or her general intellectual function and academic achievement and whether the correlation is greater with intelligence or academic achievement. This research is important because there is solid empirical evidence which shows that the quality of early attachment relationships affects later social emotional and cognitive development, which, in turn, affects academic achievement (Jacobsen & Hofman, 1997). In particular, the literature reveals that cognitive deficits are associated with a disruption in attachment relationships. For example, Chisholm (1998) found that

children adopted from Romanian orphanages with an insecure attachment had a significantly lower IQ compared to non-adopted children with a secure attachment. The literature also indicates that attachment patterns may be directly related to academic achievement because these internalized attachment patterns may place constraints on a child's learning and exploration (Moss & St. Laurent, 2001). Furthermore, learning occurs and intelligence develops through interaction with the environment. A child's attachment to a primary caregiver significantly influences how the child interacts with the environment. Therefore, the relationship between attachment patterns and intelligence merits further examination.

It is widely accepted that intelligence and academic performance are important markers of success in the real world. However, outside of attachment researchers, it is not commonly known that secure early attachment to a primary caregiver serves as a protective factor that fosters success in school and completion of school (Marcus & Sanders-Reio, 2001). Rumberger (1995) found attendance, parental involvement and academic achievement as salient predictors of school completion. Of particular interest is the finding that secure attachment to parents has been shown to be a predictor of graduation from high school. This demonstrates the importance of studying the influence of attachment on academic achievement due to the impact it has on whether a child ultimately finishes school.

This study will advance the literature on attachment and intelligence by addressing the limitations of previous research in this area. Previous studies have analyzed only the general attachment categories of secure and insecure and how they

relate to intelligence. This study will examine associations between intelligence and the four specific attachment patterns: secure attachment, anxious-ambivalent attachment, anxious-avoidant attachment and disorganized attachment. Additionally, this study will include the measure of intelligence, which largely has been excluded by contemporary studies that have examined developmental outcomes as a function of attachment style. Furthermore, due to incongruent results from previous studies, it remains to be established whether the quality of the child's attachment to a primary caregiver is relevant for general intellectual function. This limitation will be addressed here by including IQ as a variable.

Another objective of this study will be to offer school psychologists insight into the underlying social emotional reasons for academic underachievement. It will also provide a framework (i.e. attachment theory) for conceptualizing low academic achievement, which has been linked to school dropout. With this insight, school psychologists may be able to work with teachers in a consultative relationship to provide intervention to low achieving students with insecure attachment patterns. Therefore, this study may provide information that could facilitate the prevention of school dropout as well as give school psychologists an understanding of attachment styles and their related behavior patterns. The evidence suggests that early identification of attachment style and the associated behavior patterns may facilitate prevention of maladaptive behavior patterns (Kennedy & Kennedy, 2004).

Research Questions

This study seeks to answer four questions in order to advance the research on attachment and intelligence and academic achievement. The questions are as follows: (1) Is there a relationship between secure, anxious-ambivalent, anxious-avoidant and disorganized attachment patterns and level of intelligence? (2) If there is a relationship between these variables, to which component of intelligence (fluid or crystallized) is attachment more related? (3) Is there an association between secure, anxious-ambivalent, anxious-avoidant and disorganized attachment patterns and academic achievement? (4) Is attachment pattern more related to intelligence or academic achievement?

Definition of Terms

There are specific terms used throughout this study which may have different interpretations. Thus, for the sake of clarity, each term will be defined in the way it is used in this research.

Attachment Pattern. This construct is measured by the Friends and Family Interview. Attachment pattern is defined as internalized patterns of behavior that the child exhibits when seeking and maintaining proximity to an attachment figure (Bowlby, 1979). These patterns indicate the quality of their attachment bond, and are categorized as secure attachment, anxious-ambivalent attachment, anxious-avoidant attachment and disorganized attachment.

Secure Attachment. This is defined as a pattern of attachment in which infants have a high quality, relatively un-ambivalent relationship with their attachment figure. The child can use the caregiver as secure base for exploration. During times of

separation, the child may be upset when the caregiver leaves, but happy when she or he returns and able to recover quickly from distress (Ainsworth, 1973).

Anxious-ambivalent Attachment. This pattern of attachment is characterized by uncertainty and dependence on the attachment figure. These infants/children are clingy and stay close to their caregiver rather than exploring their environment. During separation, these children tend to become very upset, and they are not readily comforted by strangers. When the caregiver returns, these children are still not easily comforted. They both seek comfort and resist efforts by the caregiver to comfort them (Ainsworth, 1973).

Anxious-avoidant Attachment. This is characterized by the infant/child appearing indifferent toward their caregiver and possibly avoiding the caregiver. When separated from the caregiver, these children may or may not become upset. If they are upset when left alone, then they are as easily comforted by a stranger as they are by a parent. When the caregiver returns, these children are indifferent toward the caregiver or avoid her (Ainsworth, 1973).

Disorganized Attachment. Infants and children with this attachment pattern have no consistent way of coping with the stress of separation from their primary caregiver. Their behavior is often confused or contradictory. For example, they may exhibit fearful smiles and look away while approaching their mother and often appear dazed or disoriented. These children want to approach their mother, but they also seem to regard her as a source of fear from which they want to withdraw (Main & Hesse, 1990).

Intelligence. This construct is measured by the child's score on the Reynolds Intellectual Assessment Scales (RIAS). This test measures general intelligence and its components, fluid and crystallized intelligence. Based on the Cattell-Horn Model of Intelligence (Horn & Cattell, 1966), intellectual abilities are organized at a general level into two general intelligences, fluid intelligence and crystallized intelligence.

Fluid intelligence. This type of intelligence involves one's ability to reason and make sense of abstract information. It is an individual's ability to think and act quickly, solve novel problems, and encode short-term memories. This has been described as the source of intelligence that an individual uses when he or she does not already know what to do. Fluid intelligence is relatively independent learning, experience, education and acculturation (Horn, 1967).

Crystallized Intelligence. This type of intelligence involves learning, knowledge, and skills that are accumulated. It is learning from past experiences and stems from past learning and acculturation. This type of intelligence is based upon facts and is demonstrated in tests of knowledge, general information, vocabulary and a wide variety of acquired skills (Horn & Cattell, 1967). Personality factors, motivation and educational and cultural opportunity are essential to its development.

Academic Achievement. This term is measured by the child's scores on the Wide Range Achievement Test – Fourth Edition (WRAT-IV). Academic achievement refers to how well a student has met age and grade equivalent standards set forth by the State Department of Education. This also refers to how a child is progressing in school.

Summary

A child's bond with a primary caregiver plays a key role in later social emotional and cognitive development. It sets the stage for later learning, intelligence and academic achievement because, based on the quality of the attachment relationship, the child develops an internal representation of himself, others and the environment that guides his response to others and the environment. Consequently, the securely attached child feels competent in relationships with others and explores the environment. The insecurely attached child feels anxious or detached in relationships with others and his attachment behavior is either over-activated or de-activated, which puts constraints on his exploration of the environment. This inhibited exploration of the environment would be expected to negatively impact the development of crystallized intelligence. In the context of school, the teacher-child relationship resembles the parent-child attachment relationship, whereby the teacher is the secure base from which the child can explore at school. If the child has difficulty utilizing the teacher as a secure base and, therefore, has limited exploration, his progress in school will likely be negatively impacted.

As such, the present study examines the relationship between secure, anxious-ambivalent, anxious-avoidant and disorganized attachment and intelligence and academic achievement. This study seeks to determine if there are differences in the children's level of intelligence and academic achievement that can be associated with their specific attachment patterns.

The following chapter provides a review of the literature related to this study. The third chapter details the methodology and procedures used in this study. The fourth

chapter presents the results of this study. Finally, the fifth chapter offers conclusions, relates findings to those of previous studies, and also identifies limitations and implications for future research.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter presents an overview of the development of attachment theory and the existing literature examining its ramifications. It describes the different attachment classifications and assessment methods, identifies the risk factors for the development of insecure attachment, and considers the behavioral outcomes associated with each attachment classification. The remainder of the chapter then critically reviews the literature regarding the impact of attachment on intelligence and academic achievement and examines the areas suggested for future research. The review concludes with a description of the independent and dependent variables to be measured and areas suggested for further study.

Overview of Attachment Theory

The concept of attachment came to light through the work of John Bowlby (1957). Bowlby became interested in early infant bonding to a mother figure while he was studying the adverse effects of inadequate maternal care during early childhood on personality development. He found that the widely held psychoanalytic explanations of early personality development, which focused on dependency and feeding, were inadequate. Psychoanalytic explanations did not reflect the central role that the mother-child emotional bond plays in early personality development (Bowlby, 1988). Thus, he developed an alternative explanation, focusing on the child's tie to its mother as an *attachment* instead of dependency. He called this "attachment theory."

Bowlby defined attachment as a “lasting psychological connectedness between human beings” (1969, p.194). He stated that an infant has an instinctive tendency to seek proximity and form an emotional bond to its caregiver, not primarily for oral needs, but for protection and reproductive success. Attachment is based on emotional comfort or connectedness rather than feeding. Bowlby (1969) explained that attachment experiences are gradually internalized and organized into patterns of personality that guide behavior and later relationships. He identified these patterns as secure or insecure attachment styles and postulated that patterns of sensitive parental responses lead to secure attachments while patterns of inconsistent or harsh responding lead to insecure attachment. Furthermore, when a disruption of attachment occurs, it can be devastating to both the emotional and the physical well being of the child and persist throughout the lifecycle (Bowlby, 1979).

Bowlby based his new theory on his observations of children and on Lorenz’ (1935) findings that goslings and ducklings formed strong bonds to a mother figure without the intermediary of food. Harlow’s (Harlow & Zimmerman, 1959) findings that rhesus monkeys developed an attachment to a soft dummy mother who did not provide food rather than a wire dummy mother that provided food also served as a basis for the development of attachment theory. With an understanding of the origin of attachment theory, an overview of the theory is detailed here in order to highlight the principle features and to delineate the normal and deviant patterns of care-giving behavior that lead to secure and insecure attachment.

According to Bowlby (1979) attachment theory is characterized by six specific features. The first is that attachment behavior is specific, meaning that it is directed toward one or a few specific persons. For clarification purposes, attachment behavior is any behavior that a child exhibits to obtain and/or maintain a desired proximity to his attachment figure (Bowlby, 1988). The child usually prefers his mother-figure, whom he will seek proximity to when physically hurt, sick or emotionally upset. However, in the mother's absences, someone else he knows will suffice. In these situations and in general, a child usually shows a clear order of preference for the attachment figures (Bowlby, 1979/1988).

The second feature is that attachment persists throughout life. At different developmental stages in life, early attachments may become weaker or become supplemented by new ones. However, the early attachment bond endures and is rarely broken unless forced separation occurs through death or some other circumstance. For example, the infant's attachment to her mother may become attenuated during adolescence, and the adolescent may supplement that attachment relationship with a boyfriend or later in adulthood with a husband.

The third feature of attachment theory is engagement of emotion. This means that intense feelings are created during the formation and maintenance of the bond and when the bond is threatened or broken. Bowlby (1979) described the formation of the bond as falling in love and the maintenance of the bond as loving someone. Feelings of anxiety arise with the threat of losing the attachment figure, and grief ensues with the loss of the loved person. When the bond is unchallenged it gives rise to feelings of security.

The fourth feature of attachment theory is that the attachment behavior to a preferred figure usually develops in the first nine months of life with the person with whom the child interacts most often. This is the person who is primarily caring for the infant, usually the mother, but it could be a father, grandparent or nanny.

The fifth feature of attachment theory is learning. This simply means that a child learns to differentiate people he/she knows from strangers. This is a central component to developing an attachment.

The sixth feature is the organization of attachment behavior into different systems. These systems include the *internal working model of attachment* which typically develops within the first two years of life (Bowlby, 1979/1988). According to Bowlby (1979/1988), the internal working model of attachment develops when infants internalize their interactions with attachment figures into a mental representation of the self, of attachment figures, and of relationships in general. This model guides the child's expectations about relationships throughout life. It influences his/her overall adjustment, social behavior and the development of self-esteem and self-concept.

Securely attached children have a positive working model of the self and others and have a pattern of warm and sensitive interactions with responsive caregivers. Anxious-ambivalent and anxious-avoidant children have a negative working model of the self and others and have a history of frustrating and painful interactions with unresponsive caregivers. Disorganized children also have a negative working model of the self and others and have a history of frightening interactions with their attachment figures (Jacobsen, et al., 1994; Karass & Braungart-Reiker, 2004).

Another concept that is central to attachment theory is the notion of the primary caregiver being a *secure base* from which the child explores. The secure base is when the presence of a trusted caregiver provides the child with a sense of security that allows the child to explore the environment and to become knowledgeable and competent. The caregiver is readily available to respond to the child when called upon for comfort, encouragement, and help but only when necessary (Bowlby, 1988). Ultimately, the primary caregiver serves as a safe haven when the infant or child feels threatened or insecure. Bowlby (1988) acknowledged Mary Ainsworth as the person who first introduced the concept of secure base and the individual who brought his theory into the mainstream.

Mary Ainsworth pioneered the first studies in 1954 to provide empirical support for Bowlby's attachment theory (Ainsworth, 1967). Her early studies involved extensive naturalistic observations of infant-mother interactions. Later, on the basis of her early research, she developed the first laboratory test to assess an infant's attachment to his or her primary caregiver. This test is known as the Strange Situation Procedure (SSP). In the SSP, the infant's attachment behavior toward the parent is observed in a laboratory playroom when an unfamiliar adult enters and then the infant is briefly separated twice from his/her attachment figure. During the reunion with the parent, Ainsworth observed whether the infant was able to feel secure in the presence of his/her caregiver and how well he/she utilized the caregiver as a source of comfort. This became known as the parent providing a secure base for the child.

Furthermore, in her work with the SSP, Ainsworth (1973) detected three distinct patterns of infant behavior that indicated the quality of the child's attachment to his or her primary caregiver. Based on these patterns of behavior, Ainsworth identified three attachment categories: secure attachment, anxious-ambivalent attachment, and anxious-avoidant attachment. The categories anxious-avoidant and anxious-ambivalent are insecure attachment patterns. These terms are alternately designated as insecure-avoidant and insecure-ambivalent. Subsequent to Ainsworth's work, other attachment researchers identified a fourth category of insecure attachment called disorganized attachment (Main & Hess, 1990; Main & Solomon, 1990). These categories are the most widely known and generally accepted classifications of attachment in the field of psychology and human development.

Bowlby (1979) has described both normal and deviant patterns of care-giving behavior that lead to secure and insecure attachment patterns. The caregiver behavior that leads to secure attachment is a pattern of responding to the child that is consistently sensitive, caring, loving and comforting. A caregiver that responds quickly to a crying infant by holding, soothing, physically touching and talking helps the child to feel confident that the caregiver will usually respond in this comforting manner. This consistently sensitive way of responding helps the child to build a healthy, un-ambivalent, secure attachment to the caregiver.

A recent study conducted by McElwain and Booth-LaForce (2006) provides evidence that sensitive responding by the primary caregiver fosters a secure attachment. This study looked at whether mothers' sensitivity to their infants' distress and non-

distress at 6 months and 15 months affected the infants' attachment styles. They measured whether the child was securely or insecurely attached at 15 months. The results showed that greater maternal sensitivity to distress (but not non-distress) at 6 months of age was associated with increased odds of secure infant-mother attachment. In contrast, maternal sensitivity to distress and non-distress at 15 months was not a significant predictor of secure attachment. This indicates that infant-mother attachment may be particularly important during early infancy and that there may be a critical period for its development.

The caregiver behavior that leads to the three types of insecure attachment is comprised of a pattern of responding to the child in ways that are not consistently sensitive nor nurturing, but rather insensitive, inconsistent and sometimes frightening. This type of care-giving behavior is characterized by rejection, anger, intrusiveness, and inconsistent responses to the child's attempts to gain proximity to the caregiver (Isabella, 1993; Van Ijzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). An example of such an inconsistent response would be a caregiver responding to a sick child who is crying in an attempt to gain proximity at some times but not at others. Another example would be responding with anger at times and offering comfort at others. Therefore, the caregiver who responds to a child who is emotionally distressed, frightened, hurt or sick by ignoring, laughing, mocking, or becoming angry leads the child to feel unimportant, unworthy, and unsure of how the attachment figure will usually respond. This overall style of response fosters an insecure child-caregiver attachment.

Based on the principles of attachment theory, the child-caregiver attachment relationship significantly influences how a child interacts with the environment. Insecurely attached children are inhibited in their exploration of the environment, which may place constraints on their learning and cognitive development. In contrast, securely attached children actively explore their environment and become knowledgeable and competent. Therefore, secure attachment to a primary caregiver serves as a protective factor that avails a child to learning in school and fosters the completion of school. With this in mind, it is important to understand intelligence and academic achievement in relation to attachment because these variables are important markers of success in school and the real world.

The following review of studies details the impact of the child-caregiver attachment bond as it relates to a child's intellectual functioning and academic performance. Most of these studies share similar strengths and weaknesses. In general, there is a lack of consistency in the classification of attachment among the literature. In these studies there are varieties of assessment techniques used to assess the quality of attachment in children. In particular, there are different assessment methods for each stage of development in the lifespan. The different assessment tools yield different attachment categories. Consequently, there is inconsistency in the categorization of attachment among the research.

Attachment and Intelligence

A review of the literature on attachment and intelligence indicates that children's cognitive functioning may be influenced by the quality of the early attachment

relationship with the primary caregiver. The research shows that children with different attachment patterns explore and react to their environment differently. In general, securely attached children actively explore their environment, whereas, insecurely attached children are inhibited in their exploration of their environment. According to the research (Crandell & Hobson, 1999; Hazen & Durrett, 1982; Jacobsen, Edelstein, & Hofman, 1994; Kirsh & Cassidy, 1997; O'Connor & McCartney, 2007; Van Ijzendoorn & Van Vliet-Visser, 1986; Vorria et al., 2006) this results in securely attached children acquiring more knowledge about their world and developing stronger cognitive skills than insecurely attached children. Several studies are reviewed here that support this notion.

Hazen and Durrett (1982) conducted a study that examined how attachment quality impacts toddlers' exploration and cognitive mapping abilities. Their study consisted of 28 white middle class boys and girls ranging in age from 30 to 34 months. Attachment styles in this study were classified as anxious/resistant, anxious/avoidant or secure. They hypothesized that children who were classified as anxious/resistant or anxious/avoidant would be passive in their exploration and less skilled in their cognitive mapping. Securely attached children were expected to engage in active exploration and be highest in spatial cognitive abilities compared to children classified as anxious resistant and anxious avoidant. Securely attached children were also expected to be more independent in their exploration.

Hazen and Durrett (1982) found that securely attached children did, in fact, explore independently and were less inhibited in their patterns of exploration than

insecurely attached toddlers at the age of two and a half. They also found that securely attached children scored higher on tasks of spatial ability than insecurely attached toddlers. Although the findings were significant, two limitations were noted. First, the number of participants in the insecure attachment groups was small. Specifically, there were eight participants in the anxious avoidant group and seven participants in the anxious resistant group. Second, the all white middle class sample is not representative of the general population. These two shortcomings limit the generalizability of the findings.

Van Ijzendoorn and Van Vliet-Visser (1986) expanded upon Hazen and Durrett's (1982) research on the association between attachment quality and specific cognitive skills with their examination of the impact of attachment security on overall cognitive functioning. Their longitudinal study looked into whether the quality of a child's attachment to his/her primary caregiver in infancy would influence his/her intellectual ability in kindergarten. The authors hypothesized that securely attached infants would perform better on an IQ test in kindergarten than anxiously attached children. This study consisted of 77 Dutch mother-child dyads. The average age of the child at the start of the study was 24 months. The socioeconomic status of the participants was upper class. The authors used the Strange Situation to measure attachment quality at 24 months and the Leiden Diagnostic Test to measure IQ at 5 years of age. Van Ijzendoorn and Van Vliet-Visser found that securely attached children obtained the highest IQ and concluded that the quality of attachment in the second year of life appears to make a difference in cognitive development and overall cognitive functioning in kindergarten. Similar to the

previous study, these findings may not be generalized to the overall population because the sample size in each attachment group was small and the participants' SES is above average, which is not representative of the general population.

Jacobsen, Edelstein, and Hofman (1994) also conducted a longitudinal study of the relation between representations of attachment in childhood and cognitive functioning in childhood and adolescence. This study examined the association between children's representation of their attachment relationship and their self-confidence and cognitive functioning in childhood and adolescence. The authors hypothesized that children with insecure-disorganized attachment representations would be more disadvantaged in their cognitive performance than securely attached children. They predicted that securely attached children would have a higher self-esteem and perform better cognitively. Furthermore, Jacobsen et al (1994) postulated that self confidence would mediate the effect of emotional security that leads to better cognitive performance.

In Jacobsen et al.'s (1994) study, there were 85 participants consisting of 41 girls and 44 boys. All participants were from an urban area in Iceland and their SES was lower and middle class. The average age at the beginning of the study was 7 years 7 months. In the second phase of the study the ages of the participants ranged from 15 to 17 years. Jacobsen et al. used the Separation Story to measure attachment and administered Piagetian Tasks to assess cognitive ability. Jacobsen et al. found that attachment significantly affected children's overall cognitive functioning. Children who were securely attached obtained significantly higher scores on the battery of Piagetian Tasks from ages 7 to 15 than children with insecure-avoidant or insecure-disorganized

attachment pattern. In particular, children who were securely attached at age 7 performed better on Piagetian Tasks than insecurely attached children later in their development. They showed an advantage in deductive reasoning in middle childhood and adolescence.

In 1995, Van IJzendoorn, Dijkstra, and Bus conducted a quantitative meta-analysis on seven previous studies of the association between attachment and language and cognitive competence. Van Ijzendoorn et al.'s (1995) analysis revealed that there was a significant positive association between the quality of infant attachment and the child's language development. Their analysis also indicated a positive association between attachment quality and cognitive ability. However, this was a smaller correlation. Based on their findings, Van IJzendoorn et al. posited that a secure attachment relationship may jump start cognitive and language development because secure parents may be better teachers and secure children may be more motivated to learn.

Kirsh and Cassidy (1997) conducted a study on preschoolers' attention to and memory for attachment-relevant information. This study examined the relationship between attachment quality and the cognitive processes of attention and memory in 68 middleclass children of European-American descent living in Pennsylvania. The authors predicted that securely attached children would look at positive pictures of a parent child-dyad more than other children. They hypothesized that insecure/ambivalent children would attend to pictures of the angry dyad more than secure children and that insecure/avoidant children would look away from attachment-related stimuli. They also postulated that secure children would have the best memory for the stories in which the parent was responsive to the child and insecure/avoidant children would recall the

rejecting stories best. Finally, insecure/ambivalent children would recall exaggerated stories best. There were no children in the disorganized category of attachment.

In this study, attachment was evaluated at 15 to 18 months of age using the Strange Situation. General cognitive functioning was measure by the Peabody Picture Vocabulary Test and two separate tasks were given to assess the children's attention and memory at the age of 45 months. In general, Kirsh and Cassidy (1997) found that secure children process information differently than insecure children. In the attention task, insecure-avoidant children paid less attention to the stimuli than the other children. Insecure-avoidant and insecure-ambivalent children were less attentive to attachment relevant information than secure children. Finally, secure children had overall better recall than both types of insecurely attached children. Although the findings of this study are significant, it is important to note that sample size in each attachment category was small, which makes generalizing the results to the general population problematic.

Foss, Hirose, and Barnard (1999) were interested in investigating the relationship of three types of parent-child interactions in depressed and non-depressed mothers and their children's mental development at 13 months. They specifically looked at mother-child interactions with regards to feeding, attachment behaviors, and joint attention in depressed and non-depressed mothers. The authors examined the relationship between these three variables in both depressed and non-depressed groups and the child's mental development index (MDI) at one year of age. The authors predicted that children with depressed mothers would be less secure in their attachment style. The authors also hypothesized that there would be a positive relationship between secure attachment of the

child and the child's score on the MDI. Specifically, securely attached children would have a higher MDI score. The sample consisted of 36 mother-infant dyads with an equal number of depressed and non-depressed mother dyads. The infants' mental development was measured with the Bayley Scales of Infant Development. Foss et al. (1999) found that securely attached infants had a higher MDI score than insecurely attached children. This suggests that securely attached infants are more advanced cognitively than insecurely attached infants. This study had a limitation in that all of the mothers were college educated and this was not controlled for in the experiment. Thus, the correlation may not be solely due to attachment quality because mother's education is a confounding factor.

Crandell and Hobson (1999) continued previous research by studying how a mother's own attachment pattern and her relationship with her child impacts a child's cognitive abilities. The authors predicted that children of secure mothers would demonstrate higher intellectual functioning than children of insecure mothers. They also predicted that children who were involved in synchronous parent-child interactions during a free play task would demonstrate higher intellectual functioning than children who were involved in less synchronous parent-child interactions. The sample consisted of 46 mother-infant dyads who were predominantly middle class Caucasian, married and well educated. The mean age of the boys and girls was 40 months. The Adult Attachment Interview as a Questionnaire (AAIQ) was used to measure the mother's attachment pattern. The WAIS-R was used to measure mothers IQ. An abbreviated version of the Stanford-Binet Intelligence Scale Fourth Edition was used to measure the

children's IQ. A free-play task was utilized to assess mother-child synchrony. Crandell and Hobson found that children of secure mothers had an overall higher IQ than children of insecure mothers. Specifically, children of secure mothers had a 19 point advantage on their FSIQ compared to children of insecure mothers. They found that the child's IQ was significantly related to maternal attachment security independent of the influence of maternal IQ, education and SES. The degree of parent-child synchrony was also related to the child's IQ with the more synchronous relationship equaling higher intelligence. The limitations noted in this study include a nonrandomized sample of self-selected middleclass mother-child dyads and a relatively small sample size. This limits the generalizability of these findings to other populations.

In 2003, Spieker, Nelson, Petras, Jolley and Barnard explored the influence of child care and infant attachment security on cognitive and language outcomes in a sample of 179 low-income toddlers. The authors postulated that securely attached children living in poverty would benefit from any type of childcare in terms of cognitive and language development. They also hypothesized that daycare center care would benefit insecurely attached low-income children's cognitive and language development. Attachment was evaluated using the Strange Situation and cognitive ability was assessed utilizing the Bayley Mental Development Index. Language development was assessed using a parent report measure and a standardized measure. Analysis of the results indicated that children with secure attachments had both higher cognitive and language development at the age of 3 than children with insecure attachment patterns (Spieker et al., 2003).

A limitation of Spieker et al.'s (2003) study is that, although the researchers separated the participants into the different attachment categories based on the SSP, they did not conduct their analysis on the different insecure groups. They combined the insecure-avoidant, insecure-resistant and disorganized toddlers into the overall category of insecure attachment when they did their analysis. It is important to note that disorganized attachment comprised 22 percent of the sample, insecure-avoidant comprised 26 percent and 5 percent were classified as insecure-resistant. This sample had a higher proportion of disorganized and insecure-avoidant classifications, which may have a more negative impact on language and cognitive development than insecure-resistant attachment.

Recently, Vorria et al. (2006) investigated whether children reared in an institution until the age of two and then subsequently adopted into a nurturing family were able to overcome their initial adverse experiences. Specifically, this group of researchers compared adopted children to a control group raised from birth by their biological parent to find out if the adopted children were able to catch up by age four in the areas of cognitive development, social and emotional development and physical development. The quality of the children's attachment representations were also examined. The sample in this study consisted of 61 adopted children from Greece with a mean age of 4 years 2 months who had been adopted into their new homes at 2 years of age. There were 29 girls and 32 boys who participated. The comparison group was comprised of 39 children matched for age and gender. These authors found that children raised in an institution for the first two years of life did *not* catch up cognitively and that

their attachment representations did *not* change from insecure to secure. Specifically, Vorria et al. found that at the age of 4 adoptive children still performed at a lower cognitive level than family reared children. They also found that adoptive children were less able to understand the emotions of others. A follow up study at the later stages of development (i.e. middle childhood, adolescence, etc.) would be beneficial to determine if this cognitive disadvantage is long-term.

Most recently, O'Connor and McCartney (2007) examined the relationship between maternal attachment patterns and cognitive skills of first graders. They wanted to find out if specific insecure attachment patterns (i.e. avoidant, ambivalent, controlling and insecure/other) were associated with cognitive skills and whether children's exploration, maternal instruction, social relationships, and test taking behaviors mediated these associations. The subcategories of insecure attachment identified in this study come from the Cassidy, Marvin and MacArthur Working Group on Attachment (1992). The controlling and insecure/other attachment styles most closely resemble the disorganized pattern of attachment.

O'Connor and McCartney's (2007) study was a large scale study consisting of a randomly selected sample of 1364 families. African-American, Latino-American, Asian-American and Caucasians were represented in the sample which included 1000 children. The children's cognitive skills were measured at 15 months with the Bayley Mental Development Index and again in first grade using the cognitive abilities scales of the Woodcock Johnson Psycho-Educational Battery-Revised (WJR). The children's attachment was measured at 36 months of age using a modified Strange Situation.

O'Connor and McCartney found that ambivalent and insecure/other attachment patterns negatively impacted cognitive skills. Ambivalent and insecure/other children had significantly lower cognitive skills than their secure peers. O'Connor and McCartney also found that the effect of insecure/other attachment on cognitive skills was attributable to child exploration, maternal instruction, social relationships and behaviors related to teasing. Insecure/other children evidenced low levels of task engagement, had low-quality relationships with teachers and demonstrated low-level communication and attention skills which were associated with lower cognitive skills. Therefore, O'Connor and McCartney concluded that pervasive maladjustment was at the root of the negative influence of insecure/other attachment styles on cognitive skills and that attachment appears to be an important contributor to cognitive skills when examined in large, diverse samples. It is important to note that this was a well controlled large scale study, but that this sample contained relatively few high-risk children, which could have possibly reduced the strength of the association between insecure/other attachment and cognitive abilities.

Although many studies found an association between attachment representations in children and cognitive ability, there are studies that have found evidence to the contrary. Wintgens et al. (1998) found that insecurely attached toddlers who initially showed deficits in their cognitive ability recovered by age five. Wintgens et al's findings resulted from their evaluation of children's attachment style and cognitive development at 18 months of age and 5 years of age. They used the Story-Stem Completion Task with a doll family developed by Cassidy (1986) to measure the children's attachment.

Griffiths' Mental Development Scales and the McCarthy Scale for Children's Abilities were used to assess cognitive development. They found that insecure attachment was related to lower cognitive development and poor neurological status at 18 months of age. Specifically, the infants who were insecurely attached had a lower full scale developmental quotient (FSDQ). Although a difference between attachment groups and cognitive development was found at 18 months, no difference in FSIQ was found between the different attachment groups at age 5, indicating that the early negative impact of insecure attachment did not hold over time (Wintgens et al., 1998). These findings are in stark contrast to the recent findings of Vorria et al. (2006) which stated that children who were adopted from an institution with an insecure attachment classification did not catch up cognitively to their secure peers. However, these children did not experience a disruption in their attachment relationships and may have had a different insecure attachment classification than the adopted children in Vorria et al.'s study.

Karrass and Braungart-Rieker (2004) found a negative correlation between attachment and intelligence. In their study, they looked at whether infants' negative temperament predicted their IQ at the age of three and whether this association depended on their attachment to their mother. Temperament is a variable that has been shown to play a role a child's attachment to his/her primary caregiver (Magelsdorf et al., 1996). The authors predicted that negative emotionality would negatively impact later IQ, but only in insecurely attached children. The sample consisted of 63 mother-infant dyads. There were 36 girls and 27 boys who participated. The Strange Situation was used to

measure attachment at 12 months. The Infant Behavior Questionnaire was used at 4 and 12 months to measure the children's temperament. The Bayley's Scales of Infant Development were used to measure the children's cognitive development at 4 and 12 months. The Stanford Binet Fourth Edition was used to measure the children's IQ at age 3. Karrass and Braungart-Rieker found that infants categorized as having a negative temperament at four months of age had a higher IQ at age 3. Infants with a negative temperament at 12 months also had a higher IQ at 3, but only if they were insecurely attached. This is contrary to the majority of research exploring the correlation between attachment and intelligence. However, it is important to note that a direct relationship between attachment and intelligence was not measured here.

Based on the review, the majority of these studies share similar strengths and weaknesses. The marked strengths of these studies include standardized assessment tools to measure intelligence and early attachment, a range of ages between the studies, and several were longitudinal in nature. The most notable drawbacks of these studies include inconsistent categorization of the insecure attachment categories between studies, use of only two attachment categories (secure and insecure), limited sample size, and contradictory findings. Despite their methodological problems, most largely point to similar conclusions. Secure attachment is linked to better memory and reasoning, and higher language development and higher intelligence in children. In general, cognitive deficits are associated with a pervasive maladjustment and a disruption in attachment relationships.

Attachment and Academic Achievement

A review of the literature on attachment and academic achievement indicates that the quality of children's early attachment relationships with their primary caregivers is an important predictor of their achievement in school. The research shows that children explore their environment differently based on their attachment representations. In general, securely attached children navigate their environment autonomously and competently whereas insecurely attached children are passive and inhibited in their exploration of their environment. According to the research (Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001; Furrer & Skinner, 2003; Hortacsu's, 2001; Jacobsen & Hofman, 1997; Pianta, Nimetz, & Bennett, 1997; Wong, Wiest, & Cusick, 2002), this results in securely attached children being more able to benefit from the schooling environment which is reflected in their higher scholastic achievement. Several studies are reviewed here which substantiate the association between attachment quality and school performance.

In 1996, Toth and Cicchetti examined the impact of the mother-child relationship in maltreated and non-maltreated children's school functioning. Toth and Cicchetti (1996) contended that a secure attachment to the mother would promote competent school functioning, while an insecure relationship would contribute to maladaptive functioning. Results indicated that non-maltreated children who were securely attached had the highest level of school functioning as measured by attendance, standardized achievement test scores, suspensions, failing grades in half of academic subjects and being two or more years below age level in terms of grade placement. The results also

showed that maltreated children who had an insecure relationship with their mother performed the poorest in terms of school functioning. These children were found to be at risk of failing and being retained in their grade. These results accentuate the protective factor that the secure attachment bond has in children's academic performance.

In 1997 Jacobsen and Hofman conducted a study to find out if children's attachment style affects their adjustment beyond early childhood. They contended that children's attachment style predicts school behavior and academic competency during middle childhood and adolescence. In their study, Jacobsen and Hofman (1997) examined whether attachment continuously affected children's school behavior and achievement during the transition into adolescence. The authors measured attachment using a separation story which consisted of pictures depicting parent separation scenarios. They assessed school achievement by using the children's grade point average (GPA) and assessed school behavior by having the teacher complete a questionnaire. The researchers found that secure attachment style was linked to better attention, participation and GPA. Jacobsen and Hofman also found that attachment style predicted children's feelings of insecurity about self in school, which, in turn, affects achievement. It is important to note that GPA was used to measure academic achievement. This may not be an accurate measure of academic achievement because it is influenced by variables such as motivation and teacher subjectiveness.

Pianta et al. also conducted a study in 1997 which provides evidence for the influence of attachment on school performance. Pianta et al. (1997) examined the association between mother-child interactions, teacher-child interactions and school

performance in preschool and kindergarten. A total of 55 four-year-old boys and girls attending public school participated in this study. 69 percent were African-American and 31 percent were Caucasian. These children were at risk for low academic achievement and behavioral difficulties and were enrolled in an intensive intervention program as a preventative strategy. The mother-child interactions were measured by a joint problem solving task involving the mother and child. The teacher-child interactions were measured by the Teacher Attachment Q-Set. Finally, school performance was measured by the Boehm Test of Basic Concepts and the Teacher-Child Rating Scale. The results indicated that the quality of the child-mother interactions more than the child-teacher interactions predicted the children's performance on a concept formation task in preschool. The results also suggest that the child-mother relationship is positively correlated to preschool and kindergarten adjustment outcomes. It is important to note that the sample size of this study was small and unique in that the children were enrolled in an intensive intervention program to prevent academic underachievement. Therefore, these findings may not be applicable to the general population.

Jimerson, Egeland, Sroufe, and Carlson (2000) investigated the role that attachment, among other variables, plays in high school dropout. Using longitudinal data collected from age 6 months through 19 years, Jimerson et al. (2000) assessed the association between the quality of early infant-mother attachment relationship, quality of early caregiving, maternal sensitivity, socioeconomic status, academic achievement, and IQ and high school dropout at age 19. The sample consisted of 177 children living in the Minneapolis area. Several assessment tools were utilized in this study. The SSP was

used to measure infant-mother attachment at 12 and 18 months of age. The Wechsler Intelligence Scale for Children- Revised (WISC-R) was used to assess cognitive functioning and the WJR was employed to measure academic achievement. Results suggested that the process of dropping out begins before a child enters elementary school and revealed that the quality of the early attachment relationship and child-parent relationship is a powerful predictor of school dropout.

Hortacsu (2001) expanded upon Jacobsen and Hofman's (1997) research by studying the relationships between 195 Turkish children's achievement and their popularity in school, their parent's education level, children's attachment style, their perceptions of control and achievement. Among other predictions, Hortacsu hypothesized that parents' education level and children's attachment styles were positively associated with children's perceptions of control and social efficacy, which is linked to academic achievement. Attachment was measured with a Turkish translation of the Hazen and Shaver attachment-style prototype questionnaire. Participants' grades were used to determine their academic achievement. Hortacsu found that there is a relationship between attachment style and children's perceptions of control and self-efficacy, which, in turn, affected their school performance. It is important to note that an indirect rather than direct relationship was found. Hortacsu also found that parents' education level was a significant predictor of GPA.

Bus and Van Ijzendoorn (2001) assessed the relationship between the quality of attachment in infancy and preschooler's reading interests and skills. They maintained that two-year-olds with an insecure-avoidant or insecure-ambivalent attachment to their

mothers would show less intensive and effective exploratory behavior with respect to written language at five years of age than children who were securely attached to their mothers. Seventy-seven children with a mean age of 24 months and their mothers were assessed in the Strange Situation. Three years later 65 mothers filled out a questionnaire about the reading interests and skills of their child (The Early Reading Questionnaire). Teachers filled out Teacher's Questionnaires about pre-reading instruction at Kindergarten. An IQ test was given to the 65 children when they were 64 months old. Bus and Van Ijzendoorn found that securely attached children showed more interest in written material than anxiously attached children. In addition, securely attached children explored more written material than anxiously attached children even though the mothers' encouragement of reading did not differ between the attachment classifications. It is important to note that the sample only included upper SES dyads, which limits the generalizability of these results to other populations.

In 2002, Aviezer, Sagi, Resnick, and Gini (2002) built upon the previous research by analyzing how infancy attachment to parents contributed to school functioning in children. GPA, self-perceived competence and attachment representations were evaluated in 33 school-age children living in Israel. Early attachment to parents was assessed via the SSP, and attachment at age 11 or 12 was measured with the Separation Anxiety Test. The researchers used the Perceived Competence Scales to measure the children's perceptions of academic competence and self-worth. Aviezer et al. (2002) posited that infancy attachment to mother and father contributed to children's school function. Analysis indicated that children's representations of relationships were

significantly associated with GPA, general academic progress and scholastic skills. Secure attachment representations were associated with higher cognitive functioning, GPA and school behavior. Specifically, securely attached students received higher scores on scholastic skills and were rated by teachers as being better able to work independently and to cope with frustrations and criticism. It can be concluded that the infant-mother attachment serves a protective function and has a positive influence on later academic performance. A shortcoming of this study was the absence of the disorganized category of insecure attachment. Another shortcoming is the small number of participants in the insecure categories of ambivalent and avoidant. Due to the small number, these two groups were combined into one category identified as insecure. Therefore the results do not account for the possibility that the two different subcategories of insecure would yield different outcomes.

Also in 2002, Wong, Wiest, and Cusick examined whether perceived teacher autonomy support, child-parent attachment, scholastic competence, and self-worth were significant predictors of motivational orientation and achievement in 135 ethnically diverse sixth and ninth graders. Several assessment tools were used to measure the variables in this study. The Origin Climate Questionnaire was used to measure the students' perceptions of their teachers autonomy support. The Inventory of Parent Peer Attachment was used to measure the child's perception of attachment to parents. The Self-Perception Profile for Children was used to measure the child's perceptions of scholastic competence and self-worth. Wong et al's (2002) analysis indicated that scholastic competence is a significant predictor of academic achievement and motivation.

They found that students who believe that they "can do it" will often try harder to do well and may perform at a higher level. Wong et al. also found that attachment to parents contributed to students' motivation. Students with higher scores on attachment measures preferred challenging tasks to non-challenging tasks. These analyses support the salience of the attachment relationship in children's academic achievement and their desire to take on new challenges within the school environment. With that conclusion in mind, however, a direct relationship between attachment and academic achievement was not measured in this study.

Furrer and Skinner's (2003) study of the association between children's relatedness to parents, teachers and peers and their academic motivation and performance gives credence to Wong et al.'s (2002) findings that securely attached children are more available and equipped to meet the demands of the academic environment. In their study of 641 third and sixth grade children attending a suburban-rural school comprised of mostly middle and working class families, Furrer and Skinner used a self-report questionnaire to measure relatedness to parents, friends and others. This was the attachment measure. Furrer and Skinner found that children who felt connected to their parents, teachers and peers performed better in school. With specific regards to attachment, the results of this study suggest that feeling connected to parents acted as a motivational resource for children in the classroom. It offered them a willing attitude and the desire to focus on the demands of the classroom.

Most recently, in 2008, the National Institute of Child Health and Human Development (NICHHD) analyzed data from an earlier NICHHD study of early childcare

and youth development to determine if sensitive, supportive parenting is critical to third graders' academic achievement. Basically, this study expanded upon previous research by examining the association between mothers and fathers role as a secure base for preschoolers and their preschoolers' math and reading achievement in third grade. This team of researchers found that both mothers and fathers serving as secure bases were significantly associated with boys' math and reading achievement. No association was found for girls. The parents who showed the greatest support for the children's autonomy played a particularly important role in the boys' higher achievement.

Although there is consensus that an association exists between the quality of children's attachment to their primary caregivers and their academic achievement, some incongruity within and between studies is apparent. For instance, Moss and St. Laurent (2001) studied longitudinally the relationship between attachment and school-related performance in a French Canadian sample of 108 school-age children. The quality of the children's attachment to their mothers, mother-child interaction patterns, and the children's cognitive engagement were appraised using a separation-reunion procedure occurring when the children were approximately 6 years of age. The children's mastery motivation and academic performance were assessed 2 years later at 8 years of age. Analysis indicated that secure children did not significantly differ from insecure children as a group on general academic performance. However, secure children had higher scores than their insecure peers on communication, cognitive engagement, and mastery motivation. Insecure-controlling children, synonymous with disorganized attachment category, were at greatest risk for school underachievement, with the poorest

performance on all measures except mastery motivation. Insecure-avoidant and insecure-ambivalent children were lowest on mastery motivation. These results substantiate the importance of the child's attachment representation as it relates to cognitive performance in school. Based on their analysis, Moss and St. Laurent concluded that attachment patterns may be directly related to academic achievement because these internalized patterns may affect the child's ability to meet the academic demands of the school setting.

Al-Yagon and Mikulincer (2004) also studied attachment as it relates to academic achievement; however, they focused on attachment to figures outside the family. The results of their study are contrary to previous and current studies that focus on attachment to the primary caregiver. Specifically, they looked at the role of attachment pattern as a risk factor in explaining learning disabled children's sense of loneliness, sense of coherence, and academic functioning. There were 196 boys and girls aged 8 to 11 living in Israel who participated in this study. The results of this study show that secure attachment correlated significantly with higher levels of sense of coherence and lower levels of loneliness. However, Al-Yagon and Mikulincer found that secure attachment did not correlate significantly with teacher ratings of academic functioning in learning disabled students. Learning disabled children rated their relationships with significant others as less secure than non learning disabled children. There were lower incidences of secure attachment among children with learning disabilities. Children with learning disabilities reported higher levels of avoidance and anxiety in their close relationships as

compared to children with typical development. It is important to note that this study focused on attachment with extra familial figures rather than attachment to parents.

Based on the review, the majority of these studies share similar strengths and weaknesses. The marked strengths of these studies include standardized assessment tools to measure early attachment, a range of ages between the studies, and control for extraneous variables. The most notable weaknesses of these studies include inconsistent categorization of the insecure attachment categories between studies, use of only two attachment categories (secure and insecure), and the use of GPA to measure academic achievement. Regardless of their methodological problems, there is consensus among the studies that secure early attachment to a primary caregiver serves as a protective factor that fosters success in school and completion of school. Most of the studies concluded that attachment is both directly and indirectly linked to academic achievement and that secure attachment prepares the child to meet the demands of the academic environment. With this in mind, the variables of the present study are described.

Variables of the Study

In this study there are two dependent variables and one independent variable. The dependent variables are intelligence (IQ) and academic achievement. The IQ variable is to be measured by the Reynolds Intellectual Assessment Scales (RIAS). Intelligence refers to one's learned and innate cognitive abilities. Based on the Cattell-Horn Model of Intelligence (Horn & Cattell, 1966), intellectual abilities are organized into two general intelligences, fluid intelligence and crystallized intelligence. Fluid intelligence is an individual's ability to think and act quickly, solve novel problems, and encode short-term

memories. This is thought of as the source of intelligence that an individual uses when he or she does not already know what to do and is relatively independent of experience, education and acculturation (Horn, 1967). Examples of fluid intelligence include solving puzzles and coming up with problem solving strategies. Crystallized intelligence involves learning, knowledge, and skills that are accumulated. It comes from past learning, education, and acculturation; it is rooted in experience and based upon facts. Crystallized intelligence is displayed in tests of knowledge, general information, vocabulary and a wide variety of acquired skills (Horn & Cattell, 1967). Personality factors, motivation and educational and cultural opportunity are key to its development. The RIAS measures both crystallized and fluid intelligence.

The academic achievement variable was measured by the Wide Range Achievement Test – Fourth Edition (WRAT4). Academic achievement refers to how well a student has met age and grade equivalent standards for the attainment of academic skills set forth by the State Department of Education. This also refers to how a child is progressing in school. The WRAT4 measures the basic academic skills of reading, spelling and arithmetic.

The independent variable in this study is attachment pattern. There are four attachment categories: secure, anxious-ambivalent, anxious-avoidant, and disorganized attachment. The following definitions of the first three categories are based on the work of Ainsworth (1973). Secure attachment is characterized by a pattern of attachment in which infants have a high quality, relatively un-ambivalent relationship with their attachment figure. The child can use the caregiver as secure base for exploration. During

times of separation, the child may be upset when the caregiver leaves, but happy when she or he returns and able to recover quickly from distress. Anxious-ambivalent attachment is characterized by uncertainty and dependence on the attachment figure. These infants/children are clingy and stay close to their caregiver rather than exploring their environment. During separation, these children tend to become very upset, and they are not readily comforted by strangers. When the caregiver returns, these children are still not easily comforted. They both seek comfort and resist efforts by the caregiver to comfort them. Anxious-avoidant attachment is characterized by the infant/child appearing indifferent toward their caregiver and possibly avoiding the caregiver. When separated from the caregiver, these children may or may not become upset. If they are upset when left alone, then they are as easily comforted by a stranger as they are by a parent. When the caregiver returns, these children are indifferent toward the caregiver or avoid her (Ainsworth, 1973). Finally, according to Main and Hesse (1990), infants and children with Disorganized attachment have no consistent way of coping with the stress of separation from their primary caregiver. Their behavior is often confused or contradictory. For example, they may exhibit fearful smiles and look away while approaching their mother and often appear dazed or disoriented. These children want to approach their mother, but they also seem to regard her as a source of fear from which they want to withdraw.

Summary

This review of the literature has addressed the following areas of interest to the present study: (1) child-caregiver attachment bond and its implications for intellectual

functioning; and (2) child-caregiver attachment as it relates to academic achievement. The research has shown the significance of attachment and the implications this early bond has on the developing child in the areas of cognition and school achievement. Although there were contradictory findings related to intelligence, overall the quality of early attachment relationships appeared to be related to intelligence with securely attached children having higher IQ's than insecurely attached children. One of the most salient findings in the literature was that when large samples are used significant associations are detected between children's attachment patterns and their cognitive functioning. Another pertinent finding in the literature was that cognitive deficits are associated with a disruption in attachment relationships. For example, Vorria et al. (2006) recently found that children raised in an institution for the first two years of life did not catch up cognitively and that their attachment representations did not change from insecure to secure.

With regards to the literature focusing on the relationship between attachment and academic achievement, the predominant findings in the literature indicated that the attachment bond between the child and the primary caregiver is associated with academic achievement and general school performance. Children with secure attachment patterns have higher achievement in school compared to insecurely attached children. Studies have linked the quality of the child's early attachment relationship to overall adjustment to school and success in school, in addition to failure and dropout (Jimerson et al., 2000; Rumberger, 1995; Webster-Stratton & Reid, 2004).

Overall, the present review of the literature underscores the salience of the attachment relationship in children's cognitive development and academic achievement. The literature highlights the importance of this relationship in preparing and fostering school success for children. From this review, the preponderance of evidence suggests that securely attached children compared to insecurely attached students are more motivated and equipped to meet the demands of the academic environment. The present study sought to further this research by addressing limitations of the previous studies in this area. Previous studies have mainly analyzed the two general attachment categories of secure and insecure and how they relate to intelligence and academic achievement. This study examined associations between academic achievement and intelligence and three of the four specific attachment patterns: secure attachment, anxious-ambivalent attachment, anxious-avoidant attachment and disorganized attachment. The disorganized attachment pattern was excluded because no participants fell into this category. Additionally, previous studies have mostly used GPA as a measure of academic achievement, which is not a valid measure because it is influenced by other variables such as motivation and teacher subjectivity. This study included a standardized assessment tool to measure academic achievement. Furthermore, only four previous studies have specifically examined the relationship between attachment and intelligence. This study included intelligence as a variable. Finally, many of the previous studies primarily examined attachment as it relates to intelligence in very young children. The present study included a sample of school-age children, ages 8 to 12.

CHAPTER 3

METHODOLOGY

This chapter describes the method that was utilized in this study, including a brief description of the design of the study and a description of the participants, materials used, and the procedure employed for gathering data. A brief description of data analysis is also provided.

Design

A correlational design and an Analysis of variance (ANOVA) were utilized in this study to explore the relationship between attachment and intelligence and academic achievement. An independent samples t-Test was used in secondary analysis to examine the differences between attachment and intelligence. This means that no manipulation of variables occurred. Original data was collected to explore these relationships.

Participants

Fifty-four children were recruited from urban and suburban communities in New York and New Jersey. Two sibling pairs dropped out of the study which decreased the sample size to 50. Recruitment consisted of a flyer being handed out to parents in these communities by this researcher and the research assistant. Flyers were also posted in community centers, public libraries and on a web-based mom's group. The flyer gave a brief overview of the study along with this researcher's contact number and email address (See Appendix A). Once individuals agreed to participate, an appointment was scheduled to gather the data. The parents were given a consent form to sign at the assessment appointment. The sample was comprised of 24 boys and 26 girls ranging in age from 8

to12 years old. The socio-economic status of the participants was predominantly upper middle class and Caucasian. Table 1 presents frequencies and percentages for demographics of this sample. The Eligible participants were non-classified, regular education students who were English speaking. Exclusionary criteria included children who were non-English speaking or enrolled in an English as a Second Language program (ESL) and children who were classified as special education students under the Individuals with Disabilities Education Act (IDEA). The participants were sorted into four groups based on the attachment classifications of secure, anxious-ambivalent, anxious-avoidant, and disorganized. These classifications were based on the Friends and Family Interview that was administered to each participant. See Table 1 for the percentages and frequencies of the attachment classifications. They are comparable to that in the general population.

Materials

Independent Measure: Child Attachment Pattern

Friends and Family Interview (FFI). The Friends and Family Interview (FFI) was developed by Howard and Miriam Steele in 2005 for the purpose of measuring attachment in middle childhood. It is a structured interview designed to assess the attachment of 8 to14-year-old children to parents, siblings, friends and teachers. It consists of 26 questions asking children to recall and describe their attachment experiences with their mothers, fathers, siblings, best friends and teachers. The questions are focused on the child's perception of the quality of his/her relationship with parents, siblings, friends, and teachers. The questions also explore how the child copes with

emotional upsets and with separations from parents. The interviews are audio-recorded and then the different dimensions are scored based on a 4-point scale (1=no evidence; 2=mild evidence; 3=moderate evidence; 4=marked evidence; 0=not applicable/missing information). The dimensions are: coherence, metacognition or reflective functioning, evidence of secure-base availability (mother's availability, father's availability, availability from a non-parental source), evidence of self-esteem, peer relations, and anxiety and defense. After the scoring is complete, the interview is assigned to one of four major attachment classifications: Secure-autonomous, Dismissing, Preoccupied, and Disorganized (Steele & Steele, 2005). For clarification, in this study, the attachment classifications Dismissing and Preoccupied are equivalent respectively to Ainsworth's categories Anxious-avoidant and Anxious-ambivalent. The Ainsworth (1973) attachment classification labels identified and defined in Chapter 1 and 2 were used in this study.

Steele and Steele (2005) tested this interview technique in the context of the 11-year follow-up of the London Parent-Child Project. In that study, the FFI showed reliable ratings of coherence in 11-year-olds' narratives about themselves, their siblings, their parents, best friends and favorite teachers when compared to their attachment status as infants with their mothers and fathers. The FFI also showed ratings of coherence to the parents' Adult Attachment Interview responses. Based on these findings, Steele and Steele (2005) concluded that the construct and predictive validity of the FFI as a measure of attachment security was robustly demonstrated. Additionally, discriminant validity was demonstrated by way of showing that the links between the early attachment and the

FFI still held, even after taking into account verbal IQ of children and their parents. See Appendix B for the FFI interview questions.

Dependent Measures: Intelligence

Reynolds Intellectual Assessment Scales (RIAS). The Reynolds Intellectual Assessment Scales (Reynolds & Kamphaus, 2003) was designed to be an individually administered test that measures general intelligence and its components, fluid and crystallized intelligence, in individuals ages three to 94. The standardization sample consisted of 2,438 individuals between the ages of three and 94. These individuals resided in 41 states and were matched to United States census for age, gender, geographic region, ethnicity and years of education.

The RIAS (Reynolds & Kamphaus, 2003) includes a Verbal Intelligence Index (VIX) and a Nonverbal Intelligence Index (NIX), which taken together form the Composite Intelligence Index (CIX). The CIX assesses an individual's overall intelligence or (*g*), including the ability to reason, solve problems and learn. This is equivalent to the FSIQ. Each of the three indexes provides age-based standard scores, which have a mean of 100 and a standard deviation of 15.

The VIX consists of two subtests which assess verbal intelligence by measuring verbal problem solving and reasoning where acquired knowledge and skills are critical. This index measures crystallized intelligence, which is based on learning, acquired skills and acculturation (Horn & Cattell, 1967). Personality factors, motivation and educational and cultural opportunity are also central to its development.

The NIX includes two subtests which assess nonverbal intelligence by measuring reasoning and spatial ability using novel situations and stimuli that are mostly nonverbal. This index measures fluid intelligence. Fluid intelligence is an individual's ability to think and act quickly, solve novel problems, and encode short-term memories. This has been described as the source of intelligence that an individual uses when he or she does not already know what to do. Fluid intelligence is relatively independent of education and acculturation (Horn, 1967).

The Manual for the RIAS (Reynolds & Kamphaus, 2003) provides the psychometric properties of the test. Reliability for all subtests is from .90 to .95 and from .94 to .96 for the Indexes.

Dependent Measures: Academic Achievement

Wide Range Achievement Test-Fourth Edition (WRAT4). The WRAT4 (Wilkinson & Robertson, 2006) measures the basic skills necessary for academic performance in reading, spelling, and arithmetic. A new measure of reading achievement was added to enhance the scope of this instrument. This new subtest is named Sentence Comprehension. Two alternate test forms (Blue and Green) may be used interchangeably with all examinees, 5 to 94 years of age. Only the Blue form will be used in this study for the purpose of consistency.

The WRAT4 was standardized on a sample of 3000 individuals that were representative of the United States population. The sample was selected based on a stratified national sampling procedure that controlled for age, gender, ethnicity, geographic region, and parental education as an indicator of socioeconomic status.

The WRAT4 provides several types of scores for each of the four subtests (Word Reading, Sentence Comprehension, Spelling, Math Computation): raw scores, standard scores, grade equivalent scores, percentiles and normal curve equivalents, and Rasch ability scale scores. The standard scores will be used for all comparisons in this study. The WRAT4 standard scores range from 45 to 155 with a mean of 100 and a standard deviation of 15.

The WRAT4 Word Reading subtest measures letter and word decoding through letter identification and word recognition. The Sentence Comprehension subtest measures an individual's ability to understand the meaning of words and to comprehend ideas and information contained in sentences through a modified cloze technique (fill-in-the-blank). The Spelling subtest measures an individual's ability to encode sounds into written form through orally presented letters and words. The Math Computation subtest measures an individual's ability to perform basic mathematics computations through counting, identifying numbers, and solving simple problems. The items are presented orally and in written format.

The WRAT4 Administration Manual (Wilkinson & Robertson, 2006) provides the psychometric properties of the test. The median internal consistency coefficients across ages for each of the alternate forms used individually range from .87 to .96. The median internal consistency coefficients for the different ages for each of the alternate forms combined range from .94 to .96. The alternate form immediate re-test reliabilities range from .78 to .89 for an age-based sample and from .86 to .90 for a grade-based sample (Wilkinson & Robertson).

In terms of validity, the WRAT4 shows solid validity, which is derived from the content and structure of the test battery. The median inter-correlations among the subtests range from .56 to .79. Convergent validity for the WRAT4 subtests and similar subtests of the Woodcock Johnson-III Tests of Achievement ranges from .66 to .85. Finally, correlations between the WRAT4 subtests and the Wechsler Intelligence Scale for Children – Fourth Edition (WISC-IV) Indexes range from .46 to .83.

Procedure

Children's attachment quality was assessed individually in the child's home. Each child was administered the Friends and Family Interview (FFI) by this researcher. This is a face-to-face, one-to-one interview that was audio-recorded so that it could be scored and coded later. Upon completion of the interview, the child was offered a break. Then this researcher left the room and a research assistant who was trained in administering the Reynolds Intellectual Assessment Scales (RIAS) and the Wide Range Achievement Test- Four (WRAT4) entered the room. The research assistant, blind to the child's attachment style, then administered the RIAS and the WRAT4 to the child. After the child completed the assessments, he or she was given the chance to choose a prize from a prize box. Additionally, upon completion of this research project, the parents of the participants were sent a summary of the results of this study via email.

Data Analysis

The purpose of this study was to determine if a child's attachment bond to a primary caregiver was associated with his or her general intellectual function and academic achievement and whether the effect was greater on intelligence or academic

achievement. Initially, an Analysis of covariance (ANCOVA) was used to test the influence of the different attachment categories on intelligence and academic achievement. ANCOVA was used in order to include the covariate of Socio-economic status in the analyses; however, the inclusion of this covariate did not affect the hypothesized relationships so it was dropped from analysis. Thus, a one-way analysis of variance (ANOVA) was used to test the influence of attachment categories on intelligence and academic achievement. The Pearson correlation was used to test whether there is a stronger relationship between attachment and intelligence versus attachment and academic achievement. Four null hypotheses and eight alternative hypotheses were proposed in this study. The four null hypotheses and four of the alternative hypotheses (1a, 1b, 3a, and 3b) were tested in this study.

Null Hypothesis 1. There is no difference between children's attachment patterns as measured by the FFI and their level of intelligence as measured by the RIAS. The test of this hypothesis was an ANOVA.

Alternative Hypothesis 1. There are significant differences between children's attachment patterns and their level of intelligence.

Alternative Hypothesis 1a. Securely attached children are expected to have the highest FSIQ compared to Anxious-ambivalent, Anxious-avoidant and Disorganized children. A planned comparison ANOVA was proposed to compare the Secure attachment group versus the other three Insecure attachment groups. This prediction is based on past findings that children with a secure attachment have higher intelligence

than children with the three patterns of insecure attachment (Karrass & Braungart-Rieker, 2004; O'Connor & McCartney, 2007).

Alternative Hypothesis 1b. Children with an Anxious-ambivalent or Disorganized attachment pattern were predicted to have the lowest FSIQ. A planned comparison ANOVA was proposed to compare the mean FSIQ scores of the Anxious-ambivalent attachment group versus Secure attachment group and Anxious-avoidant attachment group. This prediction is based on past findings which show that children with an anxious-ambivalent or disorganized attachment pattern are the most disadvantaged in their intellectual development (O'Connor & McCartney, 2007).

Null Hypothesis 2. There is no difference in the strength of the relationship between attachment pattern and fluid intelligence versus attachment pattern and crystallized intelligence. The test of this hypothesis was a Pearson correlation.

Alternative Hypothesis 2. There is a stronger relationship between attachment pattern and crystallized intelligence than between attachment and fluid intelligence. The Pearson correlation was proposed to test the strength of the association between attachment and crystallized intelligence and attachment and fluid intelligence. This prediction is based on attachment theory's notion that children's level of exploration of their environment is influenced by the quality of attachment to their primary caregiver.

Null Hypothesis 3. There is no difference between attachment patterns and academic achievement as measured by the WRAT4. The test of this hypothesis was an ANOVA.

Alternative Hypothesis 3. There is a difference between attachment patterns and academic achievement. This prediction is based on the preponderance of evidence in previous literature showing a significant difference in means between attachment and academic achievement (Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001; Furrer & Skinner, 2003; Hoffman, 1997; Hortacsu, 2001; Wong, Wiest, & Cusick, 2002).

Alternative Hypothesis 3a. Securely attached children have the highest academic achievement compared to Anxious-ambivalent, Anxious-avoidant and Disorganized children. A planned comparison ANOVA was proposed to compare the Secure attachment group versus the Insecure attachment groups. This prediction is based on the findings in previous literature showing securely attached children have the highest scholastic performance (Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001; Furrer & Skinner, 2003; Hoffman, 1997; Hortacsu, 2001; Wong, Wiest, & Cusick, 2002).

Alternative Hypothesis 3b. Children with Anxious-ambivalent and Anxious-avoidant attachment patterns have higher academic achievement than children with Disorganized attachment. A planned comparison ANOVA was proposed to compare the Anxious-ambivalent group and the Anxious-avoidant group versus the Disorganized group anticipating that the Anxious-ambivalent group and the Anxious-avoidant group would be greater on academic achievement than the Disorganized group. This prediction is based on past findings showing that children with disorganized attachment underachieve in school and are most disadvantaged in their academic performance

(Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001; Furrer & Skinner, 2003; Hoffman, 1997; Hortacsu, 2001; Wong, Wiest, & Cusick, 2002).

Null Hypothesis 4. There is no difference in the strength of the relationship between attachment pattern and academic achievement versus attachment pattern and intelligence. The test of this hypothesis was a Pearson correlation.

Alternative Hypothesis 4. There is a stronger relationship between attachment pattern and academic achievement than between attachment and intelligence. The Pearson correlation was proposed to test the strength of the association between attachment and academic achievement versus attachment and overall intelligence. This prediction is based on the majority of past findings showing a correlation between attachment and academic achievement, but not all studies showing an association between attachment and intelligence.

Summary

A total of 54 children ranging in age from 8 to 12 were recruited for this study. Two sibling pairs dropped out leaving a total of 50 children who participated. They were administered the WRAT4 and the RIAS. These two standardized measures provided a reasonably accurate assessment of the subjects' cognitive functioning and academic achievement. The independent variable, attachment pattern, was assessed via the FFI. All assessment measures were administered individually to the participants.

Two null hypothesis and their alternatives concerning attachment and intelligence and attachment and academic achievement were tested using a one-way ANOVA. Two null hypotheses concerning the strength of the relationship between attachment and

intelligence and attachment and academic achievement were tested using a Pearson correlation. The results of these analyses are presented in Chapter 4. Chapter 5 provides a discussion of these results, including conclusions, implications for school psychologists, and implications for future research.

CHAPTER 4

RESULTS

This chapter presents the results of all data analysis procedures. Initially, an Analysis of covariance (ANCOVA) was used to test the influence of the independent variable, attachment pattern, on the dependant variables intelligence and academic achievement. ANCOVA was used in order to control for Socio-economic status (SES) in the analyses. However, the inclusion of this covariate did not affect the hypothesized relationships so it was no longer deemed necessary in further analyses. Thus, a one-way Analysis of variance (ANOVA) was used to test the influence of attachment categories on both intelligence and academic achievement. An independent samples t-Test was used in secondary analysis to examine the differences between attachment and intelligence. These analyses addressed the research questions regarding the differences in children's level of intelligence and academic achievement related to their attachment patterns.

Pearson correlations were used to test the strength of the relationship between attachment categories and fluid intelligence versus attachment pattern and crystallized intelligence. This analysis addressed the research question examining which component of intelligence (fluid or crystallized) attachment is more related. Pearson correlations were also used to test the strength of the relationship between attachment pattern and academic achievement versus attachment pattern and intelligence. This addressed the research question examining whether attachment patterns are more related to intelligence or academic achievement.

Four null hypotheses and four of the alternative hypotheses (1a, 1b, 3a, and 3b) were tested in this study. All analyses were performed using an alpha level of .05.

Attachment Patterns and Intelligence

Null Hypothesis 1. This hypothesis stated that there is no difference between children's attachment and their level of intelligence. The test of this hypothesis was a one-way between-groups ANOVA comparing the three attachment groups Secure, Anxious-ambivalent, and Anxious-Avoidant to intelligence as measured by the Full Scale Intelligence Quotient (FSIQ), Crystallized Intelligence, and Fluid Intelligence. No significant differences were found between attachment category and FSIQ, $F(2, 47) = 1.22$, $p = .303$, indicating that children's attachment was not related their overall intelligence. No significant differences were found between attachment category and Crystallized Intelligence $F(2, 47) = 2.91$, $p = .064$. No significant differences were found between attachment and Fluid Intelligence, $F(2, 47) = .654$, $p = .525$, indicating that children's attachment was not related to their fluid intelligence. Table 2 contains ANOVA means and standard deviations for IQ across the three attachment categories. Table 3 contains ANOVA statistics (f values and significance for intelligence).

A Post Hoc comparison using the Fisher LSD test was performed on the three IQ scores across the three attachment groups. The results revealed that there were significant mean differences in crystallized IQ between the Securely attached group ($M = 112.54$, $SD = 14.01$) and the Anxiously-Avoidant attached group ($M = 102.54$, $SD = 8.66$). These findings suggest that securely attached children have higher crystallized intelligence than children with an anxious-avoidant attachment pattern.

Additional analysis included an independent-samples t-test to compare the crystallized IQ scores for the Securely attached group and the Anxiously-avoidant attached group. There was a significant difference in crystallized IQ scores for the Secure group (M = 112.54, SD = 14.01) and the Anxious-Avoidant group [M = 102.54, SD = 8.66; $t(42) = 2.29$, $p = .027$]. See Table 4 for t-Test means and standard deviations for crystallized IQ across the two attachment categories secure and anxious-avoidant.

Alternative Hypothesis 1a. This hypothesis proposed that Securely attached children would have the highest FSIQ compared to Anxious-ambivalent, Anxious-avoidant and Disorganized children. However, the disorganized group was dropped from analysis due to zero participants falling into this category. The test of this hypothesis was a one-way between-groups ANOVA with planned comparisons comparing the Secure group to the Anxious-ambivalent and the Anxious-Avoidant groups. No significant differences were found between the Secure group's FSIQ compared to the other two attachment groups' FSIQ, $F(2, 47) = 1.15$, $p = .282$, indicating that the secure attachment group did not have a significantly higher overall intelligence compared to the Anxious-ambivalent and Anxious-avoidant attachment groups. Table 2 contains ANOVA means and standard deviations for IQ across the four attachment categories.

Alternative Hypothesis 1b. This hypothesis proposed that children with an Anxious-ambivalent or Disorganized attachment pattern would have the lowest FSIQ. The sample in this study did not have any participants who fell into the Disorganized category of attachment. Therefore, the disorganized group was not included in the analysis. The test of this hypothesis was a one-way between-groups ANOVA with planned comparisons

comparing the Anxious-ambivalent group to the Secure and Anxious-Avoidant groups. No significant differences were found between the Anxious-ambivalent group's FSIQ compared to the other two attachment groups' FSIQ, $F(2, 47) = .064$, $p = .800$, indicating that the Anxious-ambivalent attachment group did not have a significantly lower overall intelligence compared to the Secure and Anxious-avoidant attachment groups. Table 2 contains means and standard deviations for IQ across the four attachment categories.

Null Hypothesis 2. This hypothesis proposed that there would be no difference in the strength of the relationship between attachment pattern and fluid intelligence versus attachment pattern and crystallized intelligence. The test of this hypothesis was a Pearson product-moment correlation coefficient. Then the Fisher Z test of significance of the difference between the Z-transformed correlations for the two groups was computed. In order to utilize this test, attachment had to be a dichotomous variable. Therefore, the two insecure attachment groups Anxious-avoidant and Anxious-Ambivalent were consolidated into one group categorized as *insecure*. Preliminary analysis of this hypothesis examined the relationship between attachment and crystallized intelligence and attachment and fluid intelligence. A significant small positive correlation was found between attachment pattern and crystallized intelligence ($r = .292$, $n = 50$, $p < .05$), with secure attachment associated with higher crystallized intelligence scores. No significant correlation was found between attachment pattern and fluid intelligence ($r = .024$, $n = 50$, $p < .05$), indicating that attachment pattern is not associated with fluid intelligence.

The Fisher Z test of significance of the difference between the Z-transformed correlations for the two correlation coefficients revealed that there is no significant

difference in the strength of the relationship between attachment pattern and fluid intelligence versus attachment pattern and crystallized intelligence ($z = 1.34$, $p = .180$). Table 5 contains Pearson product-moment correlations between attachment patterns and intelligence.

Attachment Patterns and Academic Achievement

Null Hypothesis 3. This hypothesis stated that there is no difference between attachment patterns and academic achievement. The test of this hypothesis was a one-way between-groups ANOVA comparing the three attachment groups Secure, Anxious-ambivalent, and Anxious-Avoidant to the three areas of academic achievement. No significant differences were found between attachment category and the three achievement groups for Reading $F(2, 47) = .164$, $p = .849$; Math $F(2, 47) = .213$, $p = .809$; and Spelling $F(2, 47) = .333$, $p = .718$, indicating that children's attachment patterns were not related to their academic achievement in reading, math and spelling. Table 6 contains ANOVA means and standard deviations for reading, math, and spelling. Table 7 contains ANOVA statistics (f values and significance for the three areas of achievement).

Alternative Hypothesis 3a. This hypothesis proposed that Securely attached children would have the highest academic achievement compared to Anxious-ambivalent, Anxious-avoidant and Disorganized children. The disorganized group was dropped from analysis due to zero participants falling into this category. The test of this hypothesis was a one-way between-groups ANOVA with planned comparisons comparing the Securely attached group to the Anxious-ambivalent and the Anxious-Avoidant groups. No

significant differences were found between the Secure group's academic performance compared to the other two attachment groups' achievement for Reading $F(2, 47) = -.319$, $p = .575$; Math $F(2, 47) = -.423$, $p = .518$; and Spelling $F(2, 47) = .409$, $p = .525$. This indicates that the secure attachment group did not have significantly higher achievement in reading, math, and spelling compared to the Anxious-ambivalent and Anxious-avoidant attachment groups. Table 6 contains ANOVA means and standard deviations for reading, math, and spelling.

Alternative Hypothesis 3b. This hypothesis stated that children with Anxious-ambivalent and Anxious-avoidant attachment patterns would have higher academic achievement than children with Disorganized attachment. The sample in this study did not have any participants who fell into the Disorganized category of attachment. Therefore, this hypothesis could not be tested.

Null Hypothesis 4. This hypothesis proposed that there is no difference in the strength of the relationship between attachment pattern and academic achievement versus attachment pattern and intelligence. The test of this hypothesis was a Pearson product-moment correlation coefficient between attachment and the three areas of achievement and attachment and intelligence. Then the Z test of significance of the difference between the Z-transformed correlations for the two groups was computed. Preliminary analysis of this hypothesis examined the relationship between attachment pattern and IQ and attachment pattern and academic achievement. A small positive correlation was found between attachment pattern and IQ ($r = .220$, $n = 50$, $p < .05$). However, it was not significant. No significant correlation was found between attachment pattern and

Reading (r = -.074, n = 50, p < .05), indicating that attachment pattern is not associated with achievement in reading. No significant correlation was found between attachment pattern and Math (r = -.092, n = 50, p < .05), indicating that attachment pattern is not associated with achievement in math. No significant correlation was found between attachment pattern and Spelling (r = .067, n = 50, p < .05), indicating that attachment pattern is not associated with achievement in spelling.

The Fisher Z test of significance of the difference between the Z-transformed correlations for the two correlation coefficients revealed that there is no significant difference in the strength of the relationship between attachment and IQ versus attachment and Reading (z = -1.32, p = .186). No significant differences were found in the strength of the relationship between attachment and IQ versus attachment and Math (z = -1.4, p = .161). No significant differences were found in the strength of the relationship between attachment and IQ versus attachment and Spelling (z = -.63, p = .528). These results indicate that attachment is not more or less related to intelligence or academic achievement. Table 8 contains Pearson product-moment correlations between attachment and the three areas of academic achievement.

Summary

In conclusion, the data analyses indicated that for this sample (n=50) there were no significant differences between children's attachment patterns and their overall level of intelligence as measured by the FSIQ scores on the Reynolds Intellectual Assessment Scales. Significant differences were found between children's attachment patterns and their crystallized intelligence, indicating that securely attached children have higher

crystallized intelligence than children with an anxious-avoidant attachment pattern. However, there were no differences in the strength of the relationship between attachment and fluid IQ versus attachment and crystallized IQ. There were also no differences in the children's attachment patterns and their academic achievement in reading, math and spelling as measured by the Wide Range Achievement Test - Four. Finally, there were no significant differences in the strength of the relationship between attachment and IQ and attachment and academic achievement. These results and their implications for further research are discussed in Chapter 5.

CHAPTER 5

DISCUSSION

This chapter summarizes the results of the study and integrates the findings with past literature. Convergent and divergent findings with relevant conclusions of previous research are explained. Implications of these findings, limitations of this study and future directions are also discussed.

Purpose of the Study

The purpose of this study was to examine the relationship between children's attachment to their parents and their intellectual function and academic achievement. Attachment theory was used in an attempt to conceptualize and explain differences in intelligence and academic achievement. The present study sought to further research in this area by addressing limitations of the previous studies focused on attachment and intelligence and academic achievement. Previous studies have mainly analyzed the two general attachment categories of "secure" and "insecure" and how they relate to intelligence and academic achievement. This study examined associations between academic achievement and intelligence with extension to three of the four specific attachment patterns: Secure attachment, Anxious-ambivalent attachment, and Anxious-avoidant attachment. The fourth pattern, Disorganized attachment, is not represented here because no participants fell into this category.

With regards to the literature focusing on attachment and intelligence, past research revealed contradictory findings related to the quality of the child-parent bond and its association with later intellectual development in children. Certain studies have

shown that cognitive deficits are associated with the loss or disruption of attachment relationships (Chisholm, 1998, Vorria et al., 2006). Other studies of children who have not experienced the loss of a primary attachment figure show that attachment is not significantly correlated, or is only weakly correlated, with intelligence (Van IJzendoorn, Dijkstra, & Bus, 1995, Wintgens et al., 1998). These findings beg the question of whether it is the quality of the attachment relationship that is associated with intelligence or whether it is the traumatic experience of losing the primary attachment figure that is related to intellectual development. Therefore, it remains to be established whether the quality of the children's attachment to their primary caregivers is related to their overall intellectual function. Additionally, only four previous studies have specifically examined the relationship between attachment and intelligence. The present study sought to address this limitation in previous research by including intelligence as a variable. Furthermore, many of the previous studies primarily examined attachment as it relates to intelligence in very young children. The present study considers exclusively a sample of school-age children, aged 8 to 12.

The attachment and academic achievement literature indicates that secure attachment to a primary caregiver promotes success in school (Marcus & Sanders-Reio, 2001; Rumberger, 1995). Past research shows that children explore their environment differently based on their attachment patterns. In general, securely attached children discover their environment more independently and competently than insecurely attached children, who are passive and reserved in their exploration of their environment (Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001). Furthermore, the literature

highlights the importance of the attachment relationship in preparing children for school success. The bulk of evidence suggests that securely attached children compared to insecurely attached children are more motivated and prepared to meet the demands of the academic environment. Therefore, it is argued that securely attached children are more available for learning in the school environment, resulting in higher achievement. Although there is consensus in the past literature that attachment quality is associated with academic achievement, previous studies have mostly used grade-point-average (GPA) as a measure of academic achievement. Grade-point average is a less reliable measure of academic achievement because it is influenced by other variables, such as motivation and teacher subjectivity. The present study addressed this potential limitation of previous research by utilizing a standardized assessment tool to measure academic achievement.

This study also sought to provide school psychologists and teachers insight into the many factors that may be related to intellectual development and the attainment of academic skills. Various factors including upper socio-economic status, intact two-parent families, and high maternal education are positively associated with intelligence and academic achievement. These variables serve as protective factors that buffer the possible negative impact that low quality attachment relationships may have on intelligence and scholastic achievement (Sameroff, Lewis, & Miller, 2000).

Attachment Patterns and Intelligence

Based on previous attachment and intelligence research, it was predicted that there would be differences between children's levels of intelligence depending on the

type of attachment representations they have of their primary caregivers. Specifically, it was posited that children with a Secure attachment pattern would have the highest global intelligence as measured by the full-scale intelligence quotient (FSIQ) compared to children with an Anxious-ambivalent and/or Anxious-avoidant attachment pattern. It was also thought that the Anxious-ambivalent children would have the lowest FSIQ. The main finding in regard to these predictions was that there were no differences between children's attachment patterns and their level of intelligence. In other words, children's attachment pattern was not related to their global intelligence. Children with a Secure attachment did not have significantly higher general intelligence compared to children with an Anxious-ambivalent and Anxious-avoidant attachment pattern. Nor did Anxious-ambivalent children have the lowest overall intelligence compared to Secure and Anxious-avoidant children. These non-significant findings may be attributable to inadequate statistical power. This study had a sample of 50 subjects. A power analysis revealed that at least 54 subjects were needed to observe small effects, so it is possible that non-significant findings are due to this small sample size. In line with this reasoning, the Anxious-ambivalent category only had six subjects, which also restricts the power to detect differences. Therefore, a larger sample may be needed to find a significant mean difference between the different attachment groups and confirm the predictions.

It is plausible, however, that no such effects exist and that the predictions are false. If this is the case, then one can consider other reasons for the lack of effects. There may be other factors that make the children in this sample resilient to their insecure attachment patterns, consequently resulting in intelligence scores that were not significantly different

from their secure peers. Namely, 74% of the sample in this study was comprised of families with a household income of 100-499 thousand dollars. Based on Thompson and Hickey's (2005) model of socio-economic status, this income level falls into the upper middle class bracket. Additionally, 96% of the sample in this study was comprised of children from intact, two-parent families. These sample characteristics, such as intact families and upper middle socio-economic status, may serve as protective factors for children with insecure attachments (Sameroff, Lewis, & Miller, 2000). Thus, in the context of this upper middle SES sample, anxious-ambivalent and/or anxious-avoidant attachment is not a risk factor for significantly lower general intellectual ability. This is an important point that can contribute to the field and extend our understanding of variables involved in the resilience of children.

These results both converge and diverge with past literature. On one hand, they are consistent with other studies (Van Ijzendoorn & Van Vliet-Visser, 1986; Wintgens et al.,1998) that have used IQ as a variable when examining the relationship between attachment and cognitive ability. On the other hand, they are not consistent with other studies (Crandell & Hobson,1999; Karrass & Braungart-Rieker, 2004; O'Connor & McCartney, 2007) that have utilized IQ as a variable and found a significant relationship between intelligence and the quality of the children's attachment to their parents. The convergence and divergence with previous literature implies that there may not be a direct relationship between the two constructs of attachment and intelligence. Instead, there may be an indirect relationship that is complicated by many other variables that need to be controlled in order to perceive the relationship.

Another main finding of this study was that a significant relationship emerged between children's attachment pattern and their crystallized intelligence. Securely attached children had significantly higher crystallized intelligence compared to children with an Anxious-avoidant attachment pattern. This finding is similar to Crandell and Hobson's (1999) finding that parent-child attunement was significantly related to child verbal reasoning abilities. Crystallized intelligence, as measured by the Reynolds Intellectual Assessment Scale, is tested by the verbal reasoning subtests and reflects one's verbal reasoning abilities and their general knowledge of facts.

According to Horn and Cattell (1967), crystallized intelligence is derived from learning and rooted in experience; personality factors, motivation, education, and cultural opportunity are essential to its development. Based on Bowlby's (1979) theory, attachment is paramount to personality development and motivation levels. Therefore, the finding that children with a Secure attachment had higher crystallized intelligence scores than children with an Anxious-avoidant pattern lends support for the notion that securely attached children are better able to learn from their environment than anxious-avoidant children. This advantage in learning is due to the securely attached child's sense of competence in relationships with others, which allows him to actively explore his environment and gain more experience. The anxious-avoidant child feels detached and less attuned in relationships with others, which may manifest in the child paying less attention to environmental stimuli than other children. Essentially, this means that the anxious-avoidant child may not freely and actively explore his/her environment, which results in less experience and disadvantaged learning. This finding also implies that a

secure attachment relationship may boost cognitive development because secure children may be more motivated and available to learn from their parents.

It is interesting to note that a significant relationship was not detected between the Secure attachment group and the Anxious-ambivalent group. This lack of significance may have been a result of the low number of participants in this group (n = 6). Or, it may have been due to the demographic characteristics (i.e. all 6 participants were from upper middle SES families) of the Anxious-ambivalent group being similar to the Secure attachment group, thereby buffering the Anxious-ambivalent group from the possible negative impact of their attachment relationship.

Another result of this study was that there were no significant differences in the strength of the relationship between attachment and crystallized intelligence versus attachment and fluid intelligence. In other words, the quality of children's attachment relationship is no more associated with crystallized intelligence than it is associated with fluid intelligence. This is interesting because, given attachment theory's (Bowlby, 1988) notion of the level of child exploration being based on the quality of the attachment relationship, it would be expected that there would be a stronger relationship between attachment and crystallized intelligence compared to attachment and fluid intelligence. This would be expected because crystallized intelligence is rooted in experience and highly influenced by exposure to the environment and education, whereas fluid intelligence is innate and independent of experience, exposure to the environment, learning, and education (Horn & Cattell, 1967). Again, this non-significant finding may be attributable to insufficient statistical power. Based on other analyses in this study, the

correlation between attachment and crystallized intelligence was significant but small (r=.292), suggesting that greater power was needed to observe differences in the strength of the relationship between the correlations. As stated previously, it is possible that this study did not have enough power to detect effects, so the findings should not be discounted as confirming the null hypothesis because more participants may have been needed to observe such small associations as may be present.

Attachment Patterns and Academic Achievement

Based on previous attachment and academic achievement research, it was predicted that there would be differences between children's attachment and their academic achievement in the areas of reading, math and spelling. Specifically, it was posited that children with a Secure attachment pattern would have the highest academic achievement compared to children with an Anxious-ambivalent and/or Anxious-avoidant attachment pattern. The main finding in regards to this prediction was that no significant differences were found between children's attachment style and their achievement in reading, math, and spelling. Additionally, Securely attached children did not have significantly higher achievement in reading, math and spelling compared to the Anxious-ambivalent and Anxious-avoidant groups. Nor did Anxious-ambivalent children have the lowest academic achievement compared to the Secure and Anxious-avoidant group. These findings indicate that children's attachment pattern is not related to their academic achievement.

These findings diverge from previous research focusing on attachment and academic achievement, which shows a strong association between attachment and school

achievement. In fact, there is a predominance of findings in past research showing that attachment is related to school achievement. One can speculate that the divergence from previous research can be attributed to the use of a standardized assessment method to measure academic achievement. The majority of previous studies used GPA, parent-report, self-report or teacher-report to measure academic achievement (Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001; Furrer & Skinner, 2003; Hoffman, 1997; Hortacsu, 2001; Wong, Wiest, & Cusick, 2002). Grade-point-average is subjective and influenced by motivation, student-teacher relationship and teacher subjectivity. Parent, self and teacher report are all subjective as well. Standardized measures of achievement in specific subject areas such as math, reading and spelling are related to one's skills in the specified area as compared to their same aged peers and/or same grade peers. Thus, performance on an achievement test could be a better indicator of mastery of academic skills (i.e. academic achievement in math, reading, and spelling) than GPA. Attachment has been shown in previous studies (Granot & Mayseless, 2001; Jacobsen & Hofman, 1997) to influence children's adaptive functioning in school, which can be a large factor of GPA. Therefore, one might conclude that in previous studies other factors such as student-teacher relationship, social and emotional adjustment, frequency of behavioral problems, and teacher subjectivity influenced students' GPA rather than actual attainment of academic skills. Interestingly, these findings suggest that attachment may be more related to a child's success or failure in adjusting to the school environment, in addition to their performance or grades in school, rather than their mastery of academic skills. A study examining attachment patterns of children at-risk of

dropping out of school could provide clarification in this area. Additionally, a study correlating both, scores on a standardized achievement test and GPA, with attachment may also provide clarification.

Another possible reason for the present findings deviating from previous research may be that there was a restricted range of SES in this sample population, which lowers the possibility of detecting significant differences. Again, upper middle SES is a protective factor for scholastic achievement. This may be influencing the results in this study as evidenced by the sample's mean achievement scores being above average for each of the three subtests (Reading, $x = 111.80$; Math, $x = 114.36$; Spelling, $x = 117.88$). Additional studies utilizing standard measures of academic achievement in samples with a broad range of SES would shed light on this divergent finding.

Another main finding in the present study was that there were no significant differences in the strength of the relationship between attachment and intelligence compared to attachment and academic achievement. These results indicate that attachment is no more related to intelligence than to academic achievement. This finding diverges from previous research which shows that attachment is strongly related to academic achievement whereas intelligence has a smaller association to attachment (Aviezer, Sagi, Resnick, & Gini, 2002; Bus and Van Ijzendoorn, 2001; Furrer & Skinner, 2003; Hortacsu's, 2001; Jacobsen & Hofman, 1997; Pianta, Nimetz, & Bennett, 1997; Van IJzendoorn, Dijkstra, & Bus, 1995; Wong, Wiest, & Cusick, 2002). Again, this deviation from previous literature may be due to insufficient power to detect a

relationship between the two groups; the small range in the sample SES may have also restricted the test's ability to detect a correlation if it in fact exists.

General Implications of Findings

Many general implications about attachment as it relates to intelligence and academic achievement can be drawn from the present study. First, the finding that the quality of children's attachment to their parents is not related to their global intellectual functioning, as was expected based on the principles of attachment theory, suggests that attachment may not play a role in one's overall ability to think about and solve problems. Examining this finding in the context of this sample with demographic characteristics that increase resilience in children also points to the importance of protective factors buffering the potential negative affects of insecure attachment patterns. Second, the finding that children's attachment patterns are related to their crystallized intelligence, which is rooted in experience and based on educational opportunity and motivation, but not their fluid intelligence, which is innate ability, provides support for the previous finding and signifies that children with secure attachment patterns may be advantaged in their verbal reasoning abilities and their knowledge of over-learned material. However, securely attached children may not necessarily be advantaged in their innate abilities to solve novel problems and make sense of abstract information.

In addition, the finding that children's attachment patterns were not related to academic achievement is an unexpected result because, similar to crystallized intelligence, academic achievement was measured by tests assessing the amount of skill attainment in the three specific areas of reading, math and spelling. This suggests that

resilience may play a key role in these children's achievement because as noted earlier, the mean scores in all three areas of academic achievement were above average. This could also be due to standardized tests of achievement yielding different results than non-standardized, subjective assessments of achievement. Furthermore, it may be that attachment relates more to performance, success, failure or completion of school than to actual attainment of academic skills. Overall, these findings demonstrate that the relationship between attachment and intelligence and academic achievement is complex and may be mediated by other external factors, such as intact families and upper socio-economic status.

Limitations and Future Directions

Some general limitations are noted in this study. One limitation of this study was the method used to obtain subjects. Subjects were recruited on a voluntary basis through various community outreaches. Due to the method of recruitment, this study was conducted on a nonrandomized sample of self-selected, upper middleclass, Caucasian children. More effective methods of obtaining a random sampling of this population should be considered in order to increase the probability of detecting differences between attachment groups. A random sample may have also captured participants with a disorganized attachment pattern. The absence of the Disorganized category of insecure attachment was a limitation, and inclusion of this category may have rendered different results in terms of associations between attachment and the dependent variables of intelligence and achievement. Based on past research, children with a disorganized pattern of attachment were disadvantaged in their cognitive abilities (Jacobsen, Edelstein,

& Hofman, 1994). A random sample would also allow findings to be generalized to other populations.

Another limitation of the present study was a relatively small sample size. A power analysis revealed that a sample of at least 54 subjects was needed in order to detect significant differences. Although 54 subjects were recruited, four withdrew from the study, leaving only 50 subjects. A larger sample size would have yielded more participants in each of the attachment categories. This would have addressed the limitation of the small number of participants in the insecure categories of Anxious-ambivalent (n = 6) and Anxious-avoidant (n = 13).

Another limitation of this study was that the two insecure attachment categories were collapsed into one category of *insecure* attachment in order to do the correlational analyses. This was a limitation because the mean scores for the Anxious-avoidant and Anxious-ambivalent groups were vastly different.

Although this study provides some interesting insights into the relationship between attachment and intelligence and academic achievement, the role of standardized measures to assess academic achievement needs clarification. The results of the present study do not provide support for the idea that academic achievement is positively related to attachment patterns. Additional studies utilizing standardized achievement tests may provide clarification in this area.

Future studies should test both variables (crystallized intelligence and academic achievement) in a larger, randomized sample controlled for resilience factors, such as intact family and mother's education level, because they serve as protective factors in a

child's trajectory for intellectual development and academic progress, which may have influenced the current findings. Future studies examining the relationship between the different insecure attachment patterns and intelligence and academic achievement of school-age children from low, middle and upper SES families may shed additional light on the role of protective factors, or resilience, as it relates to intellectual development and attainment of scholastic skills and thereby extend these findings.

Future studies examining the role of attachment as it relates to school graduation or dropout may also provide clarification as to whether attachment is more related to school performance or to attainment of academic skills. It would also be interesting to compare intelligence and academic achievement scores of school-age children with insecure attachments versus school-age children with insecure attachments who experience early disruption in the attachment relationship or the loss of the primary attachment figure. This type of study would offer insights as to whether it is the quality of the attachment relationship that is associated with intelligence or whether it is the traumatic experience of losing the primary attachment figure that is related to intellectual development.

Despite the limitations of this study, both the significant and non-significant findings are important and can contribute substantially to the field of school psychology. This study will inform attachment researchers, as well as researchers in the area of resilience, because it broadens our understanding of the different variables involved in the resilience of children and their intellectual development and academic achievement. Additionally, these findings will inform school psychologists, teachers, and parents about the intricacies and socio-emotional factors (i.e. attachment, intact two-parent families,

SES) that may influence cognitive functioning, academic performance and the attainment of academic skills. This area of research is always relevant because it identifies the factors that are involved in offering protection or building resilience in children with less than optimal adjustment and low quality attachment relationships with their parents.

It is imperative to understand the quality of the primary attachment relationship in the context of school psychology because it relates to children's learning, knowledge and skills that are accumulated throughout their school experience. Going forward, this information may also help school psychologists, teachers, and parents in assisting students with less than optimal attachment patterns and those with low resilience to succeed in the academic environment and in life.

APPENDIX A

RECRUITMENT FLYER

Are you interested in helping a University of Arizona researcher find out if intelligence or school performance is related to the parent bond?

If you are, then you might want your child to participate in my study! I live locally and am looking for children in the Tri-state area.

What is the purpose of this study?

- To determine if a child's emotional bond to a primary caregiver is related to his or her intelligence and academic achievement.

Who am I looking for?

- Boys and girls ages 8 – 12
- English speaking
- Regular education students

Do you have to participate?

- NO. Participation is strictly voluntary. You or your child can choose not to participate in the study at any point in time with no bad feelings or repercussions

How much time will it take for your child to participate?

- It can take up to 2 hours of your child's time

What does the study involve?

- Your child will be interviewed about their relationship with their mother, father, sibling(s), best friend and teacher
- Your child will be given a brief intelligence test and achievement test

Please contact Victoria Wacha at 201-683-4237 or vwacha@yahoo.com if you are interested in having your son or daughter participate in this study. I live locally and my research assistant and I will come to you to conduct the interview and two tests.

APPENDIX B

FRIENDS AND FAMILY INTERVIEW

1. **Now, could we start by getting a description of the people close to you in your family, those living in the house with you, and those you are close to you but not living with you?**

2. **I'd like to start by getting some idea about what sort of person you are.. for example, could you tell me what sort of things you like to do?**

   Can you tell me about any time you were doing [X] –like, who was there, what did you do, how did you feel, what happened in the end.

3. **So you told me about things you like to do, now I'd like to ask you to give me an idea about the kind of person you are.**

   What are the kinds of things that someone would get to know about you if they knew you well?

4. **What would you say is your most favourite things about yourself, something you like about yourself best of all?**

   Can you tell me about any time you were like that?
   What would you say is your least favourite thing about yourself, something you don't like much?
   Can you tell me about any time you were like that?

5. **When you are upset, what do you do?**

   What happens then?
   Is there someone you turn to?
   Can you tell me about a time you were upset?

<u>SCHOOL & PEERS</u>

6. **What's it like for you at school now?**

7. **Have you taken any exams lately?**

   Has it made a difference in your relationships with friends?

8. Are you going to a new school soon?

How do you feel about that?
Do you think it will make a difference to your relationships with your friends?
How do you think you will feel at your new school?
Do you think you'll be able to make friends easily?

9. Now I'm going to ask you about your teacher. What's s/he like?

What do you like most about this teacher?
Can you think of a time s/he was like that?
What do you think your teacher thinks about you?

10. How about your friends, could you name three of your friends?

Who would you say is your closest friend?

How long have you been friends?
What sort of things do you and [X] do together?
How often on average do you see [X]?

11. What is the best thing about your relationship with [X]?

What is the thing you like least about your friendship w [X]?

12. Have you ever fallen out with [X]?

How did it start?
What did you do, how did you respond?
How did it end?
How did you feel? How do you think he felt?

13. Have you ever felt jealous of your friend?

Can you tell me about a time you were jealous?
Do you think [X] has ever felt jealous of you?

Can you tell me about a time?

14. What do you think [your friend] thinks about you?

<u>PARENTS & SIBLINGS</u>

15. Can you tell me a bit about your relationship with your mum?

What's it like when you and your mum are together?
Can you tell me about any time it was like that?

16. What is the *best* part of your relationship with your mum?

Can you tell me about any time it was [it felt] like that?

What is one thing you like *least* about your relationship with your mother?

Can you tell me about any time it was [it felt] like that?

17. What do you think your mother thinks about you?

18. Can you tell me a bit about your relationship with your dad?

What's it like when you and your dad are together?
Can you tell me about any time it was like that?

19. What is the best part of your relationship with your dad?

Can you tell me about any time it was [it felt] like that?

What is one thing you like least about your relationship with your father?

Can you tell me about any time it was [it felt] like that?

20. What do you think your father thinks about you?

21. Could you think of the first time you were separated from your parents?

How old were you at the time?
Do you remember how you felt?
How do you think your parents felt at the time?

22. Now I'd like to ask you a bit about your relationship with [your brother / your sister].

What's it like when you and X are together?
What sort of things do you do together?
Can you tell me about any time?

Do you talk to [X] about things that are important or things that upset you?
Does he/she come to you to talk or for help?
Can you tell me about a time?

23. What do you like *best* about [X]?

What do you like *least* about [X]?

24. I'd like to ask you about your parents again, but now it's not about your relationship with each of them, but rather how do you think they get along with each other?

Do they ever argue?
How do you feel when they argue?
Do you remember a time recently when they were arguing?
Can you tell me how it was, what it was about?
How did you feel?
Could you imagine how you'd feel if you saw them arguing?

25. Now, could you think back and tell me if you think your relationship with your parents has changed since you were little?

26. Thinking ahead to the future what do you think the relationship with your parents will be like, say five years from now?

APPENDIX C

TABLES

Table 1

Demographic Characteristics of the Sample (n=50)

Variable	Frequency	%
Attachment Pattern		
Secure	31	62
Anxious-Ambivalent	6	12
Anxious-Avoidant	13	26
Gender		
Male	24	48
Female	26	52
Ethnicity		
White	43	86
Hispanic	3	6
African American/Black	1	2
Asian/Pacific Islander	2	4
Middle Eastern	1	2
Socio-economic Status		
Upper Class (500k+)	3	6
Upper Middle Class (100k-499k)	37	74
Middle Class (75k-100k)	4	6
Lower Middle Class (50k-75k)	3	6
Lower Class (25k-50k)	3	6

Table 2

Means and Standard Deviations for IQ Across the Three Attachment Categories

		IQ		
		Full Scale	Fluid	Crystallized
Variable	*N*	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)
Secure	31	112.09(11.74)	110.35(9.28)	112.54(14.01)
Anxious-Ambivalent	6	110.50(11.27)	105.83(9.82)	114.16(13.48)
Anxious-Avoidant	13	106.46(8.18)	110.38(8.29)	102.92(8.66)
Disorganized	0			

Note: M=100; SD=15 is used in the Reynolds Intellectual Assessment Scales composite scores.

Table 3

ANOVA Statistics and Significance for Attachment Across the Three Intelligence Scores

ANOVA						
	Variable	Sum of Squares	df	Mean Square	F	Significance
IQ	Between Groups	290.88	2	145.44	1.22	.303
	Within Groups	5579.44	47	118.71		
	Total	5870.32	49			
Crystal IQ	Between Groups	953.68	2	476.84	2.91	.064
	Within Groups	7701.43	47	163.86		
	Total	8655.12	49			
Fluid IQ	Between Groups	108.37	2	54.18	.654	.525
	Within Groups	3895.00	47	82.87		
	Total	4003.38	49			

Note: N=50. *F statistic is significant at the .05 alpha level.

Table 4

Means and Standard Deviations for crystallized IQ Across the Two Attachment Categories Secure and Anxious-avoidant

		Crystallized IQ
Variable	*N*	*M(SD)*
Secure	31	112.54(14.01)
Anxious-Avoidant	13	102.92(8.66)

Note: M=100; SD=15 is used in the Reynolds Intellectual Assessment Scales composite scores.

Table 5

Pearson Product-Moment Correlations Between Attachment and IQ

Variable	1. FSIQ	2.Fluid IQ	3. Crystallized IQ	4. Attachment
1. FSIQ	--	.679**	.895**	.220
2. Fluid IQ		--	.297*	.024
3. Crystallized IQ			--	.292*
4. Attachment				--

N = 50. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed).

Table 6

Means and Standard Deviations for the WRAT4 Subtest Scores Across the Three Attachment Categories

		WRAT4		
		Reading	Math	Spelling
Variable	*n*	*M*(*SD*)	*M*(*SD*)	*M*(*SD*)
Secure	31	111.16(11.37)	113.45(12.06)	118.51(13.53)
Anxious-Ambivalent	6	113.83(11.88)	116.50(14.88)	114.00(12.66)
Anxious-Avoidant	13	112.38(10.83)	115.53(14.08)	118.15(9.24)
Disorganized	0			

Note: M=100; SD=15 is used in the Wide Range Achievement Test 4 subtest scores.

Table 7

ANOVA Statistics and Significance for the WRAT4 Subtest Scores and Attachment

ANOVA						
	Variable	Sum of Squares	df	Mean Square	F	Significance
Reading	Between Groups	41.89	2	20.94	.164	.849
	Within Groups	5998.10	47	127.61		
	Total	6040.00	49			
Math	Between Groups	71.11	2	35.55	.213	.809
	Within Groups	7850.40	47	167.03		
	Total	7921.52	49			
Spelling	Between Groups	103.84	2	51.92	.333	.718
	Within Groups	7327.43	47	155.90		
	Total	7431.28	49			

Note: N=50. *F statistic is significant at the .05 alpha level.

Table 8

Pearson Product-Moment Correlations Between Attachment and Academic Achievement

Variable	1. Reading	2. Math	3. Spelling	4. Attachment
1. Reading	--	.460**	.656**	-.074
2. Math		--	.372**	-.092
3. Spelling			--	.067
4. Attachment				--

Note: N = 50. ** Correlation is significant at the 0.01 level (2-tailed).

Table 9

IQ and Academic Achievement Means for the Sample (n=50)

Variable	Mean	Standard Deviation
IQ	110.44	10.94
Reading	111.80	11.10
Math	114.36	12.71
Spelling	117.88	12.31

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