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Are Holding Patterns Predictive of Infant Attachment Classification in 12 to 18 Month Old Infants?

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ARE HOLDING PATTERNS PREDICTIVE OF INFANT ATTACHMENT
CLASSIFICATION IN 12 TO 18 MONTH OLD INFANTS?

by

LAUREN BEAM

(Under the Direction of Janice Kennedy)

ABSTRACT

Research investigating infant attachment has demonstrated the benefits of infants' secure attachment to their mothers. While Ainsworth (1973) has determined four maternal behaviors, tender holding, stimulation, contingent responding and maternal sensitivity to infant signals, that promote a secure attachment in infants, are there other behaviors a mother could perform to promote a secure attachment in her infant? Whether infant attachment classification could be predicted from maternal holding patterns was investigated in the current study. Infant attachment classification was determined by infant behavior in Ainsworth's Strange Situation Procedure. Maternal holding patterns were comprised of eight holding behaviors. Results revealed that mothers of avoidant infants held their infants at a significantly further distance away from their torsos than mothers of secure, ambivalent and disorganized infants. Additionally securely attached infants initiated holds significantly more than disorganized infants. Results are discussed in terms of applications of this research for new mothers.

INDEX WORDS: Infants, Attachment classifications, Holding, Strange situation procedure

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LAUREN BEAM

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LAUREN BEAM

Major Professor: Janice Kennedy
Committee Members: Karen Naufel
Lawrence Locker

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DEDICATION

I would like to dedicate my thesis to my parents for their unwavering support throughout graduate school and every life journey I find myself on. Thank you for believing in me, helping me, and providing me with the belief I can do anything if I work hard at it. I love you and feel so blessed to have you as my parents.

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CHAPTER 1

INTRODUCTION

Donald Winnicott (1960) stated “there are those mothers who can hold an infant and those who cannot; the latter quickly produce in the infant a sense of insecurity” (p. 49). Although some may believe the pure physical contact resulting from holding is sufficient enough to provide infants with a sense of trust both in their mothers and in the world (Erikson, 1950), there may be other important factors as well. What is Winnicott attempting to convey in his bold statement? Seemingly all mothers can physically pick up their infants and hold them; it is quite a natural behavior performed by every able-bodied mother in the world. So what does it mean to be a mother who can hold an infant and provide a sense of security versus a mother who cannot hold an infant and thus provide a sense of insecurity? Perhaps, then, it is the manner or pattern in which mothers hold their infants that carries the most importance in instilling infants’ sense of security.

What is it that is present in some infant-mother interactions and not in others that leads to a disparity in holding patterns? Aside from Ainsworth’s research on tender holding, there is little else known about the connection between qualitatively different holding patterns and infant-mother relationships (Romer & Sossin, 1990). What is known from attachment theory, however, is that there are various factors that contribute to an infant-mother relationship. Chief among these are infants’ expectations concerning how their mothers will behave when they need to be comforted and assured in a stress-inducing circumstance (Ainsworth & Bowlby, 1991). Once infants’ expectations are set, there are certain behaviors infants will perform when separated from their mothers. These are referred to as *attachment behaviors* (Bowlby, 1969). This paper presents the formation of attachment theory, an assessment of the Strange Situation, an

assessment of attachment classifications, and infant holding patterns. The goal of this project is to investigate the relationship between infant attachment classifications and parental holding patterns. The argument presented here that it is possible to predict infants' attachment classification based on the pattern in which their mothers holds them.

CHAPTER 2

HISTORY OF ATTACHMENT THEORY

Psychologists have always speculated about the various ways infants develop into adults. Psychoanalysis, for example, argued that infant attachment stemmed from the need to reduce primary drives, such as the need for food. For an infant, this would only be possible if another human was present (Biringen, 1994). John Bowlby, on the other hand, wanted to explain infant attachment from another perspective. Bowlby (1952) first began to investigate attachment while observing children who were separated from their mothers due to hospitalization. From the time he first began his research, Bowlby believed human emotions and the behaviors associated with those emotions stemmed from real-life experiences rather than the drives psychoanalytic theory proposed (Ainsworth, 1992).

Bowlby worked alongside James Roberston investigating the effects of separation in young children. During that time, Roberston recorded his observations of the effects of separation due to hospitalization in *A Two-Year-Old Goes to Hospital* (Roberston, 1989). Roberston noted that these children, in the initial stages of separation from their mothers in the hospital, show great distress. They often call out for their mothers and exhaust themselves crying. Toward the middle of their stay, these children begin to appear settled in, but also appear to withdraw from contact attempts made by their mothers during short visits. Nearing the end of their stay, children begin to show no excitement when visited by their mothers and ignore attempts at physical contact with their mothers all together. When finally leaving the hospital, Roberston noted that some children walk out of the hospital apart from their mothers. His observations of children separated from their mothers provided insight into the psychological

stages children experience when their mothers are absent for a significant amount of time. Roberston stated that infants “can tell little in words, so that understanding has to be sought largely through interpreting their behavior” (p.11).

Roberston also began to investigate the effects mothers had on the early development of their infants. Through observations of mother-infant pairs, Roberston concluded that deficient mothers could greatly disturb infants’ development. Based on his observations, he provided certain criteria for assessing what he called “motherhood”, or how a mother adjusts to the new demands made of her as well as the reality of being a mother to her infant. Roberston referred to this as the *adaptive period*. The adaptive period was successful, Roberston believed, when a mother feels and expresses pleasure being a mother to her new infant and is aware of her infant’s affective states and responds to them.

Bowlby’s (1960) and Roberston’s (1989) observations of hospitalized 15 to 30 month olds included the time the children spent with their mothers, which was minimal. In addition, any nurses present during the infants’ stay were rotated frequently. Bowlby concluded through his observations that this frequent change in caretakers did not allow infants to develop any significant or stable relationship. This work at the Tavistock Clinic led Bowlby and Roberston to identify three distinct stages of separation: protest, despair and detachment.

Protest, Bowlby (1960) believed, is the primary response to separation. When infants are first separated from their mothers, they become distressed, physically agitated, begin to severely cry and desperately seek to be reunited with their mothers. This active search for their mothers suggests that infants have an expectation that their mothers will return (Bowlby, 1960). In the second stage of separation, despair, it becomes apparent that infants still seek to be reunited with their mothers, but behaviors such as crying and physical distress are not present. Infants begin to

act as if they are unwilling to search for their mothers any further (Bowlby, 1960). Finally, in the last phase of separation, detachment, infants exhibit behaviors that suggest they no longer have a significant relationship with their mothers, regardless of if she is present or absent. Infants will no longer greet or cling to their mothers, and will accept care from another person present rather than preferring their mothers. Bowlby (1960) also suggested that if infants remain out of contact with their mothers for a prolonged amount of time, they will begin to act as if contact with another person is meaningless and will not attempt to attach themselves to another person again. While working at the London Child Guidance Clinic, Bowlby made many detailed observations of 44 young children staying at the clinic. Children who were without the contact of their mothers for an extended amount of time began to steal and act out. In addition, their capacity for physical interaction with others was apparent: they were affectionless. Through his observations, Bowlby linked their negative behaviors to maternal deprivation and separation (Bretherton, 1992).

Bowlby's research in responses to separation could not be explained by any other theories present at that time. Hypotheses that the psychoanalytic theory postulated could not be empirically tested; and without hypothesis testing, a theory cannot be supported (Bowlby, 1957). Therefore, drawing from the work of Konrad Lorenz's (1980) theory of ethology and Charles Darwin's (1875) evolutionary theory, Bowlby argued the need for a new theory to explain these responses to separation (Ainsworth, 1992). Bowlby's new theory was called *attachment theory*.

Lorenz (1980) was interested in ethology, which can be defined as the comparative study of behavior. Ethologists are interested in behavioral processes; for example, Lorenz studied imprinting in birds. His observations began immediately after the birds he was investigating hatched as Lorenz wanted himself to be the first animal the young birds saw after birth. Through

this research, Lorenz (1980) determined that birds attach themselves to and follow the first animal they perceive after birth. The time immediately following birth in which imprinting occurs is termed a *sensitive period* (Lorenz, 1980). It was through this research and other observations that Lorenz determined that animals are capable of striving toward a purpose using goal-oriented behavior, such as following their mothers. In addition, Lorenz (1980) observed that the birds that imprinted on their mothers showed signs of separation distress and proximity seeking when their mothers were not present. The behaviors exhibited by the birds, Bowlby observed, were markedly similar to the behaviors exhibited in young children separated from their mothers (Ainsworth & Bowlby, 1991). As Bowlby (1969) demonstrated, infants will seek proximity to their mothers and show distress in their mothers' absence. Furthermore, infants can also show signs of goal-corrected behaviors: actions performed to achieve a specific goal, namely proximity to their attachment figures. Lorenz (1980) observed that similar to young birds imprinting on their mothers, humans also have sensitive periods during their childhood when their needs must be met, preferably by their mothers; if they are not, unalterable damage can occur.

Additionally, applying Darwin's (1875) research, Bowlby concluded that infant attachment also serves an evolutionary purpose. The core concept of evolution, according to Darwin, is survival of a species' offspring until reproduction through the process of natural selection. It is through this process of natural selection that humans developed biologically advantageous instincts that allow them to survive long enough to reproduce (Darwin, 1875). So how do infants use these instincts in order survive long enough to reproduce? In the beginning of our evolutionary history, it seems, survival of our species was a difficult task met with many challenges. Consequently, infants' separations from their mothers were almost certain to result in

death and therefore, infants were required to use their instincts to adapt behaviors that would allow for their survival. Bowlby (1982) called these behaviors *attachment behaviors*.

Attachment behaviors, which serve to strengthen the bond between the mother and her infant, are behaviors such as sucking, clinging, smiling and crying (Bowlby, 1958). Each of these behaviors serves an evolutionary purpose. Once infants have developed locomotor skills, they begin to proximity seek and follow their mothers when she leaves their sight (Bowlby, 1958). From an evolutionary standpoint, it seems, this would allow infants to be within a close enough distance to be protected from anything that could harm them. For example, if humans lived among dangerous animals, being even a few feet from their mothers could result in being eaten. When infants are within a safe distance from their mothers, the chances of this occurring would dramatically decrease. Infants can assure this proximity by moving closer to their mothers when their mothers move further away from them. Similarly, proximity maintaining behaviors, such as clinging to their mothers or refusing to be put down, also allow infants to stay within a safe proximity to their mothers.

Crying and smiling, on the other hand, are signaling behaviors (Ainsworth, Blehar, Waters & Wall, 1978). When infants are frightened, crying allows their mothers to know that their infants are possibly in danger and that she should attend to them to ensure their safety. Many things can frighten an infant such as a loud noise or an unfamiliar person. These stimuli are also possibly indicative of danger. Smiling, alternatively, is a signaling behavior that allows infants to indicate to their mothers that they enjoy having their mothers near them. This, in turn, causes mothers to desire to be near their infants, thus increasing the infants' safety (Bowlby, 1982). The attachment behaviors that infants exhibit become a goal-corrected system (Ainsworth, 1971). When their mothers leave, infants will follow as to correct for this and regain

proximity. Each of these attachment behaviors, then, serves to protect infants from the possible dangers present in our evolutionary history. Bowlby's research clearly demonstrated an ethological and evolutionary basis for infant attachment given that infants' attachment to their mothers or caregivers would promote their survival.

Bowlby's (1960) theory of attachment was unique for its time. His application of Lorenz's (1980) and Darwin's (1875) ethological theories to infant attachment provided the field of psychology an entirely new way of looking at and investigating infant development. Through his research, observers of child development can begin to understand young children's behaviors and that the ways in which young children act when separated from their mothers promote their survival. For some parents it may have seemed that crying was simply an annoying habit in their children. However, Bowlby's research allowed parents to better understand why infants cry. Lorenz's research on imprinting demonstrated the importance of a critical period in development and this idea was extended to human behavior. Although imprinting in animals is not synonymous with human attachment, the separation behaviors in Lorenz's birds were certainly comparable to infant separation behaviors. In addition, this similarity in separation behaviors between birds and infants demonstrated the evolutionary purpose of attachment in that both young infants and birds are aware of their need for their primary caregivers in order to survive. Beginning with the three stages of separation and moving into attachment behaviors, Bowlby's research provided evidence as to why infant attachment served an evolutionary purpose. His research gave investigators specific behaviors to look for when observing young children separated from their mothers as well as behaviors that serve to keep infants close to their mothers. Bowlby's research, however, did not provide descriptions of the differences in infant attachment behaviors with different mothers. His descriptions of the stages of separation and

attachment behaviors tended to be a 'one size fits all' description of how infants respond to separation.

CHAPTER 3

INTRODUCTION OF ATTACHMENT CLASSIFICATIONS

In the early 1950's, Mary Ainsworth also began to work at the Tavistock Clinic. There, she met Bowlby who introduced her to his theory of ethology and she began investigating this new phenomenon (Bretherton, 1992). Ainsworth left the Tavistock Clinic for Uganda to conduct an observational study of Uganda infants. Ainsworth observed 26 infant-mother pairs for two hours every two weeks; she also conducted interviews with the mothers. Her observations of the infants in Uganda were congruent with Bowlby's research on ethology, especially concerning proximity promoting signals and behaviors. Her study of Uganda infants became the first empirical study of attachment from an ethological standpoint (Bretherton, 1992).

Ainsworth's observations of Uganda infants led to the identification of some interesting individual differences in infant-mother pairs. Ainsworth noted certain interaction patterns between mother-infant pairs. For instance, Ainsworth (1963) observed that some infants cried less than other infants she observed and frequently explored their environment; Ainsworth called these securely attached infants. On the other hand, some infants cried often, even while being held by their mothers, and explored a small amount. Ainsworth called these infants insecurely attached. Not-yet attached infants had no disparity in their behavior toward their mothers (1963). These differences, Ainsworth observed, stemmed from the mothers' sensitivity to the signals their infants were giving, such as crying or proximity seeking. Mothers who were highly sensitive to their infants' needs and responded appropriately tended to have infants who were securely attached, whereas mothers who were insensitive to their infants' needs were likely to have infants who were insecurely attached (Ainsworth, 1963).

Ainsworth's research in Uganda was a strong starting point for further studies both of infant attachment behaviors and of classifying infants into attachment categories. Ainsworth's work on infant attachment classifications extended Bowlby's research in terms of the identification of qualitatively different patterns of attachment behaviors exhibited by infants based on their mothers' sensitivity to their signals. The data from this first observational study allowed Ainsworth to identify specific attachment behaviors, which could be used in later studies to identify behaviors of interest. Ainsworth's first empirical study of infant attachment allowed researchers to identify behavioral patterns exhibited not only by the infant, but by the mother as well, that are crucial for classifying infants into attachment categories. However, these observational studies were unstructured. What was needed was a systematic method for identifying infant attachment classifications.

CHAPTER 4

THE STRANGE SITUATION PROCEDURE

Back in the United States, Ainsworth (1973) began a second observational study entitled the Baltimore Project. Similar to the study done in Uganda, Ainsworth again observed 26 mothers and their infants in their homes, during times of play and feeding, every three weeks for four hours during the infants' first year. Ainsworth was particularly interested in observing times the infants were separated from their mothers in order to study separation behaviors. Using her data from Uganda, researchers were instructed identify attachment behaviors, such as crying or proximity seeking and maintaining, to identify situations in which those behaviors were likely to occur, and to note the mothers' response to them (Ainsworth & Bowlby, 1991). Ainsworth was interested both in attachment behaviors as well as the developmental trend of these behaviors. Results of the Baltimore Project showed that by the end of the first year, following was the most frequent response to separation in the home. Furthermore, once reunited, infants were more likely to give a positive greeting, such as smiling, than to cry (Stayton, Ainsworth & Main, 1973).

Ainsworth and Witting (1969) invited the mothers and their infants at the infants' first birthday to participate in the Strange Situation Procedure (see Table 1). Ainsworth was interested in how infants would respond to two brief separations and use their mothers as a secure base from which to explore (Ainsworth, Bell & Stayton, 1971). The Strange Situation Procedure is a 24-minute, eight episode laboratory situation designed to provide researchers with a classification procedure for infant attachment categories. Each episode lasts three minutes and each of these episodes involves an infant (age 12 to 18 months), an infant's mother, a stranger,

and an unfamiliar adult female. The Strange Situation Procedure takes place in a laboratory setting in which there are two chairs facing each other for the mother and the stranger to sit in, and toys on the floor for an infant to play with. Two-way mirrors on the wall are used so that the situation may be video-recorded for further analysis of infant behavioral patterns. Mothers are instructed to only engage with their infant when the infant initiates (Ainsworth, Blehar, Waters & Wall, 1978).

Ainsworth designed the Strange Situation Procedure as follows: in the first episode, the experimenter, infant and mother are brought into the playroom together and the experimenter explains what will take place to the mother. The second episode involves the mother pretending to read a magazine while the infant plays with toys placed on the floor. In the third episode, the stranger enters the room. For the first minute, she is silent allowing the infant to notice and examine her. For the second, minute she speaks with the mother and then for the third minute she attempts to make friends and play with the infant.

In the fourth episode, the mother leaves the room and the infant is left with the stranger. The fifth episode begins when the mother enters the room and the stranger leaves. It is during this reunion episode that infants' behavioral patterns indicate the most about their attachment classification. In the sixth episode, the mother leaves again, and the infant is left alone. The stranger again enters in the seventh episode. Finally, the eighth episode begins when the mother comes back into the room and the stranger leaves; the eighth episode also serves as a reunion episode. At the conclusion of the Strange Situation Procedure, the video tapes are coded by researchers and attachment classifications are determined. Attachment classifications are determined based on the patterns of behavior exhibited by infants, particularly in response to reunion with their mothers after separation (Ainsworth, 1979). Brief separations from the mother

are designed to induce mild stress in the infant, whereas reunion episodes provide researchers with the best opportunities to assess attachment behaviors.

Based on the data from the Baltimore Project and infants' participation in the Strange Situation Procedure, Ainsworth identified several behaviors present in the infants: exploratory behavior, crying, search behavior, proximity-seeking and contact-maintaining behaviors, proximity-avoiding and contact-resisting behaviors (Ainsworth & Bell, 1970). Exploratory behaviors are those exhibited by the infants' investigation of a novel environment that aid in infants' ability to learn about the world. Search behaviors include following the mother to the door, attempting to open it or moving toward to the chair the mother was sitting in. Proximity-seeking and contact-maintaining behaviors are behaviors that lead to infants gaining contact with their mothers including clinging, embracing and resisting release by increasing clinging (Bowlby, 1960). Proximity-avoiding behaviors include ignoring the mother when she attempts a greeting by looking or turning away from her. Finally, contact-resisting behaviors include hitting or kicking a mother that seeks to make physical contact with her infant. Ainsworth scored each of these behaviors by the strength of the behavior, its frequency, duration, latency and type. Active behaviors, such as following, were considered stronger than signaling behaviors, such as crying (Ainsworth & Bell, 1970). In summary, the dimensions of behavior used to classify infants into attachment classifications were proximity and contact seeking behavior, contact maintaining behavior, avoidance, resistance and exploration (Ainsworth, Blehar, Waters & Wall, 1978). These behaviors often depend on the episode of the Strange Situation Procedure being investigated as well as the infant attachment classification.

Based on the behaviors exhibited by the infants in the Strange Situation Procedure, Ainsworth (1978) determined eight overall patterns of attachment that formed three main groups:

A, B, and C. Classification groups were based on the similarities in behaviors exhibited by the infants. Group B infants are deemed secure infants. These infants are comfortable exploring new environments and show high exploratory behavior because they use their mothers as secure bases from which to explore. When secure infants are in a novel environment, they will stay within a close distance to their mother until they are reassured the environment is safe; then they begin to explore. When separated from their mothers, secure infants will diminish their play, cry and show search behavior, as they are not comfortable being away from their mothers (Ainsworth, 1973). Once reunited with their mothers, secure infants will usually show strong proximity and contact seeking behaviors as they need to be comforted by their mothers after separation. At the very least, secure infants will give a warm greeting to their mothers. However, once reassured, infants will again show strong exploratory behaviors and again begin to play.

Observing these similar patterns in securely attached infants, Ainsworth then began to investigate whether the differences in infant responses to separation and reunion observed in securely attached infants and insecurely attached infants were associated with disparities in maternal behavior (Stayton & Ainsworth, 1973). Comparing the Strange Situation Procedure data with the home visit data, Ainsworth observed that mothers of secure infants also showed similar patterns of behavior. For example, these mothers tenderly held their infants when they picked them up. However, Ainsworth noted that it was not the amount of time mothers held their infants that promoted a secure attachment, but rather contingent picking-up. Contingent picking-up means that mothers picked their infants up every time they signaled need to be picked up. In addition, these mothers also responded immediately and sensitively to their infants' signals and provided adequate stimulation for their infants. Furthermore, securely attached infants cried very little when at home with their mothers (Ainsworth, 1973). Securely attached infants also almost

immediately greeted their mothers upon reunion and usually sought comfort in physical contact with their mothers (Hopkins, 1987).

In addition to the securely attached infants, Ainsworth (1973) observed two other classifications of insecure infants: insecure-ambivalent infants, Group C, and insecure-avoidant infants, Group A. Insecure-ambivalent infants showed little exploratory behavior in the Strange Situation Procedure as they were extremely preoccupied with their mothers' whereabouts. They showed strong proximity-seeking and contact-maintaining behaviors prior to separation (Ainsworth, Blehar, Waters & Wall, 1978). They could not be reassured by their mothers in the novel environment, and did not use their mothers as a secure base from which to explore. Once separated, insecure-ambivalent infants became distressed and cried; these infants also showed strong search behavior. However, once reunited, these infants showed a unique and somewhat confusing response to their mothers: one moment they would be proximity seeking, the other, they would be avoiding and pushing her away (Ainsworth, 1979).

Upon observations of mothers at home with their infants, Ainsworth (1979) noted that these mothers, while tenderly holding, stimulating, and sensitive to their infants' needs, similar to mothers of securely attached infants, these mothers did not respond to their infants in a consistent manner. Therefore, insecure-ambivalent infants became uncertain how their mother would respond to them. They desperately wanted to be near their mothers, yet also exhibited their anger with them (Ainsworth, 1971). In summary, insecure-ambivalent infants feared they would not get enough of what they need from their mothers.

Alternatively, insecure-avoidant infants showed behaviors in the Strange Situation Procedure that were quite dissimilar to insecure-ambivalent and secure infants. It was as if these infants did not care that their mothers were even present. They showed high exploratory

behaviors, although of low quality, and did not use their mothers as a secure base from which to explore. When separated, insecure-avoidant infants rarely appeared to notice their mothers' absence (Ainsworth, 1979). Upon reunion, avoidant infants did not seek proximity or contact, and if they were approached by their mothers, they avoided eye-contact and resisted being held by the mother.

Ainsworth (1978) observed from the home data that mothers of insecure-avoidant infants did not tenderly hold their infants, and in fact may have been physically rejecting toward their infants. They did not provide adequate stimulation, were not sensitive to their infants' signals and did not respond to their infants' needs in a consistent manner. Insecure-avoidant infants learned that they may not be able to depend on their mothers, and therefore behaved in a way that was defensive. Insecure-avoidant infants have a self-protecting relationship with their mothers; they have begun to ignore their need for her (Ainsworth 1978). Furthermore, other research has shown that these infants were not tenderly held or exposed to a significant amount of physical contact by their mothers. Therefore, insecure-avoidant infants also no longer displayed contact-maintaining behaviors while being held (Hopkins, 1987). In summary, insecure-avoidant infants fear what they want. They want and need attention and contact with their mothers, but fear that the mother will not be responsive to that need.

Later, Main (1990) identified a fourth infant attachment classification: group D infants. These infants, deemed disorganized infants, showed extremely inconsistent behavior in the Strange Situation Procedure. Main and Solomon (1990) noted that infants classified as group D exhibited behaviors that lacked a specific intention or goal. Some specific behaviors associated with disorganized infants include contradictory behaviors, maladaptive behaviors, such as head banging or freezing and indications of confusion or apprehension (Main & Solomon). Infants

may also proximity-seek to their mothers following separation, but then withdraw immediately following (Main & Solomon). Mothers of these infants have been found to suffer from trauma related to unresolved attachment in their own lives. In addition, maltreatment is often a concern and has shown to be a factor in disorganized infants. For example, infants may proximity-seek to their mothers following separation, but may also withdraw immediately following (Main & Solomon).

Further research has investigated other maternal behaviors associated with attachment classifications. Schore (2001) has stated that attachment theory is fundamentally a regulatory theory in that mothers are continuously, though unconsciously, regulating their infants' emotional states. Blehar, Lieberman and Ainsworth (1977) examined the role of face-to-face interactions regarding attachment classification. Six to 15 week old infants participated in this study with the hypothesis that infants' earliest interactions with others are likely to occur while he or she is either facing or in close bodily contact with another person. Every face-to-face encounter between a mother and her infant was recorded at home visits at six, nine, 12 and 15 weeks and face-to-face contact was defined as a "full-face presentation of adult and infant to each other, occurring at a distance judged to ranged from eight to 18 inches" (p. 185). These interactions were then compared with Strange Situation Procedure data collected at 12 months. Results revealed that mothers of securely attached infants initiated significantly more face-to-face interactions than mothers of insecure-avoidant infants although there were no significant differences between insecure-ambivalent infants and insecure-avoidant or secure infants. Furthermore, mothers of avoidant infants also responded to face-to-face interaction with silent and impassive expressions. If avoidant infants did attempt to make face-to-face interactions, their mothers often did not respond.

Beckwith, Cohen and Hamilton (1999) conducted a study with preterm infants that investigated the importance of early infant experience in regard to adult attachment at 18 years. The central early infant experience examined was maternal sensitivity to infant signals, which included holding behaviors. These behaviors included maternal vocalization, gaze and touching. Results revealed that mothers of adults judged as secure and preoccupied in the Adult Attachment Interview (Main & Goldwyn, 1993) were more sensitive and responsive in their behavior toward their infants than mothers of adults judged as dismissing. Therefore, maternal sensitivity in infancy can not only predict infant attachment classification, but adult attachment classification as well.

Ainsworth's development of the Strange Situation Procedure provided the field of psychology with a structured and standard methodology to classify infant attachment. The 24-minute procedure provided a means by which to examine in the laboratory what Ainsworth had observed in Baltimore for almost a year. The Strange Situation Procedure is an assessment tool that can be used by other researchers. However, it should be noted that this method has not always proven to be reliable. Masters and Wellman (1974), for example, have noted that the Strange Situation Procedures employed by other researchers have not demonstrated stability in identification of attachment behaviors from one situation to another.

Although Masters and Wellman (1974) offer this critique of the Strange Situation Procedure, Bowlby would have predicted just that. Bowlby's research does not predict stability in behaviors in episodes of the Strange Situation Procedure. Rather, his research predicts permanence of the attachment bond. Bowlby (1991) notes that attachment behavior calls upon the internal organization and working models infants develop not only with the attachment figure, but with themselves. Therefore, it is the infants' expectations of their mothers, not their

outward behavior, which is most important. The trademark of attachment is proximity, not stability in behavior across Strange Situation Procedures. For example, close bodily contact with the mother ceases attachment behaviors displayed by the infant (Ainsworth & Bowlby, 1991).

Further research has raised concerns regarding the validity of infants' response to their mother in the Strange Situation Procedure. McElwain and Booth-LaForce (2006) conducted a study in which the Strange Situation Procedure was used to assess maternal sensitivity to infant distress as a predictor of attachment security. Attachment security was investigated through observations of play interactions of mothers and infants at six and 15 months. Also at 15 months, the infant-mother pairs participated in the Strange Situation Procedure. As researchers using the Strange Situation Procedure before have demonstrated, greater maternal sensitivity to distress indicates a secure attachment. Results of this study indicated maternal sensitivity was present in some of the mother-infant pairs; however, those infants were not classified as securely attached in the Strange Situation Procedure. Therefore, while specific maternal behaviors are typically associated with a specific infant attachment classification, some research has suggested this is not always the case.

CHAPTER 5

INFANT HOLDING

There are certain behaviors exhibited by a mother toward her infant during the Strange Situation Procedure that are of particular importance. Ainsworth (1973) observed four central patterns of behavior present in all mothers during her research that led to the disparities in infant attachment classifications. Among these patterns of behavior is tender holding. A mother who tenderly holds her infant is gentle in her touch and ensures that any movement occurring while being held, either by her infant or her, is a smooth transition. This tender holding pattern is one in which infants are held closely and facing toward their mothers; it is just another way mothers shows their infants they are sensitive and responsive to their needs.

Behaviorists in the 1950's believed that infants only became attached to their mothers because their mothers provide them with food (Solter, 2001). This was a strict view that only stemmed from the idea of rewards and punishers. If infants received food from their mothers, a reward, their attachment to her would increase, as this would increase their rewards. Harlow (1958) designed a study to investigate other possible explanations for infants' preference for their mothers with a study of contact comfort. To investigate this, Harlow raised infant monkeys without their mothers. These monkeys were placed in a laboratory with two artificial mothers: one mother whose body was made of cold wire, but that provided the monkey with food, and a mother whose body was made of soft terry cloth and did not have any food to provide the monkey. Results revealed that the infant monkeys preferred and clung to the soft terry cloth mother despite the fact that she did not have any food. Harlow's study was the first of its time to suggest that simply providing for the biological needs of an infant is not enough to promote

attachment. This groundbreaking study sparked further investigation as to why holding infants is so important for their development.

Applying Harlow's idea to humans, Anisfeld, Casper, Nozyce and Cunningham (1990) investigated whether carrying an infant, which increased physical contact, was related to attachment. Investigators gave mothers who had just delivered at a local hospital either an infant seat or a soft baby carrier to use to carry their infants throughout their first months. The infant seat provided less physical contact, while the soft baby carriers allowed for increased physical contact between the mother and infant. When the infants turned three and a half months, while observed in a play session, mothers who used a soft baby carrier were more contingently responsive to their infants' needs than mothers who used an infant seat. At 13 months, a greater percentage of infants being carried in a soft baby carrier were securely attached in the Strange Situation Procedure than those infants in the control group.

Anisfeld and colleagues' (1990) study demonstrated that increased physical contact by carrying an infant can lead to a greater likelihood of having a securely attached infant at the end of the first year. This study clearly showed what Ainsworth et al. (1978) had observed about tender holding promoting secure attachment. Infants in the infant seat were farther away from their mothers' bodies, while infants in the soft baby carrier were actually held by their mothers. Perhaps being physically close allows mothers to become more sensitive to their infants' needs. Although this study demonstrated the need for increased physical contact through carrying an infant, this study did not explore the possible differences in the quality of the carrying or any patterns associated with holding.

Field (2003) investigated the effects of stimulation on preterm infants. Both Kangaroo Care as well as massage were examined as possible therapies for weight gain and shorter hospital

stays for preterm infants. Kangaroo Care is practiced in Bogota, Colombia and involves infants being carried chest-to-chest in their mothers' clothes. This holding technique is used to provide tactile, kinesthetic and vestibular stimulation and transmit body heat from the mother to her infant (Field, 2003). Massage therapy can involve either a mother simply placing her hands on an infant's back or a mother lightly stroking her infant. Field has found that Kangaroo Care facilitates breastfeeding, which in turn leads to greater weight gain for infants carried in this manner versus control groups not carried in this manner. Infants carried with Kangaroo Care were also discharged from the hospital earlier than control groups. Further benefits included better quality of sleep, higher activity levels, fewer infections and incidence of illness and pain reduction. Field has also found that massaged infants gained an average of 47% more weight than non-massaged infants, which continued throughout the first months of life. Preterm infants, then, can benefit greatly from these forms of stimulation. These results further indicate the importance of physical contact, especially in the first few months of an infant's life.

Dagenbach, Harris and Fitzgerald (1988) investigated infant holding patterns in parents of infants from the first week until the infants were 18 months of age. Thirty-seven participants were recruited from a local hospital. Parent handedness as well as a self-report of holding patterns was taken from parents. In addition, direct observations of parental holding and infant head turning were made. Results revealed that parents, whether left or right handed, have a significantly greater preference for holding their infants on their left side. This side preference tended to be fairly stable across the first 18 months. Furthermore, the results of the study revealed that infants were significantly more likely to turn their heads to the right while being held on the left side; however, infants held on the right side did not show a significant left head preference. Perhaps parents were taking cues from their infants when determining their

preference for left or right side holding. If an infant is more inclined to face the right, a left-sided holding pattern would allow more face-to-face interaction, especially during times of feeding (Dagenbach et al., 1988). This study provides great insight into a specific pattern of holding. Based on face-to-face interactions, it seems that a left-sided holding pattern would lead to more infants to become securely attached; however, this was not discussed in this study.

Other studies have attempted to explain the left-handed holding phenomenon. Salk (1960) also observed mother-infant interactions in rhesus monkeys. Rhesus monkeys, as research has shown for human mothers, also tend to hold their infants on the left; this occurs about 80% of the time. Salk believed the monkeys did this so their infants could hear their heartbeat. Their mothers' heartbeat, he believed, represented the peaceful environment they lived in utero, an environment which kept them fed, warm, supplied with oxygen and relatively free from the stressors the monkeys were exposed to after birth. In a later study, Salk (1970) revealed that human mothers who had to be separated from their infants the first 24 hours after birth were lacking this left-handed holding pattern. Conversely, if the mothers had had previous children and had not been separated from those children, the left-handed holding preference was present while holding their infants. Bogren (1984) demonstrated the same prevalence of 80% in human mothers' left-handed holding patterns as Salk showed with the rhesus monkeys. Clearly, research in this topic demonstrates a strong left-handed holding preference among mothers; perhaps this pattern of holding is somehow more beneficial to infant-mother interactions. These studies demonstrate not only the pervasiveness for this pattern, but also provide an ethological view for why mothers may tend to hold their infants on one specific side.

Romer and Sossin (1990) claim that the qualities of differential holding patterns can have a significant effect on various aspects of early psychological development. Through their

research, they have identified four aspects of holding patterns that enhance parent-infant interactions and promote motor development. The first, sufficient stabilization and support of the trunk, allows infants to begin to support their body parts and develop a body image. This holding pattern includes an infant sitting on the forearm, facing the mother. Stabilization of the head is the second holding pattern that Romer and Sossin believe can enhance parent-infant interactions. This stable hold prevents infants from developing a fear of falling. This holding pattern allows the infant to be held slightly away from the mother, with one hand under the infant's head, and the other supporting the body, facing the mother. The third holding pattern is fostering motility which is accomplished by not restricting peripheral movements of the arms and legs. If mothers immobilize their infants while holding them, infants will become restricted in their motor movements. The fourth pattern involves holding an infant with one arm, fostering mutuality in the flow of interactions. Romer and Sossin (1990) suggest that when the mothers' supporting arm is mobile, this facilitates adjustment to infants' movements. Finally, while carrying the infant for prolonged periods of time, Romer and Sossin (1990) suggest that the first pattern of holding, having the infant seated on the forearm facing the mother, is most appropriate. This is because the mothers' arm provides security to the infant, support for the infants' spine as well as support for the infants' head.

According to attachment theory, these holding patterns would promote secure attachment. Holding infants in a way that does not restrict motor movement provides infants, while still very young and immobile, a means by which to explore the world around them. It seems that this is the beginning of infants using their mothers as a secure base from which to explore. Holding in a way that fosters interaction between mothers and infants allows mothers to become aware of their infants' needs and adequately respond to them. While very young, holding may be one of

the few times during the day that a mother can truly interact with her infant. Finally, stable holding can instill in infants a sense of trust that their mothers will protect them from falling. This stable hold is another basis for promoting secure attachment: infants learn to rely on their mothers to keep them safe. One would hope, along with contingent responding and responding sensitively to infants' needs and providing stimulation, that these patterns of tender holding will promote a secure attachment.

On the other hand, if these patterns are absent, infants could be at risk for an insecure attachment. Hopkins (1987) has integrated attachment theory in her research on holding patterns. While illustrating the significance of mothers' physical contact with their infants, she notes that some mothers, though otherwise present in their infants' lives, are physically rejecting. Mothers who are physically rejecting fail to hold their infants in a tender way and may fail to hold them altogether. When signaled by their infant to pick them up, these mothers ignore their infants' signals. In addition, Ainsworth (1978) has also noted through her observations that mothers of avoidant infants are physically rejecting of their infants. Winnicott (1960) also noted that being insecurely held is one of the earliest causes of anxiety for an infant.

These two ideas taken together suggest that holding is a much more significant experience than merely a behavior conducted to feed or transport infants from place to place. Holding patterns serve as a form of communication between a mother and her infant. Just as mothers who sensitively and appropriately respond to their infants' signals are likely to have securely attached infants, perhaps mothers who hold their infants in a pattern that is sensitive and appropriate to their needs will promote secure attachment.

Just as the maternal behaviors Ainsworth (1978) observed toward their infants were predictive of attachment classification, holding patterns also may serve as predictors of

attachment. If mothers behave in a certain way to ensure a secure attachment, mothers' particular holding behaviors may accomplish the same goal.

CHAPTER 6

STATEMENT OF PROBLEM

Clearly there are gaps in the research concerning holding patterns and attachment classifications. While being held is a significant part of infants' early experiences with their mothers (Romer & Sossin, 1990), there has been little research to link the two. Therefore, predicting attachment classification based on holding patterns is the next step in identifying maternal behaviors that promote specific attachment classifications. This research sought to fill the gap between holding patterns and attachment classification and investigated whether infant holding patterns were predictive of infant attachment classification in 12 to 18 month old infants.

It was hypothesized that mothers of securely attached infants would display a markedly different holding pattern than mothers of insecurely attached or disorganized infants. This hypothesis was based on maternal behaviors observed during Ainsworth's (1979) research in infant-mother interactions, especially concerning tender holding. The results of Ainsworth's research revealed significantly different maternal behaviors in mothers of secure infants from that of mothers of insecurely attached and disorganized infants. These behaviors, it seems, would presumably include holding behaviors. Additionally, it was hypothesized that mothers of infants classified in each attachment classification would demonstrate their own unique holding pattern. This hypothesis was again grounded in Ainsworth's research regarding the similarities in maternal behaviors and the differences found between mothers of infants classified into different attachment categories. This hypothesis was also based on Romer and Sossin's (1990) research concerning parental holding patterns, which suggests specific holding patterns, in addition to other factors, leads an infant to feel secure.

It was hypothesized that the specific holding pattern mothers of secure infants should display in the reunion episodes of the Strange Situation Procedure include consistently picking up their infants when signaled to, successfully comforting their infants, holding their infants facing toward them, holding their infants within a close distance to their torsos, displaying a left-sided hold, giving a high level of attention to their infants, and holding their infants close to their hearts. This holding pattern was expected to be performed by mothers to comfort their infants after the stress of separation.

Similarly, mothers of insecure-ambivalent infants were expected to show a holding pattern similar to mothers of secure infants in the reunion episodes of the Strange Situation Procedure, but with less consistency. Therefore, mothers of insecure-ambivalent infants were expected to pick up their infants when signaled to, but only some of the time. In addition, these mothers were not expected to be able to comfort their infants successfully. A high level of attention to their infants would also be inconsistent. However, mothers of insecure-ambivalent infants were expected to display a holding pattern that includes holding their infants facing them, holding them within a close distance to their torsos, displaying a left-sided hold, and holding their infants with their infants' face near their heart

On the other hand, mothers of insecure-avoidant infants were expected to show a significantly different holding pattern than mothers of secure or insecure-ambivalent infants. These mothers were expected to pick up their infants far less often when signaled to, to hold their infants facing away from them as well as at a far distance from their torsos. Mothers of insecure-avoidant infants were not expected to be able to successfully comfort their infants. It was expected that there would be more of a right-sided holding pattern as well as a low level of

attention given to their infants. Finally mothers of avoidant infants were expected not to hold their infants with their infants' face near their hearts.

Mothers of disorganized infants were expected to display a holding pattern similar to that of insecure-avoidant infants that should include not picking up their infants when signaled to and if picked up, infants would be facing away from their mothers. Mothers of disorganized infants were not expected to be able to successfully comfort their infants. In addition, it was hypothesized that there would be a significantly greater distance between the mothers and their infants' torsos as well as a low level of attention given to their infants. Finally, infants should be held on the right side of their mothers and it is expected that there should be a significantly larger distance from the infants' head and the mothers' heart than that of any of the other mothers. It was also hypothesized that infants classified as disorganized would keep their head at a significantly farther distance from their mothers based on Main and Solomon's (1990) research investigating maltreatment of disorganized infants. While disorganized infants seek proximity, they often keep their heads far away from their mothers as a way of preventing possible abuse.

These four hypothesized holding patterns are grounded in Ainsworth's (1979) research into maternal behaviors, Salk's (1990) research into the effects of maternal heartbeats, Anisfeld's (1990) investigation of physical contact between mothers and infants, Beckwith et al.'s (1999) research in maternal sensitivity in infancy and holding and Dagenbach et al.'s (1988) research in left-handed holding patterns. Ainsworth's observations of different maternal behaviors were associated with different attachment styles of the infants of those mothers. Contingent responding, another maternal behavior observed by Ainsworth, was also associated with differences observed between mothers of secure and insecure-ambivalent infants. Hypothesized holding patterns were also based upon Salk's (1973) research on heartbeat as a calming influence

and Anisfeld's (1990) research on maternal physical contact with infants. Both of these studies suggest holding patterns would lead to infants developing a secure attachment style with their mothers. Finally, Dagenbach et al.'s (1988) research in left-handed holding patterns is also a basis for the hypothesized differences in holding patterns.

CHAPTER 7

METHOD

Participants

Mothers and infants were recruited from introductory psychology, family life, and education classes in a mid-sized university, as well as from the surrounding rural community as part of a larger research project. Seventy-two mothers (M age = 28.22 years, SD = 9.50) and their infants (43 girls/29 boys; M age = 15.97 months, SD = 3.58) participated in the study. Eighty-one percent were Caucasian and 19 percent were African-American. Forty-two percent of the infants had siblings (1-3 siblings; 4 percent had a younger sibling); 58 percent were only children. Ninety percent of the mothers had at least some college experience, and all but one had finished high school. Sixty (84%) of the mothers were either employed at least part-time or were college students. The child's father resided in the home in 77 percent (n = 55) of the cases.

Procedure

This study utilized archival data collected from video tapes of the Strange Situation Procedure taken from 1994-2002 in a laboratory of a mid-sized university. The Strange Situation Procedure had only slight modifications from Ainsworth's original procedure. The playroom is 9 by 14 feet, carpeted, with two chairs facing each other for the mother and stranger. There is a child's chair adjacent to the adult chairs, with approximately 15 toys scattered around the infant chair. There are two-way mirrors on three of the walls of the playroom, with two doors on two walls.

Holding patterns were comprised of eight exhibits of holding behavior during reunion episodes: who initiated the hold, whether the infant is facing away or toward the mother,

approximate distance from the mother's torso, attention to infant, whether the infant is held on the left or right side, if mothers can successfully comfort their infants, if the infant's head is near the mother's heart, and number of holds present.

Who initiated the hold was assessed by determining whether the mother or the infant began the hold. Infants were judged to be the initiators if they used signaling behaviors as well as lifting their arms up. Mothers were judged to be the initiators if they picked up their infant without the infant signaling that that was something they needed. Facing away from the mother included the infant's head and body facing in the same direction as the mother, while facing toward the mother included the infant's head and body facing toward the mother's face and body. Distance from the mother and infant was an estimate in inches of space between the infant's body and the mother's torso. If the infant was successfully comforted by the mother included a cessation of crying or distressed appearance while being held by the mother as well as an appearance of snuggling into the mother. In addition, the infant should have begun to play again. Attention to the infant included vocalizations made by the mother to her infant, gazes made by the mother toward her infant, and touching her infant. Vocalizations were judged as maternal utterance directed at the infant. Maternal gaze was judged as the mother looking in the direction of her infant, but not necessarily making eye contact. Touching was assessed as the number of times the mother placed her hand somewhere on her infant's body. However, coders were instructed to keep in mind the directions given to mothers at the beginning of the Strange Situation Procedure. Those directions are that mothers should not direct their infants' behavior and that they should only respond to their infant if needed.

If the infant was held on the left or the right side was judged by which side of the mother's body the infant was being held. If the infant's head was near the mother's heart was

assessed by researchers approximating the distance in inches from the mother's upper chest to the infant's head. Finally, number of holds was judged as the number of times a mother held her infant.

Prior to the investigation of holding patterns in the Strange Situation Procedure, both researchers were blind to previously determined attachment classification. In addition, the coder utilized for reliability purposes was blind to attachment behaviors associated with specific attachment classifications. This assured that researchers were not biased when coding for specific holding behaviors.

Two aspects of holding, whether infants were comforted by their mothers and attention to the infant, were assessed with a rating scale from one to five. Attention to infant, however, was comprised of three aspects: vocalizations, gazes and number of touches. Therefore, each of these aspects was rated on a scale of one to five, and then a mean was computed to obtain an overall score for attention to infant. The rating of one represented a low frequency and duration, while a five indicated high frequency and duration.

Measures

Two independent researchers were given a coding sheet to complete while assessing holding patterns in the reunion episode of the Strange Situation Procedure. Holding patterns were assessed for each hold present in the episode (See Appendix A for the coding sheet for maternal holding behavior and Appendix B for descriptors for rating scale items).

Reliability

Holding patterns were assessed in the reunion episodes of the Strange Situation Procedure. Two independent researchers individually coded holding patterns in the Strange Situation Procedure. One independent researcher was the principle investigator, while the other

was a graduate student research assistant. This researcher was trained to a reliability criterion of 80%. Discrepancies in holding classification were resolved with a conference. Reliability was computed using a Pearson's product-moment correlation coefficient (r). Reliability was .87 for the eight aspects of holding investigated in the Strange Situation Procedure data. Which side the infant was held on had the lowest average reliability at .81 while who initiated the hold had the highest reliability at 1.0.

CHAPTER 8

RESULTS

To determine whether the hypotheses that mothers of securely attached infants would display a markedly different holding pattern than mothers of insecurely attached or disorganized infants and that mothers of infants classified into specific infant attachment classifications would have their own unique holding pattern were supported, a one-way multivariate analysis of variance (MANOVA) was conducted to assess attachment classification differences in various aspects of holding patterns exhibited by mothers in the Strange Situation Procedure. These aspects of holding included whether infants needed comforting, who initiated the hold, if infants were facing their mothers, the infants' approximate distance from their mothers' torso, mothers' attention to infant, on which side the infant was held, the infant's approximate distance from the mother's heart, and number of holds.

MANOVA results revealed significant differences among attachment classifications on the dependent variables, Roy's Largest Root = 1.35, $F(8, 23) = 3.88$, $p < .01$. (See Table 2 for dependent variable information.) Follow-up Analyses of Variance (ANOVA) revealed significant differences among levels of the independent variable for "who initiated the hold" and "distance from the mother's torso." Tukey's HSD was used to further assess mean differences. In terms of "who initiated the hold" there was a significant difference between secure ($M = 1.92$, $SD = .13$) and disorganized ($M = 1.53$, $SD = .50$) dyads. For distance, avoidant ($M = 3.08$, $SD = .82$) differed from secure ($M = .85$, $SD = .93$), resistant, ($M = .00$, $SD = .00$), and disorganized ($M = .83$, $SD = .96$) dyads. Results are illustrated in Figures 1 and 2.

Thus, the first hypothesis that mothers of securely attached infants will display a markedly different holding pattern than mothers of insecurely attached infants, was partially supported. These mothers showed a significantly different holding pattern from that of disorganized infants in terms of who initiated the hold. For securely attached infants, it was the infants who initiated the hold. For disorganized infants, mothers were significantly more likely to initiate the hold.

The second hypothesis that mothers of infants classified as a particular attachment classification would display similar holding patterns was also partially supported. Mothers of avoidant infants differed significantly from all others on distance from the torso. Therefore, mothers of insecure-avoidant infants displayed their own unique pattern of holding. However, there were no significant differences in holding patterns among the other three groups.

CHAPTER 9

DISCUSSION

The present study confirmed that certain aspects of holding patterns displayed by mothers in the Strange Situation Procedure are predictive of infant attachment classifications. It was hypothesized that mothers of securely attached infants would display a markedly different holding pattern from mothers of insecurely attached infants. Moreover, it was hypothesized that mothers of infants classified in each attachment classification would demonstrate their own unique holding pattern. These hypotheses were partially supported: mothers of securely attached infants did differ from mothers of disorganized infants in terms of who initiated the hold. Secondly, mothers of avoidant infants differed from mothers of infants in other classifications in terms of the distance between their infants and their torso while holding their infants.

Concerning the hypothesis that mothers of securely attached infants would display a markedly different holding pattern from mothers of insecurely attached infants, mothers of disorganized infants were significantly more likely to initiate a hold than mothers of securely attached infants. Who initiates a hold is a large part of contingent responding. When feeling fear and stress in the Strange Situation Procedure, securely attached infants signaled to their mothers that they wished to be held and comforted. Disorganized infants, however, did not make that signal. Mothers of disorganized infants held them regardless of whether being held was something their infants needed at that time. This lack of sensitivity to their infants' signals may be a critical difference between a securely attached infant and a disorganized infant. Perhaps then, if mothers would allow their infants to signal that they want to be held and would respond

appropriately to that signal, they would be more likely to promote a secure attachment classification (Ainsworth et al., 1978).

Results of this study strongly support findings reported by Ainsworth regarding maternal behaviors. Ainsworth's (1973) research investigating maternal behaviors in the Strange Situation Procedure found contingent responding to be a maternal behavior only present in mothers of securely attached infants. Ainsworth found that these mothers waited for their infants to signal to them what they needed at a particular time and then responded appropriately. Concerning initiating a hold, mothers of securely attached infants in this study were significantly more likely to wait for a signal from their infant to hold them.

Regarding the hypothesis that mothers of infants classified in each attachment classification would demonstrate their own unique holding pattern, results of the overall MANOVA showed significant differences among holding patterns of some of the infant attachment classifications. However, univariate analyses showed that there were only significant differences between two holding patterns among the groups. Univariate analyses also showed that mothers of insecure-avoidant infants held their infants significantly further away from their torsos than did mothers of all other infant attachment classifications.

Prior research (Romer & Sossin, 1990) suggests that holding an infant closer to the torso may promote a secure attachment classification. Because in this study avoidant infants were held significantly farther away from their mothers than secure, ambivalent, and disorganized infants, this study did not fully support the hypothesis that holding infants close to their mothers' torso specifically promotes a secure attachment. Anisfeld, Casper, Nozyce and Cunningham (1990) found that infants held in a soft baby carrier near their parents' bodies were significantly more

likely to be securely attached than infants held in an infant carrier further away from their parent's bodies.

Previous research has also found that mothers of avoidant infants are likely to express an aversion to physical contact with their infants (Ainsworth et al., 1978), and results of this study support this finding. However, insecure-ambivalent infants have been shown to resist contact with their mothers once picked up (Ainsworth & Bell, 1970), which may account for those mothers holding their infants further away from their torsos in previous studies. Finally, disorganized infants have been shown to keep their heads at a far distance from their mothers while being held (Hesse & Main, 2006), which in turn assures they will also not be held close to their mothers. This study, however, did not support previous research in terms of insecure-ambivalent and disorganized infants being held at a further distance from their mothers' torsos.

Although the number of holds present in the reunion episodes of the Strange Situation Procedure was investigated as a predictor of infant attachment classification, results revealed that number of holds was not a significant predictor. Whether mothers held their infant one time or several times during the Strange Situation Procedure did not predict which attachment classification their infants were assigned. Therefore, it is the quality of maternal holding, not the quantity, which is predictive of infant attachment classification. These results are consistent with Ainsworth's (1972) research in the quality of the attachment relationship. A mother may hold her infant a considerable amount of time and her infant will not necessarily be securely attached.

It is the quality of the holding, such as holding infants close to their mothers' torsos, and mothers initiating a hold that significantly predicted which infant attachment classification an infant was likely to have by the end of their first year. Mothers taking cues from their infants and knowing an appropriate time to pick up their infants is certainly an aspect of the positive quality

of holding. Mothers who initiate holds when their infants are not signaling a need for holding is certainly related to a poorer quality of holding (Ainsworth et al., 1978).

There were, however, some limitations to this study. One limitation was a lack of diversity in the sample. Mothers were recruited on a volunteer basis, and a large majority of mothers were either employed with the university or had their infants in the child care center on campus. These mothers are likely to be more educated and may place a greater importance on their infants' education than the average mother. In addition, these mothers are also more likely to value quality child care more than the average mother. The child care center on campus maintains a very small adult to child ratio, is relatively expensive, and often takes many months on a waiting list to get infants into their center. Therefore, this child care center is likely of higher quality than many child care centers. Obtaining a more diverse sample, as well as a larger sample, may give future researchers a better method to investigate holding patterns.

Finally, another part of the protocol in the Strange Situation Procedure, in which mothers are instructed to allow their infants to play and to calm their infants only when the infants appear in distress, may be another limitation. Because mothers are instructed not to direct their infants' behaviors, but to feel free to comfort their infants, mothers may have interpreted this as not to hold their infants. Perhaps mothers felt pressure to allow their infants to self-soothe upon reunion and did not pick them up to comfort them. Although these are not the instructions given to mothers, perhaps even mentioning to let their infants play when not upset affected their behavior.

Because these instructions may have reduced the number of holds present in reunion episodes, there were several video tapes of Strange Situation Procedures that were not included in this study as there was no holding present. Out of 72 possible videos, only 33 were included in the study, as they exhibited holding in the reunion episodes. These limitations in holds present in

Strange Situation Procedure video tapes are perhaps one reason the hypotheses were not fully supported.

However, the current study is suggestive of future research directions. Because the Strange Situation Procedure is designed much what like an infant experiences at a physician's office, researchers may utilize naturalistic observations regarding mothers' holding patterns. Because the attachment system is highly activated when infants are ill, a physician's office would be an ideal location to observe maternal holding, especially in terms of using holding to comfort sick infants. Mothers and their infants may then be invited to participate in a Strange Situation Procedure to compare their holding patterns to their infant attachment classifications in a real world environment.

Future research may also benefit from utilizing photographs of mothers and their infants. At the conclusion of the Strange Situation Procedure researchers may snap a picture of the infant with his or her mother and use this to compare with the video of the infant being held by his or her mother. In addition, researchers may ask mothers to bring in pictures of them holding their infants. The pictures taken in a mother and infant's natural environment, as well as pictures in which the mother and her infant are not posing, may provide the best information regarding holding patterns. Pictures in which a mother is not posing with her infant can give researchers further insight into how a mother naturally holds her infant. These pictures can be compared to the video data, as well as with a picture taken at the end of the research session.

Future research may also investigate how mothers develop their particular holding pattern. Are mothers modeling other mothers, or did they develop their holding pattern from their experiences with their own mothers? Or perhaps they developed their holding pattern on their own according to what felt right for themselves and their infants. Either way, antecedents to

holding patterns may be investigated. Another research direction may be to investigate methods for altering a mother's holding pattern as well as how easily that may be accomplished. Are holding patterns enduring? Can interventions be successful if a mother is not displaying a sensitive and tender holding pattern that will promote a secure attachment style? If holding patterns may be altered, will this change alter an infant's attachment classification?

The results of this study have several implications regarding child development and attachment. Because infants can learn within the first three months what to expect from their mothers, results of this research may be shared with women expecting children, perhaps at a childbirth or breastfeeding class. Understanding that infants learn quickly what they can expect from their mothers in terms of sensitive and tender holding, as well as contingent holding, is certainly something mothers can benefit from. Perhaps this information may be given to mothers in the hospital after they have given birth as they leave with their infants. Through this information, mothers may be made aware to let their infants signal to them when they need to be held, as well as to hold their infants close to their torsos as much as possible. Many mothers today still believe they should not pick up their infants right away or every time they cry for fear of spoiling their infants. Regarding attachment theory and results of this research, responding to an infant's cry or signal to be picked up is an important way to promote a secure attachment (Ainsworth, et al., 1978).

Because infants will spend a significant amount of time being held by their mothers, it seems odd that so many mothers spend so much time investigating the birthing process, which lasts a short time in comparison with the amount of time they will be holding their infant, and do not take the time to learn the implications and consequences of the behaviors related to holding their infant. While the physical health of an infant is certainly important, it is equally important

to promote sound psychological development. Perhaps through this study, and others like it, promoting a secure attachment style through holding will be just as important to new mothers as breastfeeding and visits to the pediatrician.

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Table 1

Infant Behaviors of Interest in the Strange Situation Procedure

	Behavior of Interest	What Behavior Indicates
1. Experimenter Mother Infant	N/A	N/A
2. Mother Infant	Contact-maintaining behaviors Exploratory behaviors Using mother as secure base	Uncomfortable in novel situation Interest in novel toys and environment Need to be reassured environment is safe
3. Mother Infant Stranger	Exploratory behaviors Smiling at Stranger Proximity seeking	Low frequency indicates stress of stranger Views stranger as safe Feeling of safety
4. Stranger Infant	Searching Behaviors Contact-maintaining behaviors	Belief their mother will return Infant is comforted by stranger
5. Mother Infant	Reunion behaviors	How accessible the infant feels the mother is after the stress of separation
6. Infant	Crying Following	Distress Regain absent mother
7. Stranger Infant	Crying Contact-maintaining behavior	Response to Stranger Infant's ability to be comforted by stranger
8. Mother Infant	Reunion behaviors	How accessible the infant feels their mother is after the stress of separation

Table 2

MANOVA *F* values and significance

	<i>F</i>	<i>p</i>
Infant Need Comfort	1.09	.37
Initiate Hold	4.60	.01*
Side Facing	1.86	.16
Distance from Mother's Torso	4.96	.007*
Attention to Infant	1.08	.38
Side Infant is Held on	.19	.90
Distance from Mother's Heart	1.84	.16
Number of Holds	.292	.83

* Indicates significance at .01

Figure 1

Graph of Significant Dependent Variables

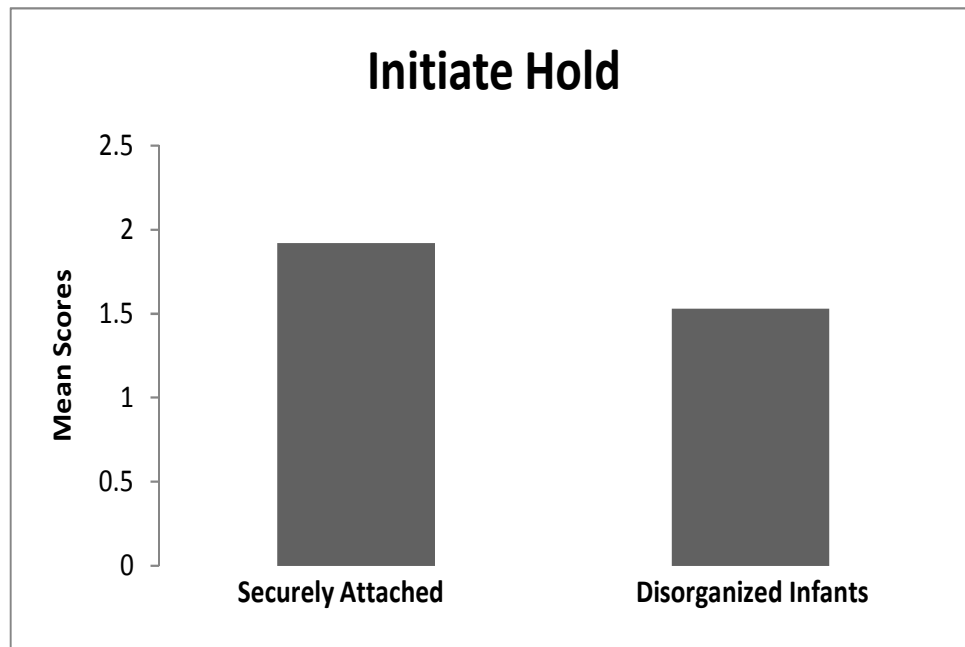
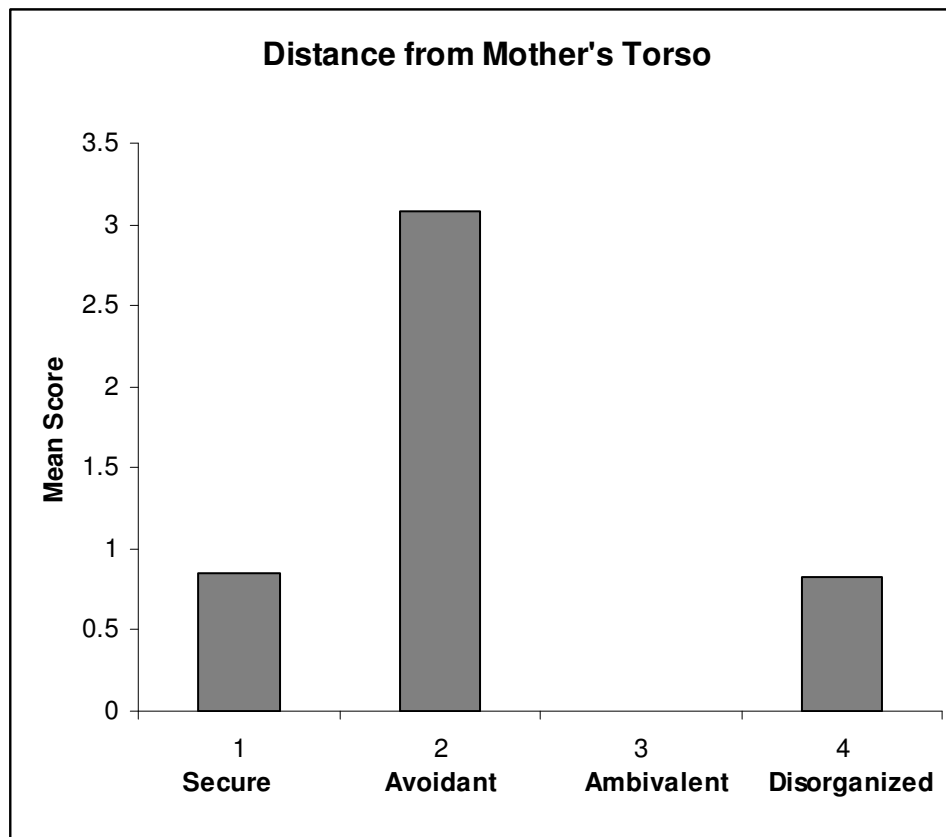


Figure 2

Graph of Significant Mean Differences



Appendix A

This is to be completed for each hold in episode 5 and 8 of the SSP.

SSP Participant Number:

Does Infant need Comforting:

Infant Comforted by Mother (1-5):

Mother Picking Infant Up

Infant Initiate:

Mother Initiate:

Infant Facing

Toward Mother:

Away from Mother:

Mixed Ascending:

Toward/Away

Toward/Away

Mixed Descending:

Toward/Away

Toward/Away

Infant's Approximate Distance from Mother's Torso:

Attention to Infant (Vocalization, Gaze and Touch) (1-5):

Side Infant is Held On:

Left:

Right:

Switch:

Infant's Approximate Distance from Mother's Heart:

Notes:

Appendix B

Descriptors for Rating Scale

Maternal Vocalization; frequency:

A rating of 1 indicates: mother does not at all, or vocalizes to infant 1 time

A rating of 3 indicates: mother vocalizes to infant between 2 and 4 times

A rating of 5 indicates: mother vocalizes to infant 5 or more times

Maternal Vocalization; duration:

A rating of 1 indicates: mother does not vocalize at all, or vocalizes less than 2 seconds

A rating of 3 indicates: mother vocalizes to infant between 2 and 10 seconds

A rating of 5 indicates: mother vocalizes to infant longer than 10 seconds

Maternal Gaze; frequency:

A rating of 1 indicates: mother does not at all, or gazes at infant 1 time

A rating of 3 indicates: mother gazes at infant between 2 and 4 times

A rating of 5 indicates: mother gazes at infant 5 or more times

Maternal Gaze; duration:

A rating of 1 indicates: mother does not gaze at all, or glances at infant

A rating of 3 indicates: mother gaze at infant between 2 and 10 seconds

A rating of 5 indicates: mother gazes at infant longer than 10 seconds

Maternal Touch; frequency:

A rating of 1 indicates: mother does not touch infant at all, or touches infant 1 time

A rating of 3 indicates: mother touches infant between 2 and 5 times

A rating of 5 indicates: mother touches infant more than 5 times

Maternal Touch; duration:

A rating of 1 indicates: mother does not touch infant at all

A rating of 3 indicates: mother touches infant between 2 and 10 seconds

A rating of 5 indicates: mother touches infant longer than 10 seconds

Infant Comforted by Mother:

A rating of 1 indicates: crying does not cease, the infant has a distressed appearance, and the infant appears to pull away from the mother while being held by the mother

A rating of 3 indicates: crying and distressed appearance decreases by half of original cry and distressed appearance, infant snuggles into mother, but does not make contact with torso

A rating of 5 indicates: a cessation of crying and distressed appearance while being held by the mother as well as an appearance of snuggling into the mother