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Maternal Representations of Attachment as Affected by Conditions of Proximity and Separation

Karen V. Monaco
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**MATERNAL REPRESENTATIONS OF ATTACHMENT AS AFFECTED BY
CONDITIONS OF PROXIMITY AND SEPARATION**

BY

KAREN V. MONACO

Dissertation Committee

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**Submitted in Partial Fulfillment
Of the Requirements for the Degree
Doctor of Philosophy
Seton Hall University**

2011

ABSTRACT

MATERNAL REPRESENTATIONS OF ATTACHMENT AS AFFECTED BY CONDITIONS OF PROXIMITY AND SEPARATION

The nature of attachment in the human infant has been a topic of interest for some time. Maternal representations of attachment, which describe the way a mother thinks about her infant, are crucial to the quality of the infant's developing attachment to his or her mother. What is known is that poor maternal representations of attachment are related to poor infant attachment. The separation of a mother from her infant, as occurs when an infant is admitted to the Neonatal Intensive Care Nursery, interferes with the natural reciprocity of maternal- infant behaviors. Maternal attachment behaviors have been studied with relation to such variables as the time the baby is held after birth, breastfeeding, skin-to-skin contact, and potential loss of the baby. However, to date no studies have explored the relationship between the length of stay in the NICU and maternal representations of attachment. The goal of this current study was to test the following hypotheses: (a) The Separation group will score lower than the Proximity group on Warmth/Affection, and higher on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection; (b) The longer the length of Separation in the NICU, the lower the score on Warmth/Affection and the higher the scores on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection; (c) Previous Secure attachment style will score higher on Warmth/Affection and lower on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. Ninety mothers participated in this study. Participants completed the Maternal Parental Acceptance-Rejection Questionnaire

(Rohner, 2004), the Relationship Questionnaire (Bartholomew & Horowitz, 1991), and a demographic questionnaire. Hypotheses I was tested using a multiple analysis of variance; Hypotheses II was tested using a simple, linear regression analysis; Hypothesis III was tested using a multiple analysis of variance. Hypothesis I was partially supported. There were significant differences between the Proximity/Separation groups on Warmth/Affection and Hostility/Aggression. Hypothesis II was partially supported. As Length of Separation increased, the scores on Warmth/Affection decreased, and the scores on Hostility/Aggression increased. Hypothesis III was partially supported. The mothers with a previous Secure attachment style scored higher on Warmth/Affection and lower on Undifferentiated Rejection.



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Ronald P. Rohner, Professor Emeritus
Family Studies and Anthropology
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SETON HALL UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN RESOURCES SERVICES
OFFICE OF GRADUATE STUDIES

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ABSTRACT

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The nature of attachment in the human infant has been a topic of interest for some time. Maternal representations of attachment, which describe the way a mother thinks about her infant, are crucial to the quality of the infant's developing attachment to his or her mother. What is known is that poor maternal representations of attachment are related to poor infant attachment. The separation of a mother from her infant, as occurs when an infant is admitted to the Neonatal Intensive Care Nursery, interferes with the natural reciprocity of maternal- infant behaviors. Maternal attachment behaviors have been studied with relation to such variables as the time the baby is held after birth, breastfeeding, skin-to-skin contact, and potential loss of the baby. However, to date no studies have explored the relationship between the length of stay in the NICU and maternal representations of attachment. The goal of this current study was to test the following hypotheses: (a) The Separation group will score lower than the Proximity group on Warmth/Affection, and higher on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection; (b) The longer the length of Separation in the NICU, the lower the score on Warmth/Affection and the higher the scores on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection; (c) Previous Secure attachment style will score higher on Warmth/Affection and lower on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. Ninety mothers participated in this study. Participants completed the Maternal Parental Acceptance-Rejection Questionnaire

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Chapter I

INTRODUCTION

Overview

The focus of this study is maternal representations of attachment as influenced by conditions of proximity and separation. Extensive research (Ainsworth, 1963; Bowlby, 1969, 1988; Feldman, Weller, Leckman, Kuint, & Edelman, 1999; Fonagy, Steele & Steele, 1991) has been done on the nature of attachment in the developing infant. The experience of hospitalization of the infant and separation from the mother has been acknowledged as an intense stressor which affects the quality of the infant's attachment to the mother. The study of maternal attachment encompasses the two distinct domains of behavior and mental representation. The ethological domain is the study of a specific behavioral repertoire that is developed to maintain the mother's physical proximity to the infant. Maternal representation of attachment is a psychological state that includes the mother's thoughts, feelings, hopes, and worries about the infant. Winnicott (1956) used the term "primary maternal preoccupations" to describe the mother's mental life during the immediate post-partum period. These preoccupations include recurrent thoughts of the baby, compulsive checking, ritualistic behaviors during feeding and caregiving, and an exclusive mental focus on the baby (Winnicott, 1956). The term maternal representations of attachment describes the behavioral repertoire along with the mental preoccupation with the baby, forming the mother's emotional experience of her relationship with the baby.

Results from previous studies (Ainsworth, Blehar, Waters, & Wall, 1978; Huth-Bocks, Levendosky, Bogat & von Eye, 2004; Main, Kaplan & Cassidy, 1985; Martins & Gaffan, 2000; van Ijzendoorn, 1995) have suggested that positive maternal representations of attachment are crucial to the infant's developing attachment to the mother and therefore, antecedents to future interpersonal relationships. This study examines the relationship between mother-infant proximity and current representations of maternal attachment. Specifically, this study focuses on mothers' self reports of their mental representations of attachment subsequent to a separation from their infants due to admittance to a Neonatal Intensive Care Unit.

Background

Attachment, which is the capacity to form selective and enduring bonds, is considered to be one of the fundamental features of the human experience. Bowlby (1969) stated that attachment is the central developmental force throughout life. Studies in humans and animals have demonstrated the inborn propensity to form attachment, the physiological and behavioral correlates of bonding (Graves, Wallen & Maestriperi, 2002; Harlow, Harlow, & Hansen, 1963; Hofer, 1987; McCarthy, 1990; Shayit, Nowak, Keller & Weller, 2003), the outcomes of secure and insecure attachments, and the factors associated with disturbances in parent-infant attachment (Marvin & Whelan, 2003; O'Connor, Marvin, Rutter, Olrick, & Britner, 2003; Zeanah, Smyke, & Dumitrescu, 2002). The focus of most of these studies has been to explore the child's developing attachment to the mother (Feldman, Weller, Leckman, Kuint, & Eidelman, 1999; van Ijzendoorn, 1995). Maternal attachment behavior was studied primarily as a facilitator of infant attachment: The type of attachment behavior exhibited by the mother

affected the bonds formed by the infant. Little attention has been paid to the reciprocity of this bond, or the unique experience of an adult forming a selective and enduring bond with a baby (van Ijzendoorn, 1995). There are mental, emotional, and behavioral changes that accompany the formation of a mother's bond to her infant. The study of maternal attachment includes observed behavior and the mother's mental domain. Additionally, the cognitive structures, emotions, and cultural adaptations of behavior play a significant role in the formation of maternal attachment. These factors influence the mother's thoughts, mental state, worries, hopes, and feelings about the baby, and together form the maternal representation of attachment.

Attachment Theory

Prior to the 20th century, the primary attitude toward infants was that they were not yet people and could not have real human feelings (Hausfater & Hrdy, 1984; Pitt & Bale, 1995). It was believed they could not experience sadness or loneliness and did not need others in any emotional or psychological way. In early psychoanalytic theory, the infant's primary relationship with the mother was regarded as the basis for all subsequent relationships (Freud, 1923; Freud & Breuer, 1895). The child's relationship to the mother was need-driven; the primitive id demanded that its needs be met. It was accepted that small children had basic physical needs that required tending, and the complex emotional relationships that involve a unique sense of interpersonal connection would only evolve later. In the conditioning paradigms of the mid-twentieth century, the caregiver was a secondary reinforcer. This person became important to the child only by virtue of being associatively linked with physical ministrations. In psychoanalytic theory the mother was presented similarly; as a need-gratifying object who developed

significance to the child through her role in satisfying drive pressures (Klein, 1975).

As child psychiatry came in to being in the 1930s and research attention was focused on children, interest grew in the emotional experiences of children in various settings.

Ethology

One of the most important steps in the development of combining attachment theory with observation and research was Bowlby's link between attachment and the empirical and theoretical framework of ethology. Ethology is the scientific and objective study of animal behavior. Ethology gave attachment theory an empirical framework with tools that were essential to theory building; the observation, assessment, and categorization of behaviors that emerged or intensified during bonding (Feldman, Weller, Leckman, Kuint and Eidelman, 1999). The ethological framework implied that behaviors occurring in the bonding stage were to be interpreted in relation to survival and evolutionary adaptation. In mammals, an infants' survival depends on the maintenance of parent-infant proximity. Therefore, the concept of proximity became the cornerstone for attachment theory (Feldman et al., 1999). Based on ethological observations of mammalian infant behavior, Bowlby (1969) suggested that infant behavior was to be understood in reference to the degree of closeness or distance from the mother. Initial distance (separation) would provoke protest and the intensification of attachment-related behavior, as displayed in the infant mammal by crying and searching for the mother. A continuation of distance (loss) would result in despair and the disappearance of the attachment complex behaviors.

Bowlby's ethological observations were supported by numerous studies that have been undertaken to examine the effects of initial and prolonged separation on the

physiology and behavior of mammals, including rat pups (Hofer, 1987), mice (McCarthy, 1990), rhesus monkeys (Harlow, 1963), and lambs (Graves, Wallen & Maestriperi, 2002; Shayit, Nowak, Keller & Weller, 2003). It has been shown that mother-infant proximity constitutes a complex system of biobehavioral regulators that are comprised of both physiological changes in hormone levels and behavioral changes in the activities of nursing, grooming, and physical closeness (Keverne, 1996). Physiological and behavioral changes in reaction to separation followed the pattern predicted by Bowlby (1969). As previously stated, Bowlby observed that initial separation led to an increase in activity in the infant, while prolonged separation resulted in low levels of activity. Physiological studies on the effects of initial and prolonged separation in mammals support Bowlby's observations. The levels of hormones and neuropeptides that regulate maternal activity and attachment in mammal mothers and infants have been shown to increase sharply with the stress imposed by separation, and then gradually decrease as the length of separation continues, until they gradually disappear (Graves et.al., 2002; Harlow et al., 1963; Hofer, 1987; McCarthy, 1990; Shayit et al., 2003). Bowlby (1969) observed that the normal attachment behaviors that occur when mothers and infants are together become more active and compulsive when they are separated, and then gradually diminish to a state of despair when the separation continues. This pattern corresponds with the physiological observations of a sharp increase in hormonal activity upon separation, and a gradual decrease as the separation continues. Therefore, the configurations of regulatory mechanisms related to attachment are viewed as three distinct states: (a) proximity, which involves normal physiological and behavioral activity; (b) separation, which stimulates increased physiological and

behavioral activity; and (c) loss, which brings a reduction of physiological and behavioral activity.

Proximity, Separation and Loss

Proximity, Separation and Loss are distinct levels of physical contact between a mother and infant, corresponding to distinct configurations of regulatory mechanisms. Proximity refers to close and uninterrupted physical contact and is accompanied by the synchronous function of regulators to maintain biological homeostasis. Separation is a period of time in which the mother and infant do not have physical contact. During this time attachment behaviors are intensified in an attempt to resume proximity. Loss is a period of continued separation without an indication that proximity will be resumed. Attachment behaviors diminish and there is an altered biological state following prolonged separation, described as “despair” which leads to “detachment” (Bowlby, 1969). These configurations of human infants’ reactions to separation were shown in the “Strange Situation” paradigm (Ainsworth et al., 1978). The Strange Situation is a 20-minute experimental activity during which a baby is exposed to a regulated pattern of activity that controls the baby’s proximity to, separation from, and reunion with its mother and another woman who is a stranger. In this paradigm, infants may be described as exhibiting patterns of attachment that are characterized as secure, anxious, avoidant, or disorganized. Ainsworth’s research has shown that anxious patterns of attachment are exemplified by conflict between the desire for proximity and the fear of loss (Ainsworth, Blehar, Waters & Wall, 1978).

Most studies on human attachment have focused on how the mother’s behavior and availability affects the infant (Ainsworth, 1978; Bowlby, 1978; Braungard-Reiker,

Garwood, Powers, & Wang, 2001; Coyl, Roggman & Newland, 2002; Jacobsen, Hibbs & Ziegenhain, 2000; and others). There has been very little research focused on the complementary hypothesis, whereby the separation and loss of infant proximity may be related to the intensification or inhibition of maternal attachment behavior (Feldman, Weller, et al., 1999). This hypothesis may also imply that the conditions of proximity, separation, and loss are expressed in distinct configurations of maternal attachment. It may also imply that the insecure attachment configurations (anxiety and avoidance) may be related to imbalances between mothers' emerging ties to their infants and the fears of loss that would prevent the formation of a selective and enduring bond.

Animal studies have provided empirical evidence regarding the formation of maternal attachment. The onset of maternal behavior relies on hormonal priming (Larsson, 1994) and the maintenance of maternal behavior depends on the stimulation that the mother receives from her young (Carlson, 1994; Larsson, 1994; Keverne, 1996). A disruption of the natural course of animal behavior either before or immediately after delivery has deleterious effects on maternal behavior (Keverne, 1996; Peredy, Persinger, Blomme, & Perkar, 1992; Sandyk, 1992). Bronfenbrenner (1968) proposed that a critical period exists for the organization and consolidation of maternal behavior. However, this "critical period" remains elusive. Animal studies (Harlow & Zimmerman, 1959; Harlow, Harlow, & Hansen, 1963) and human studies (Klaus & Kennell, 1976) have provided evidence that bonding occurs through early maternal-infant skin-to-skin contact. Human mothers who have experienced as little as ½ hour skin-to-skin contact, followed by a 12 hour period of separation, show behavioral differences in the quality of the infant-mother relationship compared to mothers who have not had this initial contact (Klaus &

Kennell, 1976). Mothers permitted more contact with their newborns were found to have more confidence and responsiveness to the infant as compared to mothers who had less contact with their newborns (Greenberg, Rosenberg & Lind, 1973). Researchers, Rose, Boggs and Olderstein (1960) as well as Kennell and Rolnick (1960) note the long term consequences of brief illness and disturbance in the mother-infant relationship during the first two days of life.

In a study that examined some determinants of maternal attachment, Peterson and Mehl (1978) conducted interviews and observations of 46 families. The families were interviewed prenatally, and again interviewed and observed 7 days, 1 month, 2 months, and 6 months after the child was born. The families were divided into three groups: natural childbirth without anesthesia in the hospital, natural birth without anesthesia in their own home, and delivery under anesthesia in the hospital. During the interviews each woman was asked several questions including her feelings about the pregnancy and the child, plans for taking care of the infant, her opinion as to the importance of the mother to the child, her expectations for the delivery, her level of psychological awareness of the needs of the baby, and her projected confidence of herself as a mother. Each group was analyzed separately using stepwise, forward direction, multiple regression analysis. The most significant variable predicting the future attachment was the amount of infant-mother separation: less separation correlated with greater attachment (partial correlation coefficient $[r_p]=.708$) (Peterson & Mehl, 1978). This was followed in significance by birth experience, length of labor (longer labors were associated with greater attachment), and prenatal attitude. From this study, Peterson and Mehl (1978) envisioned the mother's experience during labor and delivery

as a crucial transition point in the development of maternal attachment. The underlying intrapsychic events of labor implement the organization of all prenatal influences into a series of directed maternal behaviors and affectional beliefs (Bowlby, 1973; Peterson & Mehl, 1978; Winnicott, 1956). The mother's prenatal mental representation of the baby is based on her hopes, wishes, and fantasies: The assimilation of the baby into the family after birth is affected by projective identification (Jacobs, 1975). After birth, the physical presence of the baby permits reality testing and provides the concrete reality to the fantasized object. Separation of the baby from the mother maintains the infant in the status of fantasy object, and the longer the separation the greater the tendency toward projection (Peterson & Mehl, 1978).

A negative birth experience, which may include fear, pain, or trauma, may breed resentment toward the object associated with the trauma; conversely, a positive birth experience that is devoid of fear will be experienced as a positive, emotionally strengthening experience, resulting in maternal feelings of competence and satisfaction. Therefore the mother's experience of the birth process is a crucial transition point in her development of attachment to her child. While some may consider a long labor to be a negative experience, the physiological and hormonal changes that occur are beneficial in increasing a mother's feeling of attachment. The mother's associations with the labor and delivery will affect the process of organizing feelings of attachment, which is consolidated by the physical presence of the baby and the responsiveness of the baby to the mother's behaviors and feelings; therefore, the presence of the baby provides the concrete reality to the fantasized object (Peterson & Mehl, 1978).

Research in animals and humans (Bronfenbrenner, 1968; Carlson, 1994;

Feldman, Weller et al., 1999; Harlow et al., 1965; Insel, 2000; Kennell & Rolnick, 1960; Keverne, 1996; Klaus & Kennell, 1976; Larsson, 1994; Peredy et al., 1992; Peterson & Mehl, 1978; Rose, Boggs & Olderstein, 1960; Sandyk, 1992) have revealed that maternal representation of attachment is a series of complex behaviors created through physiological, mental, and behavioral changes which occur before, during, and immediately after birth. A disruption in the organization and consolidation of these processes will have a negative effect on the mother's expression of maternal behavior. When the behavior of an animal is disrupted before consolidation has begun that behavior will be absent from the animal's repertoire. When behavior is disrupted during, but before completion, of consolidation, that behavior will be expressed inappropriately. The sensitive period of attachment noted by Klaus and Kennell (1976) can be seen as the period of consolidation of behavior.

There has been much well-known research on the separation behavior of older babies and children (Ainsworth, 1963; Ainsworth, Blehar, Waters, & Wall, 1978; Aviezer, Sagi, Joels, & Ziv, 1999; Braungart-Reiker, Garwood, Powers, & Wang, 2001; Fonagy, Steele, & Steele, 1991; Heinicke, 1956; Jacobsen, Hibbs, & Ziegenhain, 2000; Main, Kaplan, & Cassidy, 1985; McMahan True, Pisani, & Oumar, 2001; O'Connor, Marvin, Rutter, Olrick, Britner, & the E.R.A. Study Team, 2003; Posada, Jacobs, Carbonell, Alzate, Bustamante, & Arenas, 1999; Robertson, 1953a; Spitz, 1946). There is little research, however, on mothers' attachment behaviors and the critical period during which these may occur. This critical period may occur at some point during the organization and consolidation of the physiological, behavioral, and mental changes that take place before, during, and immediately after birth. The initiation of maternal

behavior relies on the appropriate hormonal levels of the mother (Shayit, Nowak, Keller & Weller, 2003), along with the experience of birth and lactation (Larsson, 1994). The predominant goal of maternal behavior is to keep the infant in close proximity to the mother, therefore, initiation of maternal behavior is dependent on the location and behavior of the infant (Keverne, 1996). Thus, at birth the mother is primed to respond to infant cues. Observations of human mothers have shown that a majority of mothers can identify their infant by touch alone if they were together for at least 1 hour after birth (Larsson, 1994). Human mothers can also identify their own baby by its odor by the second day of life (Larsson, 1994). By manipulating separation of newborn rat pups from their mothers, Hofer (1997) noted that the pups immediately began to protest, and after 1 hour of separation their response changed to despair. Feldman, Weller et al. (1999) examined the relationship between maternal behavior and proximity, separation, and loss. Those researchers found that maternal attachment followed a pattern similar to that seen in infant mammals: maternal preoccupation would increase during separation and then diminish with prolonged separation and loss.

Statement of the Problem

The nature of the environment surrounding a newborn baby and his or her mother has tremendous impact, both emotionally and physiologically, on the level of attachment formed between mother and baby. The environment of the Neonatal Intensive Care Unit (NICU) prevents, on many levels and to various degrees, normal interaction between mother and baby. A baby's admission to the NICU and subsequent separation from its mother, as opposed to mother and baby not being separated at birth, may affect the maternal representation of attachment. The assumption is that maternal

attachment relies on the same mechanisms as those underlying infant attachment. Specifically, maternal preoccupation and anxiety would increase among mothers experiencing an initial separation, but those mothers who experienced a prolonged separation would exhibit diminished signs of attachment. The mother's representation of attachment at discharge from the NICU is the focus of this study. Previous research studies (Feldman, Weller et al., 1999; Peterson & Mehl, 1978) show positive correlations between the level of maternal behavior and attachment representations that mothers report upon discharge, and the degree of dyadic mutuality and maternal sensitivity during mother-child interaction observed at 3 and 6 months. A study of the resulting effect of initial separation on maternal attachment may help influence policies and psychoeducation in this fast growing field of pediatrics. The present study explores the effect that infant-mother proximity and separation has on mothers' mental representations of their relationship to their babies. It examined the effect that proximity and separation (the independent variables) may have on the measures of Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection (the dependent variables) in the Parental Acceptance-Rejection Questionnaire. It will also examine the relationship between self-report of previous relationship style and maternal representations of attachment.

Research Questions

Maternal representation of attachment is influenced by many factors, one of which is proximity to the infant. When an infant is admitted to the NICU, the mother is separated from her infant. When comparing mothers who have been separated from their infants due to admission to the NICU with mothers who have experienced no separation

from their infants, is the maternal representation of attachment (as described by the four scales of Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection) influenced by early infant-mother proximity or separation?

Is there a directional relationship between the length of time of the separation and level of maternal representation of attachment (as described by the four scales of Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection)?

Is there a relationship between self-report of previous relationship styles and maternal representations of attachment?

Hypotheses

H I. There will be significant differences among the Proximity/Separation groups on all dependent variables: Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection. Specifically, The Separation group will score lower than the Proximity group on Warmth/Affection, and higher on Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection.

H II. The Length of Separation will have a significant effect on all dependent variables: Warmth/Affection, Hostility/Aggression, Indifference/ Neglect, and Undifferentiated Rejection. Specifically, the longer the length of separation, the lower the score will be on Warmth/Affection, and the longer the length of separation, the higher the score will be on Hostility/Aggression, Indifference/ Neglect, and Undifferentiated Rejection.

H III. Self-report of previous relationship style may have a relationship with current maternal representations of attachment; specifically, previous Secure attachment

style will score higher on Warmth/Affection and lower on Hostility/Aggression, Indifference/ Neglect, and Undifferentiated Rejection. However, previous Insecure attachment styles are likely to score higher on Hostility/Aggression, Indifference/ Neglect, and Undifferentiated Rejection, and lower on Warmth/Affection.

Significance of the Study

Maternal deprivation and poor attachment quality can contribute to the etiology of several psychological disturbances (Bowlby, 1988; Carlson, 1994; Lyons-Ruth, 1996; Lyons-Ruth, Easterbrooks, Davidson, & Cibelli, 1997; Shaw 1996). However, the specific influences of emotional difficulties and psychiatric disorder are difficult to specify (MacFadyen, 1994). In studying attachment patterns through different life stages, Main, Kaplan and Cassidy (1985) have shown that one relationship can have an effect through altering the meaning of other relationships. The relationship is affected by both genetic, “within brain” factors and contextual, family, and society factors (Gloger-Tippelt & Huerkamp, 1998). The systemic approach in family therapy suggests that small deviations or changes in living systems can be amplified over time; when combined with unfavorable environmental factors, small deviations can create much larger changes in the system (Minuchin, 1974). Therefore it is possible that an early, traumatic separation of mother and infant, when combined with an unfavorable developmental trajectory, can greatly influence a child’s later life. Under certain circumstances, severe disruptions of attachment early in life, such as prolonged maternal deprivation, harsh separations, or death of a primary caregiver can lead to serious disorders, including psychopathic personality and conduct disorder (Bowlby, 1969; Erickson, Stroufe & Egeland 1985; Greenberg, Speltz & deKlyen, 1993; Nospitz,

Flaherty & Sarles, 1997), depression (Hammen & Rudolph, 1996), and anxiety disorders (Rohner, 1999). Anxious attachment is brought about when the child looks to the mother for nurturance and safety, but the mother responds in a rejecting or dismissive manner. The child then builds an internal working model wherein the attachment figure is inconsistent, rejecting, or interfering. Indeed, as much as 26% of the variability in measuring the psychological adjustment of children can be accounted for by the degree with which they perceive themselves to be accepted or rejected by their major caregiver (Rohner, 1999). Anxious attachment alone cannot predict disturbance; it must occur along with highly stressful environmental conditions (Karen, 1994). Attachment theory focuses on the quality of parent-child relationships to explain the development of psychopathology, therefore behavioral problems in children are seen as strategies for achieving proximity to caregivers who may not be responsive to normal approach signals (Hinshaw & Anderson, 1996). In caretaking environments in which attachment security is constantly in jeopardy, the infant is forced to devote excessive attention to monitoring the state of the relationship, detracting from the ability to focus on learning and exploration (Lyons-Ruth et al., 1997).

There are two environmental factors paramount in emotional disturbance in early childhood: (a) the death of the mother or a prolonged separation from her, and (b) the mother's emotional attitude toward the child. The nature of the maternal-child attachment has been shown to have an effect on the future emotional state of the child. The quality of the caregiver's emotional availability is critical for the development of a healthy internal representation of the self, the attachment figure, and the external world (Wilson, 2001). A child who has not experienced sensitive care and, therefore, does not

believe in the responsiveness of the caregiver, will form an insecure attachment.

Insecure attachment forms a risk factor in the development of ambivalent relationships, negative mood states and psychopathology (Wilson, 2001).

Several disorders have been positively linked to attachment classification and these will be briefly described.

Reactive Attachment Disorder

Reactive Attachment Disorder is characterized by markedly disturbed and developmentally inappropriate social relatedness in most contexts, beginning before the age of 5 years, along with pathogenic care. This pathogenic care can be expressed as disregard for the child's basic emotional or physical needs, or through repeated change in caregivers. The child exhibits a disturbed or distorted pattern of secure base and haven of safety behavior (Marvin & Whelan, 2003). Several researchers (O'Connor, Marvin, Rutter, Olrick, & Britner, 2003; Zeanah, Smyke & Dumitrescu, 2002) use the attachment research-based terms of secure, disorganized, avoidant, and resistant in their clinical work with attachment disordered children. In a study of adoptive families with a child diagnosed with reactive attachment disorder, 88% of the primary caregivers exhibited a dismissing pattern in their caregiving behavior and internal working models of attachment (Marvin & Whelan, 2003).

Conduct Disorder

Empirical studies of attachment security (Erickson, Stroufe & Egeland, 1985; Greenberg, Speltz & deKlyen, 1993) have found that some of the behaviors of insecurely attached children are identical to symptoms of early disruptive behavior disorders. Additionally, the anxious-avoidant attachment pattern has been linked with

oppositional-defiant problems in the pre-school years and the disorganized classification has been shown to predict behavior problems of a hostile nature (Lyons-Ruth, Alpern & Repacholi, 1993). Four general factors implicated in the onset of aggressive behavior problems include: family adversity, coercive discipline, intrinsic child characteristics such as temperamental or psychological difficulties, and insecure attachment relationships (Lyons-Ruth et al., 1997).

Anxiety

Attachment theory states that unsuitable or disruptive parenting style is a determinant of anxiety (Bowlby, 1973). Research has demonstrated the importance of inadequate affection and excessive parental control as part of the early experiences of adults with anxiety disorders. Rohner (personal communication, March 22, 2004) has shown that parents who exhibit more warmth (affection) and acceptance have children who are significantly less anxious and more securely attached. A meta-analysis examining psychosocial mechanisms of transmission has suggested that the broad dimensions of parental control and warmth are among the factors which are related to anxiety in offspring (Gerlsma, Emmelkamp & Arrindell, 1990).

Depression

Psychoanalytic and object relations theories propose the experience of loss as a vulnerability factor for depression. Loss is either actual physical loss of a parent or symbolic loss through emotional deprivation, rejection, or neglectful parenting (Hammen & Rudolph, 1996). The influence of psychosocial factors has been shown to maintain the generational cycle of depression. Specifically, ongoing and pervasive patterns of dysfunctional behavior in families with affectively disordered parents is

positively related to the incidence of depression in children (Hammen & Rudolph, 1996).

Failure to Thrive

Infants with Failure to Thrive (FTT) may look depressed, withdrawn, sad and apathetic. Mothers of these infants are more likely to be classified as insecure with respect to attachment (Benoit, Zeanah, & Barton, 1989). These findings indicate that mothers of children with Failure to Thrive are more passive, confused, or intensely angry when describing past relationships, or they dismiss attachment relationships as unimportant. Others (Crittenden, 1987; Valenzuela, 1990) have documented increased rates of insecure attachment between infants with FTT and their mothers. The infants interact with their mothers with more conflict, less reciprocity, more struggle for control, and more negative affect (Lyons-Ruth, Zeanah, & Benoit, 1996). The mothers also were more abrupt, rough, and controlling in their interactions, and had a higher rate of criticism and threats when interacting with the infants. Children with Failure to Thrive are more likely to show anxious, disorganized attachments than children who are developing normally (Ward, Lee & Lipper, 2000).

Personality Disorders

It has been shown that insecure attachment is a major risk factor affecting the development of ambivalent relationships, negative mood states, and psychopathology (Noshpitz, Flaherty, & Sarles, 1997). Two studies have examined the relationship among attachment classification, psychopathology, and personality traits in adolescents. Rosenstein and Horowitz (1996) studied this relationship in 60 adolescents admitted to a psychiatric hospital. A majority of those adolescents (97%) reported feelings congruent

with insecure attachment as measured by the Adult Attachment Inventory (George, Kaplan, & Main, 1985). Adolescents categorized as dismissing were associated with conduct and substance abuse disorders, while those labeled preoccupied were more likely to suffer from affective disorders (Rosenstein & Horowitz, 1996). These findings were consistent with the internal working models of attachment theory, and the researchers concluded that attachment patterns during infancy could be an indicator of later psychological problems (Rosenstein & Horowitz, 1996).

A link between attachment classification during infancy and a diagnosis of anxiety disorders during adolescence was shown by Warren, Huston, Egeland, and Strouf (1997). In this study, 164 infants were classified by patterns of attachment behavior as measured by the Strange Situation described by Ainsworth et al. (1978). Of these 164 infants, 20% (n=33) were classified insecure/resistant and 22% (n=36) were classified insecure/avoidant. When those children reached 17 years old, the presence of anxiety disorders was determined using The Schedule for Affective Disorders and Schizophrenia for School-Aged Children (Orvaschel, Puig-Antich, Chambers, Tabrizi, & Johnson, 1982). It was found that the insecure/resistant pattern of attachment was the only classification predictive of future anxiety disorders ($r = .20, p < .05$). Twenty-eight percent of those infants classified insecure/resistant developed anxiety disorders during adolescence. This study also supports the significance of attachment measurements as predictors of behavioral problems. Conversely, in a dissertation study of vicarious traumatization among emergency room workers, participants with a secure attachment style were found to use significantly more mature defenses than insecurely attached participants. The securely attached participants had significantly fewer trauma

symptoms and exhibited less vicarious traumatization (Lowe, 2002).

Definition of Terms

Internal Working Model

As the baby and young child develops, he or she will learn by repeated patterns of interactive experience to anticipate the responses of significant others to their wishes and needs. The child builds up a set of models of the self and others based on the known patterns of interactive experience. The representations of known interaction with the primary caregiver are then generalized to other relationships and a relatively fixed representational model is created; a worldview through which the individual anticipates and experiences all relationships. A securely attached child will store an internal working model of a loving, reliable, and responsible caregiver and project these assumptions on all other relationships. An insecurely attached child may view the world as a hostile, dangerous place and see himself as unworthy of love. Ongoing relations with important caregivers are internalized and form the foundation of subsequent relationships and experiences. Internal working models created in the early years of development are relatively stable and enduring throughout life. It is a set of expectations derived from early caregiving experience regarding the availability of attachment figures and their likelihood of providing support, and the individual's interaction with the attachment figure. It is through internal working models that childhood patterns of attachment are expressed in adult relationships.

Maternal Representations of Attachment

A maternal representation of attachment is the mother's interpretation and understanding of the way she feels toward her child. Maternal bonding is characterized

by a unique mental set and behavioral repertoire that is directed to maintain the mother's physical and psychological proximity to the child (Feldman, et al., 1999). Maternal bonding consists of two global concepts: preoccupations with infant safety and the building of a unique and selective bond. A mother will create a relationship with her child based on her own internal working model of attachment, justified or modified by the physical, hormonal, and psychological cues and signals which she experiences with the baby as the relationship is formed.

Proximity and Separation

In the initial research statement for this study, the groups were referred to as "High Proximity" and "Low Proximity". Henceforth, for the sake of greater clarity, the group "High Proximity" will be referred to as "Proximity", and the group "Low Proximity" will be referred to as "Separation".

Proximity

With regard to the maternal-infant relationship, proximity describes constant physical contact. This precludes any separation, as the infant has never been away from the mother. Proximity includes vaginal delivery, as Cesarean delivery may disrupt the process of bonding (Klaus & Kennell, 1976). Proximity requires full breastfeeding, tactile contact within the first 24 hours, and the mother's full responsibility of the infant's care day and night.

Separation

Separation includes the situation wherein mothers had healthy, low-risk infants who delivered by Cesarean, mother and infant may have had brief contact at birth, but underwent a separation as the infants remained hospitalized after mother was

discharged, and mother was not fully responsible for the infant's care. The potential for loss was not implied by the infant's condition. None of the infants involved in this study were at risk of death while in the NICU.

Parental Acceptance and Rejection

Parental Acceptance refers to positive feelings and behaviors that parents can experience and express toward their children. Parental rejection is the opposite, specifically the absence or significant withdrawal of warmth, affection, or love by parents toward children, along with the presence of physically and psychologically hurtful behaviors and affects (Rohner, 2004). Together, acceptance and rejection form the warmth dimension of parenting. In the present study, the feelings that mothers experience toward their babies will be measured using the Mother Parental Acceptance-Rejection Questionnaire (PARQ) (Rohner, 1984, 1990, 1999). The PARQ is a self-report questionnaire consisting of 60 questions which are designed to assess the mother's feelings on the four scales of warmth/affection, hostility/aggression, indifference/neglect, and undifferentiated rejection.

Warmth/Affection

The warmth dimension is described by the quality of the affectional bond between parents and their children. One end of this continuum is expressed by parental acceptance, that is, the warmth, affection, care, nurturance, or love that children receive from their parents. The other end of the continuum is expressed by parental rejection, which refers to the withdrawal or absence of these feelings and behaviors, along with the presence of psychologically hurtful behaviors and affect. Some of the items on this scale are, "I say nice things about my child," "I talk to my child in an affectionate way," and

“I make my child feel warm and needed.”

Hostility/Aggression

Hostility is an internal, emotional, feeling of anger, enmity, or resentment directed toward another person, situation, or oneself (Rohner, 2004). Hostility is expressed externally in the behavioral form of aggression, which is an act intended to hurt someone or something; sometimes to hurt oneself. Aggression may be exhibited verbally in the form of bickering, quarreling, sarcasm, criticism, making fun of someone, or by saying cruel or unkind things. It can be exhibited physically by fighting, hitting, kicking, pinching, throwing things, or other forms of destructiveness. Aggression may also be exhibited less directly through passive acts such as irritability, stubbornness, sulking, and vindictiveness. Some of the items on this scale are, “I tell my child he/she gets on my nerves,” “When my child does something wrong, I threaten or frighten him/her,” and “I hurt my child’s feelings.”

Indifference/Neglect

Indifference is exhibited when a caretaker is unresponsive to a child’s needs or wishes. The caretaker lets the child take care of himself, even if the child is not competent to do so. The caretaker may be unconcerned about the child’s diet, appropriate dress, health, or safety. Additionally, the caretaker will remain psychologically distant and withdrawn, inaccessible to the child, and avoids contact with the child. Some of the items on this scale are, “I ignore my child,” “I forget things I am supposed to do for my child,” and “I make sure my child has the right kind of food to eat.”

Undifferentiated Rejection

Undifferentiated rejection refers to conditions in which a child does not feel loved, wanted, or appreciated, but there is not necessarily some observable indicator that the parent is unaffectionate, aggressive, or neglectful. Items on this scale include, “I wonder if I really love my child,” “My child is a burden for me,” and “I am unsympathetic to my child when he/she is having trouble.”

Attachment Style

Attachment style refers to the general way that an individual relates to other people. Bartholomew and Horowitz (1991) have identified four distinct attachment styles. They are secure, insecure dismissing, insecure-preoccupied, and insecure-fearful. In this study, attachment style was measured using the Relationship Questionnaire (Bartholomew & Horowitz, 1991). The Relationship Questionnaire is a self-report measure consisting of items such as “It is easy for me to be emotionally close to others. I am comfortable depending on them and having them depend on me. I don’t worry about being alone or having others not accept me.”

Limitations of the Study

The focus of this study is on the organization of the mother’s mental representations, not her observed behavior. Measures were collected from maternal self-report, rather than observed interactions, therefore, they may be subject to bias. Future studies may be designed to integrate maternal self-report and observed behavior across time. Another limitation is imposed by the variability of infant age at the time of the survey. Additionally, because hormonal levels were not examined in this study, the link between the neurobiological components contributing to bond formation and mental

representations of maternal attachment is inferential. Further research should be conducted in animal and human models to assess the causal or correlational relationship between mental representations and hormonal levels.

Additionally, the individual behavior of the infants is not accounted for in this study. The temperament and behavioral characteristics of the infant, as well as maternal representations, contribute to the quality of an attachment relationship.

Because this study focuses on the maternal representations of attachment during infancy, it cannot be assumed that these representations will remain constant during the complex and intimate experience of establishing a relationship over time. Future longitudinal studies could analyze the rate and rhythm of interactions between mother and infant (referred to as pacing) and affect during interactions, in addition to the self-report of maternal representation of attachment. Results cannot be generalized to reflect the nature of attachment at different life stages.

Summary

A significant body of work has examined the nature of the development of attachment. The focus has primarily been on the development of representations of attachment in infants and young children. These representations of attachment have been shown to be relatively stable throughout infancy (Ainsworth, Blehar, Waters, & Wall, 1978), childhood, and adolescence (Main, Kaplan & Cassidy, 1985). However, traumatic experiences may change the nature of an attachment experience (Bowlby, 1988; Karen, 1994; Robertson, 1953b). It is the purpose of this study to explore how the experience of a separation at birth affects the nature of maternal representations of attachment.

Chapter II

REVIEW OF LITERATURE

Attachment Theory Origins

Attachment refers to the affective tie between two individuals. Attachment theory, which emphasizes the child's emotional tie to the caregiver, is the joint work of John Bowlby and Mary Ainsworth. The ideas which guide attachment theory have a long developmental history. Drawing on concepts from ethology, cognitive learning, information processing, developmental psychology, and psychoanalysis, John Bowlby formulated the basic tenets of the theory, which revolutionized thinking about a child's tie to the mother and the effects of its disruption.

Psychoanalysis

Freud's pioneering work in psychoanalysis theorized that the roots of our emotional life are found in infancy and childhood. His early work included the theory that neurosis is caused by early trauma. Freud's theory of infantile sexuality (1905) and the Oedipus complex began an interest in studying the rich interactions that occur in infancy and childhood. Psychoanalysts did not focus on the environment, but on the developing child's psychic structures and fantasy life (Freud, 1910). Analysts were interested in internal conflicts rather than external influences. Melanie Klein (1975) was not concerned with the real world or the child's adaptation to the real world, but solely to the imagination in the child's mind; its fantasies and fears. She felt that the child's early relationship with its mother lives within the child and that it becomes a template

for future relationships.

In the 1930s and 1940s, several clinicians, mostly working independently from each other, were making observations and collecting data on the effect of prolonged institutional care on personality development in children. These clinicians included Lauretta Bender, Anna Freud, John Bowlby, William Goldfarb, David Levy, and Rene' Spitz. In 1950, John Bowlby was commissioned to write a report for the World Health Organization to contribute to a United Nations study of the needs of homeless children. In 1951, he published the paper "Maternal Care and Mental Health," in which he reviewed the evidence regarding the adverse influences of inadequate maternal care during early childhood on personality development, and the acute distress felt by young children, and he provided recommendations on how to avoid or mitigate the ill effects. Also, two films provided enormous evidence of the adverse influences of inadequate care: Rene' Spitz's *Grief: a Peril in Infancy* (1947) and James Robertson's (1953) *A Two-Year-Old Goes to Hospital*. Both these films documented the distress and anxiety of young children in institutional settings.

During the 1950s there continued to be controversy. Many traditional psychoanalysts, who focused on the role of fantasy in early childhood to the exclusion of the influence of real life events, rejected Bowlby's views. At that time it was widely held that the reason a child develops a close tie to the mother is that she feeds him. Food was the primary drive and the personal relationship, referred to as "dependency," was the secondary drive. In the object relations theory advocated by Melanie Klein (as cited in Bowlby, 1988), the mother's breast was postulated as the first object and emphasis was placed on food and orality and the infantile nature of dependency. Klein (1975)

conceptualized the infant's inner life in terms of infant rage, paranoia, and agony (Karen, 1994). A very young infant is unable to grasp the concept of a whole person. The world is composed of smaller parts, namely, the breast, face, and hands, to which the baby responds with the emotions of pleasure, fear, anger, or whatever emotions that infant is capable of feeling. Klein believed that the infant's first relationship is with the breast and that the infant has a love-hate relationship with it, as he or she will later have with his/her mother. The breast is perceived by the infant as the source of pleasure and satisfaction. It is also perceived as the source of anger, rejection, and persecution. Klein argued that the young infant cannot tolerate the idea that the good breast can also be the source of pain and that the infant wants to destroy the same breast that it loves and depends on. This conflict would generate intolerable anxiety, therefore, the infant splits the breast, and later the mother, into images of all good or all bad. Klein focused her attention on this tormented inner life of the infant and child. Psychic reality was more important than material reality and she did not view the mother's behavior or the environment as having any impact on this psychic world. None of those features matched the observations of Bowlby's experience. His observations suggested that the maintenance of close relations with primary caregivers serves a protective function in that it ensures survival more than that of feeding or exploration (Main, 2000). His theory departs from the Kleinian position and relies on the biological function of human development.

Ethology

Bowlby's proposition that children need a close and continuous relationship to thrive emotionally called for a theoretical explanation. Like Spitz (1946) and Erikson

(1950), Bowlby was focusing on the concept of critical periods in embryological development and was seeking similar phenomena at the behavioral level (Bretherton, 1992). In 1951, Bowlby began studying the work of Konrad Lorenz. Bowlby was able to develop an understanding of the link between human attachment and the empirical and theoretical framework of ethology. From an empirical viewpoint, ethology lent attachment theory a set of tools that are a prerequisite for theory building: the observation, assessment, and hierarchical categorization of behaviors that emerge or intensify during bonding (Feldman & Weller, et al., 1999).

Bowlby was intrigued by Lorenz's work on the *following response* of ducklings and goslings because it showed that in some species a strong bond to an individual mother-figure could develop without the intermediary of food. He was interested to find that ethologists were studying many of the problems with which researchers in human development were grappling, in particular, the development of relatively enduring relationships between the young and parents, and later between mated pairs. Also, Bowlby favored the ethological methods of observing subjects in their natural environment, because this approach was compatible with the methods developed by Anna Freud, James Robertson, and others. Thus began Bowlby's study of ethological principles and the application of those principles to clinical problems, such as love relations, separation anxiety, mourning, defense, anger, guilt, depression, trauma, emotional detachment, and sensitive periods in early life. Having discarded the secondary-drive, dependency theory of the child's tie to the mother, and also the Kleinian alternative, Bowlby was able to formulate a replacement theory. He conceptualized attachment as a fundamental form of behavior with its own internal

motivation distinct from feeding or sex. The presence of an attachment figure who is available and responsive gives the child a strong and pervasive feeling of security and encourages him to value and continue the relationship. The biological function attributed to attachment is that of protection. Attachment, therefore, is necessary for survival. Bowlby introduced ethological concepts, such as sign stimuli or social releasers that “cause” specific responses to be activated or terminated, and these stimuli could be external or intrapsychic (Bretherton, 1992).

Attachment behavior is any form of behavior that results in an individual attaining or maintaining proximity to another clearly identified individual who is conceived of as better able to cope with the world (Bowlby, 1988). It is most obvious whenever the person is frightened, fatigued, or sick, and is assuaged by comforting and caregiving (Bowlby, (1988).

Additionally, attachment behavior is regarded as a class of social behaviors which are as important and equivalent to that of mating behavior and parental behavior (Bowlby, 1988). It has a biological function specific to itself, with no reference to needs or drives (Bowlby, 1988). Within attachment theory, instinctive behaviors become organized into flexible goal-oriented systems through learning and goal-corrected feedback (Mash & Barkley, 1996). Attachment is a behavioral/motivational system that maintains an organism in its environment. It belongs to a group of stress-reducing behavioral systems that operate in conjunction with physiological arousal-regulating systems. A child is motivated to maintain a balance between familiar, stress-reducing behaviors and exploratory behaviors. Self-reliance develops when an attachment figure provides a secure base for exploration (Ainsworth et al., 1978; Mash & Barkley, 1996).

Through the attachment relationship, a child develops an internal working model of the self and others. The internal working model represents a set of active constructions that are subject to change through psychological and environmental manipulation.

Bowlby believed that the tendency to make intimate emotional bonds to particular individuals is a basic component of human nature which is present at birth and continues across the lifespan (Bowlby, 1988). The newborn human infant has the capacity to engage in social interaction and to influence the development of attachment to his or her caregivers (Brazelton, 1983). During infancy and childhood, a baby makes emotional bonds with those who provide comfort, support, and protection. Bowlby felt that these affective bonds continue through healthy adolescence and adulthood, but they are also complimented by new bonds. According to Bowlby (1988), a principal feature of mental health is the capacity to form emotional bonds with others; at times as the individual seeking care and at other times as the caregiver.

Using his attachment theory, Bowlby presented novel explanations of separation anxiety and grief in children. Building upon observations by Robertson (1953a, 1953b) and Heinicke (1956), Harlow and Zimmermann's (1958) groundbreaking work on the effects of maternal deprivation in rhesus monkeys, and on ethological concepts regarding the control of behavior, Bowlby maintained that infants and children experience separation anxiety when a situation activates both escape and attachment behavior but an attachment figure is not available (Bretherton, 1992). Anna Freud (1960) believed that bereaved infants cannot mourn because of insufficient ego development and therefore experience only brief bouts of separation anxiety as long as an adequate substitute caregiver is available (Karen, 1994). In contrast, Bowlby (1969)

believed that grief and mourning processes in children and adults appear whenever attachment behaviors are activated but the attachment figure continues to be unavailable. He further suggested that an inability to form deep relationships with others may result when the succession of substitutes is too frequent (Bretherton, 1992).

In addition, Bowlby seemingly rejected the idea that the superego has its origin in the resolution of the Oedipus complex, and he claimed that during the early years, while the child acquires the capacity for self-regulation, the mother is the child's ego and superego:

It is not surprising that during infancy and early childhood these functions are either not operating at all or are doing so most imperfectly. During this phase of life, the child is therefore dependent on his mother performing them for him. She orients him in space and time, provides his environment, permits the satisfaction of some impulses, restricts others. She is his ego and his super-ego. Gradually he learns these arts himself, and as he does, the skilled parent transfers the roles to him. This is a slow, subtle and continuous process...Ego and super-ego development are thus inextricably bound up with the child's primary human relationships. (Bowlby, 1951, p. 53)

When the father is also engaging in caregiving responsibilities, he is also responsible for the development of ego and superego.

Harlow's Studies

Strong support for this step in attachment theory came from Harry Harlow's (Harlow & Zimmerman, 1959) studies of rhesus macaques. Harlow found that in this other primate species, infants showed a marked preference for a soft dummy "mother" who did not provide food, to a hard dummy "mother" that did provide food (Harlow & Zimmermann, 1959). Harlow's studies resulted in the first scientific questions about the belief that affectional ties were based on nursing. For the rhesus monkeys, cuddly contact proved far more important. Robert Hinde (as cited in Karen, 1994) found that

infant monkeys suffered from even short separations from their mothers and that distress caused by a longer separation was greater than that caused by a shorter separation. The young monkey's disturbance was greatest if there had been tension between mother and child. But even as attachment theory gained plausibility, nothing definitive could be said about the nature of human attachments based on monkey experiments. Given the restrictions on what researchers could do to human babies, it was difficult to make a more conclusive statement on the infant-mother bond.

Ainsworth

Mary Ainsworth worked with John Bowlby at the Tavistock Clinic for 3 years before moving to Uganda. There, in 1954, she began to observe the development of the infant-mother attachment. Inspired by her previous analysis of James Robertson's data and Bowlby's ethological ideas, she designed the first study of infant-mother attachment from an ethological perspective. She regularly visited 26 families in their homes, for several hours at a time, for a period of up to 9 months. She was particularly interested in determining the onset of proximity-promoting signals and behaviors, noting carefully when these signals and behaviors became preferentially directed toward the mother (Bretherton, 1992). By analyzing the data from this study, Ainsworth was able to evaluate maternal sensitivity to infant signals. Mothers who were excellent informants and who provided much spontaneous detail in the interviews were rated as highly sensitive, in contrast to mothers who seemed imperceptive of the nuances of infant behavior. In the Uganda Study, Ainsworth noted three infant patterns of behavior: securely attached infants cried little and were content to explore in the presence of mother, insecurely attached infants cried more frequently even when held by mother and

explored little, and not-yet attached infants manifested no differential behavior toward the mother, as their behavior was not affected by the mother's presence or absence (Ainsworth, 1963). She found that secure attachment was significantly correlated with maternal sensitivity (Ainsworth, 1963).

Upon returning to Baltimore, Ainsworth continued and further developed her research on infant-mother attachment by devising a second observational project in 1963. Ainsworth extended Bowlby's theory by developing a framework within which to empirically evaluate the main features of the theory. Bowlby conceptualized attachment as a motivational system, thereby providing an organizational view of attachment. Ainsworth elaborated that view by suggesting that differences in the quality of infant attachment could be understood by observing the differences in the patterns or organization of attachment behaviors. A unique aspect of Ainsworth's methodology in the Baltimore Study was the emphasis on meaningful behavioral patterns in context, rather than on frequency counts of specific behaviors. Close examination of the narratives derived from the study revealed the emergence of characteristic mother-infant interaction patterns during an infant's first three months. Striking individual differences were observed in how sensitively, appropriately, and promptly mothers responded to their infants' signals. Some mother-infant pairs displayed interactions characterized by smooth interactions, while other pairs consisted of mothers who had difficulties in adjusting their pacing and behavior to the baby's cues. Ainsworth (as cited in Bretherton, 1992) found that maternal sensitivity in the first quarter year of life was associated with more harmonious mother-infant relationships in the fourth quarter of the first year. Babies who had mothers who were highly responsive to the baby's crying

during the early months tended to cry less later, relying instead on communication of facial expressions, gestures, and vocalizations. Additionally, when mothers provided much tender holding during the first 3 months of life, their babies tended to seek contact less during the age of 9-12 months, and when contact occurred it was rated as more satisfying and affectionate (Bretherton, 1992). Ainsworth concluded that an infant whose mother's responsiveness helps him achieve his ends develops confidence in his own ability to control what happens to him (Bell & Ainsworth, 1972). She emphasized that the individual differences in the security or quality of infant attachment should not be conceptualized in terms of the frequency of discreet behaviors or emotions, but in terms of the organization of such attachment behaviors. The organization of the infant's affective experience is therefore believed to determine and reflect the quality of the attachment. It is through the affective experience that the baby develops an internal working model of self and caregiver.

Building on the work of Harry Harlow (Harlow, Harlow & Hansen, 1963), Ainsworth and colleagues developed the Strange Situation Paradigm, which was designed to examine the balance of attachment and exploratory behaviors under conditions of low and high stress. Initially considered a very controversial laboratory procedure, the Strange Situation is a 20- minute activity during which a baby is exposed to a regulated pattern of activity that controls the baby's proximity to, separation from, and reunion with its mother and another woman who is a stranger. The babies who had been observed at home in the Baltimore study participated in the Strange Situation. During the study, Ainsworth became aware of unexpected patterns of infant reunion behaviors, which were similar to responses documented by Robertson (1953a) in his

films of hospitalized children, and by Spitz (1947) in his films on children affected by loss and grief. Ainsworth (1978) noted that a few of the 1 year old babies were surprisingly angry when the mother returned after a 3-minute separation. They cried and wanted contact, but instead of cuddling when picked up by the returning mother, they showed ambivalence by kicking or hitting her, and did not become calm at mother's return. Another group of children avoided the mother upon return, although they may have searched for her when she was gone. Analysis of the home data showed that those infants who had been ambivalent or avoidant of the mother upon reunion had a less harmonious relationship with her at home than did the majority of infants who sought proximity and contact upon reunion. Thus, Ainsworth developed the well-known Strange Situation classification system. Infants had been seen to behave in one of three patterns. The securely attached infants sought their mother when distressed, seemed confident in her availability, greeted her positively at reunion, and were warmly accepted and readily comforted by mother's embrace. The infants in the avoidantly attached group were not likely to be distressed at separation, depended less on the mother as a secure base, sometimes attacked her with a random act of aggression, and were more clingy and demanding in the home setting. They would ignore or avoid the mother during reunions. The babies in the ambivalently attached group were generally preoccupied with the mother, were overly anxious, were clingy and demanding at home, and were likely to be distressed during separation. But these babies mixed contact-seeking and rejection behaviors during reunions, such as wanting mother but arching away from her or going limp in her embrace, and they could not be soothed. (Karen, 1994).

Ainsworth noted that the behavior of the avoidant one-year-olds was similar to the behavior of the children Robertson had observed in the long-term hospital wards. Those children went through protest and despair at being separated from mother, then proceeded to detachment, where they seemed to not care whether their mother came to visit or when she left. The avoidant response suggested that both the infant and older child had experienced a similar sense of rejection, and they were using the same defense when placed in a situation of heightened stress. They displayed an emotional cutoff that disguised their hurt and anger, even from themselves (Karen, 1994). Ainsworth was able to isolate and describe these reactions and their causes and was able to assess the effects, not of drastic separation and loss, but of the partial forms of maternal deprivation (Karen, 1994).

For the Baltimore study, Ainsworth had developed four scales to rate a mother's way of relating to her baby. How often was the mother sensitive to the baby's signals, how much acceptance did she demonstrate as opposed to rejection, did she cooperate with the baby's desires and rhythms or did she impose her own schedule and pace for activities like feeding and playing, and how available was she to the baby or how often did she ignore him or her. With this specificity, Ainsworth was able to qualify the concept of "maternal care," not by counting the frequency of certain behaviors but by focusing on the quality of the interactions. Ainsworth found that the mothers of securely attached children were rated much higher in sensitivity, acceptance, cooperation, and emotional accessibility.

By utilizing the Strange Situation, Ainsworth became the first researcher to devise a method of assessing relatedness (Karen, 1994). By analyzing the data and

validating the classifications against extensive home observations, she was able to assess how style of parenting contributed to individual differences in relatedness. Main, Kaplan, and Cassidy (1985) expanded the work of Ainsworth. In a longitudinal study of 40 middle-class families, children were assessed at 12 or 18 months of age for security of attachment in the Strange Situation. At 6 years old, the children participated in a videotaped assessment during which they were shown photos depicting children separating from their parents in different settings, such as saying goodnight, the first day of school, or going away for the weekend. The children were asked what the child in the photograph might do in response to the situation. The three major attachment patterns were evident: secure, avoidant, and ambivalent. By observing how they reacted to the photographs, Kaplan (as cited in Karen, 1994) was able to accurately surmise the original attachment classification to the mother in 79 percent of the children. Further, by analyzing the structure of the language the children used, Main, Kaplan and Cassidy (1985) stated that the behaviors are a manifestation of the way the child has mentally encoded information relevant to attachment and asserted that the early attachment experiences created an internal working model that organizes not only feeling but attention, memory, and cognition. As a result, people with different attachment histories have different behaviors as well as different patterns of language and structures of the mind (Main, Kaplan, & Cassidy, 1985).

Main- Adult Attachment

In an effort to assess the internal working models of the parents and their 6-year-olds in the aforementioned study, George, Kaplan, and Main (1985) developed the Berkeley Adult Attachment Interview (AAI). This interview examined the parents' early

attachment experiences with their own parents, as well as the adults' current representations of attachment. Bowlby believed that a newborn baby evokes feelings in the parents that are as deep as the feeling a young child has for its mother. The quality of the attachment memories were used to determine adult attachment status, thus the AAI was used as the Strange Situation for adults. In analyzing the data, George et al. were able to identify three states of mind with respect to attachment. The categories were secure-autonomous, dismissing of attachment, and pre-occupied with early attachment. They found that these categories directly paralleled Ainsworth's childhood attachment categories of secure, avoidant, and ambivalent. A great majority of the children of these parents had been rated in corresponding categories in the Strange Situation that had been assessed 5 years earlier (Karen, 1994). Later, Main and Solomon (1990) added the fourth attachment category of disorganized.

Further studies (Fonagy, Steele, & Steele, 1991), which focused on expectant parents, were able to correctly predict infant Strange Situation classifications in 75 percent of the cases based on interviews with mothers prior to giving birth. With the data collected from these longitudinal studies, it became evident that the parents' pattern of attachment is likely to be transmitted to the infant.

Rohner

The work of Robert Rohner (1999) has been focusing on the quality of parental caregiving, as revealed by parental acceptance-rejection. Parental acceptance-rejection theory (PARTheory) is "a theory of socialization and lifespan development that attempts to predict and explain major causes, consequences and correlates of parental acceptance and rejection within the United States and worldwide" (Rohner, 2004). Although similar

to Attachment theory, Rohner's parental acceptance-rejection theory (PARTheory) differs in several ways. Attachment theory focused primarily on behavior observations by the researcher. PARTheory relies more heavily on individuals' own perceptions of parenting, which is measured through self-report questionnaires and interviews. Attachment theory recognizes categories of attachment (secure, avoidant, etc.), while PARTheory emphasizes that different attachment styles are on a continuum which ranges from positive to negative. In PARTheory, the outcome of parenting style includes many interrelated personality characteristics, which vary between individuals, rather than one category. Attachment theory postulates that long-term social and emotional development is dependent on attachment in the infancy period (Bowlby, 1968). PARTheory challenges this assumption by stating that the long-term effects of attachment laid down during the infancy period may be changed by a significant change in parenting. In research spanning over 40 years, across cultures worldwide, the key concept is the emphasis on individuals' subjective perceptions of parenting behavior. Rohner (2004) asserts that children and adults appear to organize their perceptions of acceptance-rejection around the same four classes of behavior. These classes are warmth/affection; hostility/aggression; indifference/neglect; and undifferentiated rejection. These classes of behavior represent a continuum on which a mother's representation of attachment can be rated (Rohner, 1999). As previously stated, PARTheory emphasizes that an individual's representation of attachment may be changed by significant changes in parenting experiences. A significant change in parenting experience, such as having a baby admitted to the NICU, is an external stimulus which alters the mother's interaction with the infant. The location of an infant

and the infant's behavior have been shown to stimulate physiological events that affect maternal behavior (Larsson, 1994). Therefore, a change in the location and behavior of the infant will effect a change on the physiological response of the mother, the mother's behavior, and her perceptions of warmth/affection, hostility/aggression, indifference/neglect, and undifferentiated rejection. Following is a discussion of the physiological bases of attachment in mammals related to hormonal priming, proximity and external stimuli.

Physiological Bases of Attachment

Hormonal Priming

Bowlby (1982), states that maternal behavior in mammals has several manifestations, among which are nursing, nest-building and retrieval. In humans, retrieval behavior can be characterized by many terms, such as *mothering*, *maternal care*, and *nurturance*. In particular, the term *retrieval* calls attention to the fact that a majority of maternal behavior is concerned with reducing the distance between infant and mother and in keeping the infant in close physical proximity (Bowlby, 1982). This retrieval behavior is mediated by a number of behavioral systems which stimulate the maintenance of maternal proximity to the infant. Of great importance to the stimulation and maintenance of retrieval behavior are the location of the infant, the behavior of the infant itself, and the hormonal levels of the mother.

In describing normal mammalian maternal behavior, it becomes necessary to refer to studies of lower order animals (rats, sheep and non-human primates) primarily because of the limited extent to which experimental studies can be done on humans. The human mother-infant relationship is not solely the product of cognitive and affective

processes, but also of biological and hormonal events; therefore the physiological mechanisms underlying maternal behavior have potential significance for understanding human mother-infant care (Larsson, 1994).

Parenting is a universal feature of mammalian behavior. In placental mammals the initiation of maternal behavior is synchronized with parturition and lactation (Larsson, 1994). A combination of hormonal changes and external stimuli are required to initiate maternal behavior. Keverne (1996) states that the neural events which are primed during pregnancy for the expression of maternal behavior and triggered by the onset of parturition are likely to have much in common across species; however, once established, maternal behavior can be called upon by a wide variety of sensory cues which often differ among species. The ovarian secretions of estrogen and progesterone have a pivotal role in the physiological priming necessary for maternal care. When estrogen and progesterone are produced naturally in the endocrine glands and gonads they are steroidal hormones. Since these steroids can pass the blood-brain barrier, high affinity binding to neural receptors will be activated in all parts of the brain simultaneously (Keverne, 1996). The pattern of secretion of these steroid hormones during pregnancy is characterized by initially high levels of progesterone in the post-implantation period that decreases prior to parturition with an increase in estradiol. This prolonged priming of the brain is important for genomic activation promoting the synthesis of hypothalamic oxytocin and b-endorphin (Keverne, 1996). The decrease of progesterone followed by increase in estradiol is important for increased synthesis of receptors for these peptides in parts of the limbic brain (Keverne, 1996). After this hormonal activity, the complete expression of maternal behavior occurs immediately

following parturition. Attempts to replicate this pattern by administering these steroids to non-parturient rats and sheep have met with some success (Keverne, 1996).

Progesterone and estradiol given in this pattern to ovariectomized virgin female rats reduces the time it takes to sensitize them to maternal behavior (Carlson, 1994).

As previously stated, the initiation of maternal behavior requires both hormonal changes within the mother and external stimuli. The physical closeness of the offspring provides the external stimuli which are required. The mother, across species, must be able to touch, smell, and hear the offspring in order to stimulate the maintenance phase of maternal behavior. This physical closeness is referred to as *proximity*.

Proximity

Hormonal treatment will only prime the neural changes which accompany pregnancy, while the external stimuli of the tactile, olfactory, and auditory cues from the newborn offspring will link into the maintenance phase of maternal responding by subsequently activating the release of peptides, which are amino acid neurotransmitters such as oxytocin, estradiol, progesterone, and prolactin (Keverne, 1996). Olfaction plays an important role in sensitization, as shown in studies of the rat and sheep (Larsson, 1994). The odor of rat pups elicits a fear response in nulliparous females which is eliminated with physiological factors associated with pregnancy and parturition. A similar effect is seen in the ewe. The parturient rat actually prefers the odor of pups. In the rat, the vomeronasal organ and the main olfactory system project to the medial preoptic area, which is essential for maternal behavior (Carlson, 1994). Lesions of the bed nucleus of the accessory olfactory tract facilitates the onset of maternal behavior, suggesting an inhibitory influence of the vomeronasal neural circuit

on maternal behavior which is overcome by sensitization to the odor of pups. There is an interesting finding regarding the perception of human infant odor: Women of any age who have had a baby think the scent of an infant is pleasant, while non-mothers seem to think infants do not smell good. Larsson (1994) states that human maternal responses do not only include visual, auditory, and somatosensory stimuli but also include odors received during close contact and kissing in the first hours after birth. Therefore, human mothers also overcome their aversion to infant odor by the sensitization of contact with an infant. Human mothers can also distinguish the body odor of their own infant from the body odor of two other babies by the second day of life at greater than chance levels and the mothers' performance improved over a 10 day period (Larsson, 1994).

Tactile stimuli also play an important role in the maintenance of maternal behavior. In the rat, most maternal behaviors involve the use of the mouth; nuzzling, licking and carrying pups, building the nest, and attacking intruders (Blass, 1990; Carlson, 1994). Regarding the human mother, Larsson (1994) reported that mothers who were allowed to deliver fully awake and with minimal obstetrical assistance show a predictable pattern of behavior. The mother will immediately act maternal toward the infant, bringing it to the breast to nurse, aligning her face in the same vertical plane as the infant's face to look into its eyes. The mother pats, strokes, and rocks the infant, rubs the infant with her hands, and holds it against her body (Larsson, 1994). A stereotyped behavior that proceeds in a predictable and orderly fashion has been described in the mother during her first interaction with the infant. In a test for touch recognition, mothers could stroke the hand of three newborns, one of which was her own, and try to identify her own baby. The majority of women were successful if they

had been with their infant at least 1 hour after birth (Larsson, 1994).

This discussion of maternal behavior will include a brief overview of the neural structures thought to be involved in normal mammalian maternal behavior, the psychoneuroendocrine bases of parenting, the effects of parturition, postpartum psychosis, and the effects of lactation as they relate to formation of the mother-infant emotional attachment, particularly the role of oxytocin.

Considering the range of physical functions called upon by the maternal animal, many neural circuits may be involved in the control of maternal behavior (Carlson, 1994; Larsson, 1994). Circuits implicated at the onset of maternal behavior may differ from those involved in its maintenance, and circuits activated by hormones may differ from those activated by sensory stimuli.

Keverne (1996) speculates that it may be the case that the high levels of oxytocin released into cerebrospinal fluid at parturition act as neurohormonal transmitters. The maternal responses which require widespread activity throughout the brain can have their complex sequences of sensorimotor actions modulated by oxytocin.

The medial preoptic area (MPOA) of the basal forebrain rostral to the anterior hypothalamus is essential for the control of maternal behavior (Carlson, 1994; Larsson, 1994). Electrolytic lesions of MPOA performed on postpartum nursing rats disrupted retrieving, nest building and maternal behaviors. Destruction of MPOA cell bodies by a neurotoxic amino acid that spares the fibers of passage also disrupted these behaviors, indicating that neurons located in the MPOA are of critical importance for the display of maternal behavior (Larsson, 1994). The MPOA receives afferent input from the vomeronasal organ. From the MPOA there are efferent projections to the lateral

preoptic area (LPOA). Severing of these connections by knife cuts causes a selective destruction of maternal behavior, particularly retrieving and nesting, while nursing and lactation are less affected (Larsson, 1994). From the LPOA, neurons descend to the ventral tegmental area (VTA) of the midbrain. Knife cuts caudal to the VTA disrupt maternal behavior while lesions made by the injection of an amino acid that kills cell bodies, but not axons, do not disrupt maternal behavior; thus, the preoptic neurons do not terminate in the VTA, but descend more caudally passing the mesencephalic motor region (Larsson, 1994).

The MPOA also appears to be where estradiol influences maternal behavior. The MPOA contains estrogen receptors, the concentration of which increases during pregnancy due to the priming effect of the pregnancy hormones. Implants of estradiol into the MPOA stimulate maternal behavior, while similar implants into other sites are ineffective (Larsson, 1994). Injection of an antiestrogen chemical into the MPOA blocks maternal behavior (Carlson, 1994).

A brainstem region that may be influenced by preoptic efferents related to maternal behavior is the lateral midbrain tegmentum, including the perpenduncular nucleus. This area receives input from descending preoptic efferents and includes ascending trigeminal sensory pathways carrying tactile input from the perioral region (Larsson, 1994). Lesions in this area eliminate maternal aggression and the milk-ejection reflex, suggesting that the perpenduncular area may be a locus which integrates somatosensory (suckling) and motivational impulses (Larsson, 1994).

As noted previously, the changing ovarian secretions of the peptides estradiol, progesterone, and prolactin are essential in priming the peptidergic neural changes

which accompany pregnancy. The tactile, olfactory, and auditory cues from the newborn offspring are required to link into the maintenance phase of maternal responding by activating the release of peptides that act as neurotransmitters (Keverne, 1996). The peptide oxytocin is synthesized within two areas of the brain: the magnocellular secretory neurons which project from the paraventricular and supraoptic nucleus to the posterior pituitary, and the parvicellular neurons of the paraventricular nucleus which project to widespread areas of the brain (Keverne, 1996). The magnocellular neurons have terminals which have a close association with the capillary plexus of the posterior pituitary and their release of oxytocin controls uterine contractions at parturition and also milk ejection in response to suckling. In an experiment to test the hypothesis that central oxytocin has a role in maternal behavior, female rats were ovariectomized and hormonally primed, then presented with newborn rat pups and observed for maternal behavior. Infusions of oxytocin and its analogue, toxinoic acid, into the ventricular system of the brain had a significant effect in promoting maternal behavior within a 2-hour period (Keverne, 1996). A similar effect is seen in the ewe. Subsequent experiments showed that the onset of maternal behavior can be delayed by intracerebroventricular treatment with oxytocin antisera or a synthetic oxytocin antagonist (Keverne, 1996).

In sheep, artificial vagino-cervical stimulation that simulates parturition promotes a rapid onset of maternal behavior in non-gestant ewes, while ewes delivered under epidural anesthesia showed no interest in lambs until they were given intracerebral oxytocin (Keverne, 1996). In the ewe, oxytocin is released during labor, birth, and suckling in the bed nucleus of the stria terminalis, medial preoptic areas, and olfactory

bulbs (Keverne, 1996). Keverne (1996) speculates that it may be the case that the high levels of oxytocin released into cerebrospinal fluid at parturition act as neurohormonal transmitters. The maternal responses which require widespread activity throughout the brain can have their complex sequences of sensorimotor actions modulated by oxytocin. An example of the importance of oxytocin, is that when it was administered to the cerebrospinal fluid of non-parturient ewes it evoked all the sensori-motor patterns that make up full maternal responsiveness (Keverne, 1996). There are more receptors for oxytocin in the brain than there are neural terminals. This leads to the speculation that under basal conditions, oxytocin may only be effective as a transmitter at these terminal areas; however, during critical life events such as mating and parturition, the whole brain may be perfused with oxytocin activating those receptors where terminals are not located (Keverne, 1996).

External Stimuli

After parturition, the duration of behavioral effectiveness of oxytocin in the ewe is approximately 1 hour. This short duration for which intracerebral oxytocin stimulates maternal behavior in the ewe suggests that its central release may only be of importance for inducing maternal behavior, with additional mechanisms involved for sustaining central oxytocin release at other times (Keverne, 1996). In this context it is important to note that not only parturition but also suckling increases levels of oxytocin in cerebrospinal fluid in the sheep (Keverne, 1996). In addition, chemosensory cues maintain the efficiency of oxytocin release in rats in response to suckling and a human baby's crying can induce oxytocin release and milk let down in lactating women (Keverne, 1996). The way the various sensory pathways relate to oxytocin neurons has

been explored anatomically and electrophysiologically in rodents. The oxytocinergic cell bodies receive new synaptic inputs, and electrical coupling between these cells is induced by chemosensory stimulation. Therefore, the initiation and maintenance of maternal behavior appear to differ in important ways. For initiation, oxytocin receptor production depends on steroid hormone priming; at parturition sustained release of oxytocin is evoked by somatosensory stimulation; during the maintenance phase of maternal behavior, steroid levels are low and oxytocin sustains its own receptors, while its release can be evoked by suckling and other somatosensory stimulation from the young (Keverne, 1996). The duration of the maintenance phase is, therefore, dependent on the frequency of sensory stimulation, which will diminish in both type and frequency as the offspring become self-sufficient (Keverne, 1996).

This information begins to link oxytocin to maternal behavior. Parturition activates central and peripheral components of the paraventricular oxytocinergic system as part of a coordinated neuroendocrine response which is vital to maternal behavior (Keverne, 1996). The neuroendocrine events involved in pregnancy and lactation have much in common between primate and non-primate mammals (Keverne, 1996). The underlying mechanisms for neuroendocrine and behavioral coordination may persist, but the expression of these events may be uncoupled in primates. In monkeys, it seems to make no difference whether they are ovariectomised, menopausal, or have normal menstrual cycles, for they immediately adopt young infants. However, these monkeys were maternally experienced (Keverne, 1996). Among humans, women regularly adopt babies and show normal maternal responses without experiencing pregnancy or parturition. With the progressive development of neocortex, the importance of

experience (learning) becomes more significant and neuroendocrine mechanisms become less significant in the genesis of maternal behavior (Keverne, 1996). However, many neurochemical changes important to maternal behavior and sexual behavior occur in the limbic brain, which is similar in both human and non-human primates. Therefore the neural basis for maternal behavior may be very similar across mammalian species (Keverne, 1996).

In studying the differences in maternal behavior between reptiles and mammals, Paul MacClean (as cited in Peredery, Persinger, Blomme & Parker, 1992) has proposed the theory that three forms of behavior distinguish the evolutionary transition from reptiles to mammals: (a) nursing, in conjunction with maternal care; (b) audiovocal communication for maintaining maternal-offspring contact; and (c) play. It follows that maternal behavior in mammals is dependent on structures of the brain which are present in mammals but not in reptiles. Peredery et al. (1992) found that damage to the limbic system eliminated maternal behavior in rats without affecting the physiological responses.

Maternal behaviors were hypothesized to have emerged with the phylogenetic development of the thalamocingulate division of the brain, which is not well developed in reptiles. The suprageniculate nuclei and the lateral posterior nucleus project to the amygdala and have been implicated in the processing of the emotional significance of acoustic stimuli (Peredery et al., 1995). Therefore, the limbic system, which is more developed in mammals, has been shown to link acoustic stimuli (such as infants' cries) to maternal behavior.

It is presently recognized that the incidence of psychiatric illness, specifically

depression, is high in the postpartum period. The risk of hospital admission associated with functional psychoses in the first 3 months postpartum is 14.5 times greater than the risk prior to childbirth (Sandyk, 1992). The vulnerability to mental disorders in the postpartum period may be expressed as the spectrum from “baby blues” to depression to psychosis. In postpartum psychosis, delusional thoughts may involve the idea that the baby is dead or defective, the birth may be denied, ideas of persecution may be present, and auditory hallucinations may involve voices telling the woman to kill the child (Sandyk, 1992). It is known that pregnancy and the postpartum period are associated with substantial hormonal fluctuations.

The average human estrogen and progesterone levels normally drop from 2100 ng/100 ml and 160 ng/100 ml, respectively, at 14 days antepartum to 14 ng/100 ml and 3 ng/100 ml, respectively, by the fifth postpartum day (Sandyk, 1992). Although these dramatic hormonal changes immediately following childbirth prompted research into the association between postpartum psychiatric disorders and endocrine changes, various researchers could not find any correlation between postpartum depression and postpartum plasma levels of luteinizing hormone, follicle stimulating hormone, estrogen or progesterone (Sandyk, 1992). The absence of the normal increase in total plasma tryptophan concentrations observed on the first and second postpartum days was significantly associated with postpartum depression (Sandyk, 1992). Low levels of tryptophan, as the precursor of serotonin, lowers the availability of serotonin in the brain, which can cause depression as well as disinhibition of aggression (Carlson, 1994). Oral tryptophan supplementation was found to be ineffective in the treatment of postpartum “blues,” suggesting that low tryptophan levels reflect some underlying

mechanism associated with postpartum depression, rather than being etiologically related to the disorder (Sandyk, 1992).

The postpartum period is also associated with drastic changes in pineal melatonin secretion and since Sandyk (1992) found an association between pineal melatonin functions and psychotic behavior, he proposed that alterations in the activity of the pineal gland are causally related to the pathogenesis of postpartum psychosis (Sandyk, 1992). After parturition, plasma melatonin levels drop immediately (1-5 minutes after delivery) to a level significantly lower than that of early pregnancy, therefore Sandyk speculated that the dramatic fall in plasma melatonin levels immediately after childbirth may be causally related to the emergence of postpartum psychosis in susceptible individuals (Sandyk, 1992).

Additionally, the activity of lactation is very important to the hormonal well-being of the human mother. Because the physical and psychological bonds between mother and infant are so intimate, the relationship cannot be described only by how maternal behavior influences the infant, but also by the way infant behaviors affect the expression of maternal behavior (Harlow, Harlow, & Hansen, 1963). In addition, the positive effects produced by oxytocin of satiety and social bonding may help a nursing mother feel more calm, relaxed, satisfied, and “in love” with her infant.

Factors Influencing Maternal-Infant Attachment

Imprisonment

The forced separation imposed by imprisonment creates unique stressors for mothers. More than half of all incarcerated women are mothers of at least one child for whom they were responsible before incarceration (Houck & Loper, 2002). Incarcerated

women are confronted with limited contact with their children, infrequent visitation, custody issues, worry about the care their children are receiving, and overall feeling of a loss of control of the parenting process. These concerns can affect a woman's sense of competence as a parent and the representations of her relationship with her children. These children frequently experience difficulties at school, antisocial behavior, and dysregulation (Gabel & Schlinledecker, 1993). There have been few studies that have examined the effect of separation on the incarcerated mothers. Fogel (1993) studied anxiety levels in incarcerated mothers and incarcerated nonmothers. It was concluded that lack of contact with their children was a severe psychological stress for the mothers in the study (Fogel, 1993). However, other researchers have not found adjustment differences related to parental status among incarcerated women. Several studies found no significant differences between mothers and nonmothers on measures of general health and depression (Houck & Loper, 2002). One possible explanation for the lack of a difference in stress levels is that the women, both mothers and nonmothers, were experiencing such high levels of distress while incarcerated that a ceiling effect reduced sensitivity to differences. Houck and Loper (2002) attempted to study the stress related to parenting among a sample of incarcerated women and to relate self-perceived levels of parenting stress to anxiety, depression, somatization, and institutional misconduct. The sample consisted of 362 mothers, incarcerated at a women's maximum security prison, who were participants in a longitudinal study of long-term psychological adjustment of incarcerated women. Psychological stress was measured using a variation of the Parenting Stress Index which was modified to include incarceration-specific parenting issues. The Parental Attachment subscale assessed the motivation and

investment a parents has in fulfilling the role of parent. The Sense of Competence subscale assesses a sense of competence in the parenting role. The Brief Symptom Inventory was used to delineate psychological symptom patterns related to nine different symptom categories. In this study the scores used were from the Anxiety, Depression, Somatization and Global Severity scales.

Analysis indicated that parenting stress concerning amount of contact, visitation, and competence as a parent was associated with elevated anxiety ($t(714) = 13.67, p < .01$); stress concerning amount of contact and competence as a parent was associated with elevated depression ($t(714) = 15.43, p < .01$); and parenting stress concerning amount of contact was associated with somatization symptoms ($t(714) = 9.20, p < .01$). Increased parental stress was associated with increased symptoms. Contrary to the researchers' expectations, parental stress associated with attachment was not related to any of the psychological adjustment measures ($t(9991) = -.5, p > .25$) (Houck & Loper, 2002). They hypothesized that this unexpected result could be explained by examining the mother's internal working model of parenting, which include views concerning the quality of the relationship and the sense of competence in the parenting relationship. The researchers postulated that incarceration presents a greater challenge to a mother's views of her own competence than it does to her views of her feeling of closeness to her children. This study had several limitations including: no measure of mothers' mental health prior to incarceration, no account for the effect of abusive relationships, and reliance on self-report.

Foster Care

Dozier, Stovall, Albus and Bates (2001) studied the nature of the attachment

relationship formed by foster infants with their new surrogate mothers. The researchers hypothesized several possibilities regarding foster children's attachments to their caregivers. The first possibility was that foster children would organize their attachments with regard to the availability of their new caregivers and there would be concordance between the children's attachment and the foster mothers' state of mind with regard to attachment. The second possibility is that the foster infants' early caregiving experience and disruptions in caregiving may overpower the effects of current caregiver characteristics, resulting in little concordance between caregiver state of mind and infant attachment. The third possibility was that there was some concordance between foster mother state of mind and infant attachment only if the infants were placed into foster care before the age of 1 year. Fifty foster mother-infant dyads participated in this study. Mothers completed the Adult Attachment Interview. Foster mother-infant dyads participated in the Strange Situation at least 3 months after placement in the foster home. Foster mother state of mind and infant attachment were the variables of primary interest in this study. There was a 72% match $k = .43$, $X^2(1, N = 50) = 10.42$, $p < .01$ (Dozier et al., 2001). The data from the Strange Situation revealed that 52% of the children were classified as secure, 34% were classified as disorganized, 6% were classified as avoidant, and 8% classified as resistant. When compared with the van Ijzendoorn (1995) meta-analysis of infant attachment, the foster care sample had a similar proportion of children with secure attachments, but among the classifications of disorganized, avoidant, and resistant, the foster care sample had a larger proportion of children with disorganized attachments ($X^2 = (1, N = 50) = 9.42$, $p < .01$) (Dozier et al., 2001). These results suggested that foster children can organize their attachment behaviors around the

availability of their new caregivers. The findings of this study suggest that it is the maternal characteristics that primarily determine children's attachment strategies in foster care (Dozier et al., 2001).

Emotional Unavailability

Infants who have their emotional needs met adequately may develop better emotion regulating skills than those whose needs are not adequately met by caregivers who are unresponsive or rejecting (Braungart-Reiker, Garwood, Powers & Wang, 2001). Emotion regulation refers to behaviors that serve to moderate arousal. Braungart-Reiker, et al. (2001) proposed that differences in emotion regulation can be detected before the establishment of attachment security status. The still-face paradigm is an experimental situation in which parents are asked to abruptly stop interacting with their infant (Tronick, 2007). Infants as young as 3 months show more distress and gaze aversion during the still-face situation than during face-to-face interaction or a brief separation from mothers. This suggests that infants' expectations of mothers' reactions have been violated during the still-face situation (Braungart-Reiker et al., 2001). Additionally, it has been found that greater maternal positivity during interaction predicted greater amounts of infant gaze during still-face. Infants whose mothers were more sensitive at 4 months were more likely to be classified as secure in their attachment at 12 months ($F(4,94) = 9.81, p < .01$). The researchers suggested that maternal interactive behavior partially mediates still-face response (Braungart-Reiker et al., 2001). Lyons-Ruth (1996) has described patterns of parental behavior and corresponding infant attachment behavior that predict later aggression. These interactive patterns, which precede the onset of coercive cycles, are characterized by parental behaviors that are intrusive and

not easily modified by infant communications, as well as behaviors that are covertly or overtly hostile. The infant communications are then ignored or overridden (Lyons-Ruth, 1996).

Maternal affect regulation and expressed emotion has been found to be related to relationship quality in early childhood. Jacobsen, Hibbs, and Ziegenhain (2000) have found that mothers with a high level of expressed emotion (a parental measure of criticism or overinvolvement toward a child) were more likely than other mothers to have children with disorganized attachment ($X^2(1) = 4.23, p < .05$). The researchers also note that feelings of helplessness in the caregiver, as well as unresolved loss and trauma, have been associated with the disorganized attachment pattern (Jacobsen, Hibbs, & Ziegenhain, 2000).

In examining the effect of separation on mother-infant dyads, Aviezer, Sagi, Joels and Ziv (1999) studied 48 kibbutz infants who participated in two kibbutz sleeping arrangements; communal sleeping in the children's house or sleeping at home with the parents. These researchers found that security of infants' attachment relations ($F(4, 36) = 3.77, p < .012$) as well as autonomy of mothers' attachment representations ($F(4, 36) = 4.65, p < .004$), were associated with higher levels of emotional availability. The children who were in the communal sleeping group experienced various degrees of maternal inaccessibility during the nighttime. Further results indicated that the experience of emotional availability in infants' and mothers' attachment may have been disrupted by the occurrence of communal sleeping. Aviezer et al. (1999) interpreted these findings to suggest that the child-rearing context may influence the organization of attachment relationships.

Maternal depression, as well as maternal dissatisfaction with her infants, has been found to be associated with lower infant security (Coyl, Roggman & Newland, 2002; Martins & Gaffan, 2000). Because an infant has no innate understanding of the mother's internal state, attachment theory has hypothesized that parental sensitivity mediates the relation between the mother's internal working model of attachment and the attachment relationship (Bolby, 1988; van IJzendoorn, 1995; Peterson, Gleason, Moran & Bento, 1998). Attachment representations that are characterized by high levels of avoidance interfere with a child's ability to fully engage their socio-cognitive skills when reasoning about maternal mental states (Repacholi & Trapolini, 2004). Sensitive parents are expected to have a positive influence on their children's ego control and are likely to encourage their children's feelings of self-efficacy and competence. In van IJzendoorn's (1995) meta-analysis, the percentage of correspondence between the caregivers' mental representation of attachment and infants' attachment security was 75% ($k = .49$, $n = 661$) (van IJzendoorn, 1995). The strongest predictor of infant attachment is the caregiver's state of mind with regard to attachment.

Stams, Juffer, and van IJzendoorn (2002) studied the adjustment of adopted children in an attempt to identify evidence of social-interactive influences on children's development independent of genetic relationships. Their longitudinal study, which followed internationally adopted children who were placed before 6 months of age, found that the role of maternal sensitivity, infant attachment, and infant temperament are predictors of adopted children's adjustment. They found that even in adopted children who are not biologically related to their adoptive parents, early mother-infant interactions and attachment relationships predict socioemotional and cognitive

development (Stams, Juffer & Van Ijzendoorn, 2002). In contrast, Kochanska (1998) failed to find the proposed link between the mother-infant dyadic qualities of maternal responsiveness or shared affect positivity and child secure or insecure attachment at 13 to 15 months. However, when assessed concurrently with infant security, those qualities of maternal affect and shared affect positivity were found to relate significantly to security in that securely attached children were in more positive and responsive relationships with their mothers than were insecurely attached children. Kochanska interpreted these results to support the view that the forming attachments integrate input from both the relationship qualities and the individual, temperamental qualities of the child.

A mother's *insightfulness* is described as her ability to consider the underlying motives of her child's behavior and her ability to consider the child's perspective of their emotional experiences in a positive, complete and child-focused manner (Koren-Karie, Oppenheim, Dolev, Sher & Etzion-Carasso, 2002). Researchers found that mothers classified as insightful were also rated as more sensitive and had a higher probability of having securely attached children ($F(3, 126) = 2.92, p = .04$). More salient to the present study is the concept that in order to be able to understand positive caregiving, as well as problematic caregiving, it is important to consider the internal processes underlying maternal caregiving (Koren-Karie et al., 2002). Important aspects of positive caregiving include: mothers' insight into the child's motives for behavior, the ability to provide an emotionally complex picture of the child and the openness that mothers exhibit when trying to explain their child's behaviors, while updating their views of the child according to new and unexpected behaviors. The child then experiences the mother

as attentive to his or her emotional needs (Koren-Karie et al., 2002).

Culture

Both attachment theory and parental acceptance-rejection theory are framed in an evolutionary perspective. Specifically, attachment theory argues that humans have a biologically driven propensity to organize emotional bonds with a significant other and that during the course of evolution a child's sense of security and safety became dependent on the quality of the relationship with the attachment figure (Bowlby, 1982). Rohner's (1999) parental acceptance-rejection theory adds that humans have a phylogenetically acquired need for positive responses from the individuals closest to them and have evolved with the propensity to respond in specific ways when this need is not met. Accordingly, the theories postulate that the relationship between the quality of early care and infant security is consistent across cultures and contexts (Posada, Jacobs, Richmond, Carbonell, Alzate, Bustamante & Quiceno, 2002). However, most research on this topic has involved middle-class samples in industrialized societies (Posada et al., 2002), prompting a critique of the central theory of attachment theory in general and of the sensitivity-security hypothesis in particular (Rothbaum, Weicz, Pott, Miyake, & Morelli, 2000). Rothbaum et al. (2000) suggested that the cross-cultural universality of the sensitivity-security hypothesis is not valid in cultures that differ from that of industrial Western societies. Various cultures differ in culture-specific constructs, such as communication and eye contact (McMahan True, Pisani & Oumar, 2001), the role of independence versus interdependence (Posada et al., 2002), the mother's role in promoting play (Valenzuela, 1997), physical control (Carlson & Harwood, 2003), and acceptable maternal expression of pride (Karen, 1994). In spite of culture-specific

constructs, studies comparing Western and non-Western cultures report comparable mean attachment scores (Van Ijzendoorn, 1995; Zevalkink, Riksen-Walraven & Van Lieshout, 1999), as well as a significant correlation between maternal sensitivity and infant security (Mizuta, Zahn-Waxler, Cole, & Hiruma, 1996; Posada et al., 2002; Posada, Carbonell, Alzate & Plata, 2004; Rohner, 2004). Posada et al. (2002) conducted a study of maternal care and infant security, which obtained observations from populations in Denver, Colorado, and Bogota, Colombia. In Colombia, the nuclear family is considered the normative model, with a family-centered ideology that stresses the importance of kinship and family ties. The Colombian families are more sociocentric and value interdependence, while American families are more individualistic and value independence (Posada et al., 2002). The researchers hypothesized that maternal sensitivity would be related to a secure organization of attachment behavior in the infants. They also explored whether other domains of maternal caregiving could be identified and how they related to attachment security in both cultures. The sample from Denver included 29 boys and 31 girls between 11.0 and 15.8 months of age ($M = 12.7$ months). Mothers' ages ranged from 18 to 45 years ($M = 30.8$ years). The Bogota sample included 33 boys and 28 girls between 8 and 19 months of age ($M = 12.7$ months). Mothers' ages ranged from 21 to 42 years ($M = 31.2$ years). The educational range, from some high school to a university degree, was similar in both groups. Maternal caregiving was observed at home in both cultures. Infants' behavior was assessed using the Strange Situation in Denver. In Bogota, settings and accommodations for the Strange Situation were not available, so infants behavior was assessed during two additional 2-hour home visits. The Maternal Behavior Q-Set was

used to assess maternal behavior, expressed as a composite score. The infants' behavior was rated in the Strange Situation and extensive home visits, and the infants' classifications were divided into two groups of secure or insecure. Mean maternal sensitivity scores for the Denver and Bogota samples were .65 and .69, respectively. A statistical comparison of the means indicated that there was not a significant difference between maternal sensitivity scores in the two countries ($t(119) = -1.08, ns$) (Posada et al., 2002). Factor analysis was conducted in each sample using the 90 items of the Maternal Behavior Q-Set, revealing seven domains of maternal caregiving. The first four domains were: (a) sensitive responding to the infant's signals and communications; (b) accessibility, which is the mother's ability to consider the baby's needs despite competing demands; (c) acceptance of the infant, reflected in the mother's positive emotional tone in the interactions with the infant; and (d) interference, which is the mother's inability to cooperate with the infant's behavior. These four domains paralleled Ainsworth's conceptualization of caregiving behavior (Posada et al., 2002). Two additional domains were identified in both samples: (e) active-animated and (f) creating an interesting environment for the baby. While both these domains were significant in both cultures, the Colombian mothers scored higher on the active-animated domain while the American mothers scored higher on the creating an interesting environment for baby. This finding reflected the Colombian tendency toward interdependent behavior and the American tendency toward independent behavior. In addition, one sample-specific domain was identified for each culture: (g) close-intimate interactions with the baby was associated with the Denver sample and (h) concern with physical appearance of the baby was associated with the Bogota sample.

These results support the theoretical premise that maternal sensitivity is positively related to infant attachment, and that the association between maternal sensitivity and infant attachment is consistent across cultures. It also provides evidence that culture-specific domains of caregiving and secure-base behavior are evident along with the common domains. Specifically, these results bridge the theoretical divide proposed by Rothbaum et al. (2002). The attachment theory hypothesis of cross-cultural universality (that the relationship between the quality of early care and infant security is consistent across cultures and contexts) can be expressed along with culture-specific constructs (specific ways that mothers express caregiving within their cultural context) (Posada et al., 2002; Rohner, 2004).

Socio-Economic Status

Poverty and low socioeconomic status have been linked to problems in parenting and caregiving behaviors, possibly due to the effect of these stressors preoccupying parents and interfering with their availability and responsiveness (Huth-Bocks, Levendosky, Bogat & von Eye, 2004). Family adversity, as expressed in high-social-risk samples, has been identified as one of the general factors implicated in the onset of aggressive behavior problems (Greenberg, Speltz, & DeKlyen, 1993). Attachment studies by Main and Solomon (1990) have documented the increased incidence of disorganized/ disoriented forms of attachment disorder among families at social risk. Broussard (1995) found that infants of adolescent mothers were more likely to be classified as insecure/disorganized in their attachment. Other researchers (Lyons-Ruth, Repacholi, McLeod, & Silva, 1991) have indicated that the incidence of disorganized infant attachment behavior increases as the severity of family risk factors increases; as

family risk factors become more severe, this disorganized behavior is increasingly likely to include pronounced avoidant behavior. Lyons-Ruth, Easterbrooks, Davidson, and Cibelli (1997) conducted a study of 41 urban, low-income families. Infants were assessed at 18 months old and again at 7 years of age. It was found that, within this high-risk population, it is the interaction of maternal depression and infant disorganization that is the best predictor of externalizing behaviors among the 7-year-olds ($F(1,41) = 9.66, p < .003$). The result indicated that maternal/ infant assessments at 18 months of age can provide significant prediction of externalizing problems at age 7, in a high-risk sample (Lyons-Ruth et al., 1997).

Valenzuela (1997) studied urban poverty and infant chronic undernutrition in Chile. In a high-poverty population, it was found that maternal sensitivity (not socioeconomic status) was associated with physical growth and nutritional status of the children. *Maternal* sensitivity in the group of normally developing infants ($M = 5.63$) was significantly different from maternal sensitivity in the group of underweight infants ($M = 2.10$). A regression analysis indicated that maternal sensitivity accounted for 37% of the variance explaining the infant's current weight ($F(1,83) = 49.80, p < .0001$). Unresponsive maternal caregiving increased risk of poor physical growth (Valenzuela, 1997). Low socioeconomic status was not synonymous with poor caregiving; however the results demonstrate that chronic socioeconomic stress appears to exacerbate vulnerabilities in caregivers that lead to dysfunctional caregiving (Valenzuela, 1997).

Emergency at Birth

The birth of any child occurs in the context of, and acts as a marker for, a particular life-cycle stage of a family. It is felt as a stressor on the family (Carter &

McGoldrick, 1989). This stress is felt even more acutely if that child arrives prematurely or is damaged in some way. The admission of a baby to a neonatal intensive care unit has been referred to as “the crisis of newborn intensive care” (MacFadyen, 1994). The baby is at the center of a complex system of relationships involving both family members and professionals. The crisis has a different meaning for each participant and the baby’s developing relationships will both influence, and be influenced by, other relationships within the hospital and family systems. Institutional, cultural, and family beliefs about prematurity and infant care inform the actions of parents and staff, but may do so in different ways. The development of the key relationship- that between the mother and the child- may be facilitated or inhibited, depending on how these differences are recognized and addressed (Corteland & Cornwell, 1991; MacFadyen, 1994).

The field of neonatology is the most rapidly growing pediatric subspecialty (Berger, 1998). Neonatal Intensive Care Units (NICUs) have existed for at least four decades in the United States. Over the past 25 years, preterm births have increased more than 35 percent (Kornhauser & Schneiderman, 2010). Babies that are born at 22-23 weeks gestation and weighing more than 500 grams are now considered viable. Increases in maternal age and in vitro fertilization, along with medical advances, are leading to increases in preterm births and also to medical complications and associated costs. Very low birthweight babies (less than 1500 grams) account for 10 percent of all live births and more than one in ten will be left with a major impairment in functioning (MacFayden, 1994). The average medical costs through the first year of life are approximately \$32,000.00 for preterm infants versus \$3,000.00 for a full term infant

(Kornhauser & Schneiderman, 2010). Other babies, although born full-term, may be suffering from an illness in which life support is needed or may be in a life-threatening situation due to a congenital abnormality or disability. The psychological development of the baby and family has its foundations in the crucial first weeks and months of life. Under enormous pressure, ethical decisions must be made that will affect the baby both medically and psychologically.

The special care baby is immediately removed from the parents and placed in the intensive care nursery where the lifesaving equipment prevents much parental contact. Actually getting to know this baby is a difficult task for parents, due to the physical barriers in the hospital unit. Parents may be confronted with a baby who does not match their fantasies and may actually represent their worst fears, parents usually go through a mourning process (Orhler, 1981). Feelings of sadness and grief for the loss of the perfect child are to be expected. Parents may feel angry at themselves, each other, the baby, or the physicians. These feelings of anger may lead to guilt and confusion and ambivalent feeling about the infant's survival.

The Premature Baby

In order to discuss the implications of decision making in the Neonatal Intensive Care Unit (NICU), it is necessary to have a brief discussion of events that may be somewhat typical for the families and infants born under stress. The birth and life of a premature infant are vastly different from that of a full-term infant. The premature baby does not simply have to "catch up" to the full-term baby, but exhibits a totally different pattern of growth in both physical as well as psychological terms. The premature birth of a baby delivered between 26 and 36 weeks of gestation deprives the baby and parents of

weeks of vital growth which are afforded the typical full-term baby at 40 weeks of gestation. During this time the baby experiences tremendous growth in the central nervous system and respiratory system and gains weight in preparation for life outside the uterus. While the premature baby is deprived of these final weeks of growth, the parents are deprived of their final weeks of pregnancy. In an attempt to understand the phenomenon of prematurity, it is necessary to understand the phenomenon of pregnancy (Sammons & Lewis, 1985).

Pregnancy brings with it major changes in lifestyles, in relationships, and in feelings about one's self. Throughout the pregnancy there are issues and emotions that arise, consciously or unconsciously, to form the emotional background for the birth of the baby. The parents-to-be, using the expected 9 month timetable to prepare themselves emotionally to welcome their baby, may not be ready to be thrust into parenthood prematurely. How far along the parents are in their self-discovery at the time of birth will greatly affect their relationship to the premature baby, the medical staff, and the Neonatal Intensive Care Unit itself.

The premature birth is usually accompanied by great shock, fear, and confusion. The parents may feel that they have failed at a primary biological task, begin to blame themselves or each other, and feel complete loss of control. This sense is heightened as the baby is immediately taken to the NICU, which may not even be in the same hospital. In the NICU the baby is immediately connected to machinery that will provide the physical support the baby requires to survive. The parents watch the staff care for their baby while they themselves can initially do nothing. The technical environment of the NICU has been found to affect the parent-child relationship. Parents report that they are

rarely involved in the decisions made throughout the course of hospitalization (Pinch & Spielman, 1993). They also report feelings of incompetence and a lack of confidence in their ability to care for their infants during hospitalization and well after discharge (Korteland & Cornwell, 1991). The more accessible mothers are in times of stress, the more secure their children feel (Posada, Jacobs, Carbonell, Alzate, Bustamante & Arenas, 1999). As Erikson (as cited in Berger, 1998) points out, caring for children fulfills important adult needs. Parents immediately lose autonomy; relying on the staff and the technology to take over the role they expected to fill. Starting the parental role on the periphery sets the foundation for feelings of inadequacy and doubt in one's own parenting abilities, which in turn can affect one's parenting behavior.

Maternal Factors

Attachment studies have predominantly focused on the infant's viewpoint. The need to examine attachment from the mother's viewpoint is supported by the neurobiological model, which considers behavior, and the psychoanalytic model, which considers mental representations. The integration of these two models was considered by Bowlby to be the "golden road to the understanding of infant attachment" (Feldman et al., 1997). Bowlby (1980) suggested that infant behavior was influenced by the degree of physical proximity to the mother. Initial separation was observed to evoke protest and intensification of attachment-related behavior. Continuous distance (loss) results in despair and the reduction or disappearance of the attachment behaviors (Robertson, 1953b). Due to the limited extent that experimental studies can be done on humans, attachment theorists must use an animal model of behavior. Hofer (1987) studied attachment responses in the rat by separating and experimentally manipulating the

components of rat pup-dam proximity. He was able to show how proximity affects a complex system of bioregulators in rat pups such as temperature, hormonal, and behavioral systems. The physiological and behavioral changes that occurred in response to separation followed Bowlby's (1980) predicted pattern of attachment behavior. Initial separation of rat pups from their mothers led to an acute increase in autonomic and behavioral activity, including increased huddling, vocalizations, and aimless locomotion. When the time period of separation was increased to an hour or more, the acute protest response changes into the slow-developing changes of the despair phase (Hofer, 1987). The despair phase includes a decrease in body temperature, lower heart rates, and sleep disturbance, decreased social interaction, mouthing or rocking, and postures or facial expressions of sadness (Hofer, 1987). These slow developing changes of behavior have been found in infant rats and monkeys (Bayart, Hayashi, Faull, Barchas, & Levine, 1990; Harlow & Zimmerman, 1959; Hofer, 1987) and documented in humans (Robertson, 1953b). In short, initial separation led to an increase in autonomic and behavioral activity, prolonged separation resulted in lower levels of activity. Proximity, separation, and loss are, therefore, viewed as distinct stages of regulatory mechanisms. Proximity results in maintenance of homeostasis, separation results in intensification of attachment behaviors, and loss results in an altered biobehavioral state in infants across mammalian species.

Length of Separation

Attachment studies have traditionally focused on the infant. There is little empirical data on the exact conditions or length of separation at which infant separation anxiety turns into despair. The initiation of maternal behavior in mammals is linked at

birth to the acute release of oxytocin (Keverne, 1996) and opioids (Graves, Wallen, & Maestriperi, 2002; Shayit, Nowak, Keller & Weller, 2003;). However, the maintenance of maternal behavior is linked to the effect of endogenous opioids that are released in response to physical contact and social stimuli. These opioids are responsible for the feeling of satisfaction resulting from social behavior. Separation from the mother and the absence of social stimuli have been shown to result in an increase of proximity-seeking behaviors and separation anxiety, followed by feelings of despair in laboratory animals. This effect has been observed in humans, as well. However, in an early study of 24 healthy Neonatal Intensive Care unit survivors, Chang, Thompson and Fisch (1982) found that prolonged neonatal separation did not have a significant effect on infant attachment patterns. The 24 subjects of this study met the criteria of: (a) transferred to the NICU within 24 hours after birth, (b) hospitalized in the NICU for at least 10 days, (c) born to intact families, (d) absence of malformation and/or severe neurological deficit, and (e) postconceptional age of 12 months. All subjects were evaluated for their attachment patterns using the Ainsworth Strange Situation Technique. They also received a physical examination, were administered the Bayley Scales of Infant Development, and the parents were interviewed to obtain information on mother's employment and the amount of time the infant was in daycare. The mean NICU hospital stay was 26.79 days. Using the Strange Situation, 17 of the 24 subjects were classified as securely attached (70.85%), 3 were anxiously attached –avoidant (12.5%), and 4 were anxiously attached-resistant (16.7%). The anxiously attached avoidant and resistant groups were combined into one group, termed “insecure infants,” and were compared to the securely attached infants. Several variables, including gestational age, birth weight,

days in NICU, age of mother, hours per week in daycare, and mental and psychomotor development, were assessed to determine whether there were differences between the secure and insecure infants. The only significant variable ($p \leq .01$) was the mother's age at childbirth. Specifically, the length of hospitalization did not affect the development of attachment, as measured by the Strange Situation. In this study the only significant variable to affect differences in infant attachment was the mother's age at childbirth; where mothers of insecure infants were significantly older than mothers of secure infants. Daycare experience was also seen as an important factor, in that insecure infants had fewer daycare experiences. The researchers postulated that older parents might be more anxious in the rearing of high-risk infants, and that the quality of mother-infant attachment and security are mediated by successful experiences in socialization. They suggested that the etiology of infant attachment is influenced by factors other than physical separation at birth, and that the quality of attachment evolves from continuous interaction (Chang, Thompson & Fisch, 1982). However, the limitations of this study require the results to be interpreted with caution. The sociopolitical events at the time of the study may have encouraged the researchers to postulate that time spent in daycare actually improves infants' attachment quality. The sample size ($n=24$), is very small. Additionally, the researchers chose an arbitrary minimum separation of 10 days in the NICU, and did not provide a reason for choosing that time frame. Also, there was no examination of how the length of time spent in the NICU may have affected infants' attachment style.

In a study of the nature of attachment in a Neonatal Intensive Care Unit, Bialoskurski, Cox and Hayes (1998) identify the factors that affect attachment and

identify those aspects of the attachment process that may enhance the formation of attachment between the mother and her infant in the NICU. Twenty-five mothers were interviewed before their babies were discharged from the NICU. An analysis of the data indicated that the process of attachment was not automatic, but was an individualized process (Bialokursky et al., 1998). Immediate attachment occurred if the mother's feelings were positive toward the infant and was more likely to occur if the mother was able to see the infant immediately after birth and have physical contact. Delayed attachment may occur if the infant was premature, and did not look or behave in a way that conformed with the expectations associated with a full-term, healthy infant, and bond formation may be delayed because the infant was not able to play his/her part in the establishment of attachment (Bialoskirski et al., 1998). Although the length of time spent in the NICU varied from 3 days to 60 days, the researcher did not consider length of time as a variable affecting the formation of attachment.

Feldman, Weller, Leckman, Kuint and Eidelman (1999) studied the hypothesis that proximity, separation, and loss of the infant may be related to the intensification or reduction of maternal attachment behavior. Because proximity cannot be experimentally manipulated in human subjects, Feldman, Weller, et al. (1999) utilized several components of proximity to separate subjects into groups of proximity, separation, and loss. These components are: (a) mode of delivery, vaginal or Cesarean; (b) nurturing style of full breastfeeding, partial breastfeeding or none; (c) touch, defined as the availability of tactile contact within the first 24 hours post-partum; (d) caretaking, or the level of the mothers' responsibility for daily activities such as bathing, diapering and feeding; (e) separation, defined as occurring if mother and infant were separated

overnight since birth; and (f) implication of possible loss of the infant. The proximity group included mothers of full term infants for whom all six conditions of proximity were present. The separation group included mothers of healthy pre-term babies who delivered vaginally, nursed part-time, and had full contact with the infant from birth, although these infants remained in the hospital after their mothers were discharged, thereby creating the condition of separation. The third group included mothers of premature infants for whom none of the conditions of proximity were met.

The primary hypothesis that was tested by Feldman, Weller, et al. (1997) was that maternal attachment rests on processes that shape infant attachment: That the primary maternal preoccupation would increase during the time of separation and then diminish with prolonged separation and potential loss. Participants consisted of 91 Israeli mothers in three experimental groups that represented the conditions of proximity, separation, and loss. Mothers were visited at home or in the hospital nursery and were interviewed with the Hebrew version of the Yale Inventory of Parental Thoughts and Actions, as well as self-inventory scales for depression and anxiety. The results indicated support for the hypothesis that primary maternal preoccupation would increase under separation and diminish under prolonged separation with potential loss. This pattern was evident in the measures of: (a) frequency of thoughts and worries and (b) distress caused by thoughts and worries. The following measures indicated highest levels for mothers of full-term infants which decreased as the length of separation increased: (a) distress management; (b) compulsive checking; (c) affiliative behavior (repetitive behaviors similar to the repetitive grooming of mammals) which promotes the selectivity of the infant-mother bond; (d) attachment representations expressing the

mothers' internal model of the child; and (e) frequency of caretaking behavior (Feldman, Weller, et al., 1999). Feldman, Weller, et al. (1999) speculated that there is a certain point on the continuum from proximity to separation to loss at which the highly arousing state of separation changes into the diminished activity of loss. Again, however, this point on the continuum was not described as the length in time of days spent in the NICU.

Feldman, Weller, Sirota and Eidelman (2003) designed a study which provided maternal-infant body contact during a period of maternal separation to examine the effects of maternal-infant body contact on maternal-infant interactions. The Kangaroo Care intervention consists of mother-infant skin-to-skin contact, as an alternative to incubator care. In this intervention, a premature infant in stable condition is placed naked between its mother's breasts for extended periods of time, allowing the infant's body temperature to be regulated by the mother's body heat. The researchers hypothesized that the Kangaroo Care intervention would have a positive impact on the mother-infant relationship, both in terms of global sensitivity and in relation to the micro-regulatory patterns of gaze, affect, and touch. The study sample included 146 premature infants: of these, 73 underwent Kangaroo Care, and 73 were controls who received the standard incubator care. Mothers were approached to participate in the study several days to several weeks after birth and were included in the study if the following criteria were met: mothers agreed to perform Kangaroo Care for 14 consecutive days; mothers agreed to perform Kangaroo Care for at least 1 hour per day; infants were not expected to transfer from enclosed incubators to open incubators during that 2-week period, thus targeting a period when the premature infant was otherwise

deprived of full maternal contact. Infants were observed before the Kangaroo Care intervention began, at 37 weeks gestation prior to discharge from the hospital, at 3 months corrected age at home and at 6 months corrected age in the laboratory. Mothers were videotaped during their interactions with the infants, trained assistants observed the home and evaluated the home environment, and parents completed self-report measures.

The Kangaroo Care intervention was found to positively affect maternal emotional state; (Wilkes $F(6,125)=8.21, p<.01$). Following Kangaroo Care, mothers were more sensitive and less intrusive during interaction and infants showed less negative emotionality during social play (Feldman, Weller, Sirota & Eidelman, 2003). While this study revealed a difference in maternal sensitivity and infant emotionality, the amount of time spent in the NICU was not considered as a variable. The focus was on the effect of time together as provided by Kangaroo care, not on any possible effects of the length of time of separation prior to the intervention.

Bystrova, Ivanova, Edhborg, Matthiesen and Ransjo-Arvidson (2009) devised a study to evaluate possible long term effects of different practices used in maternity wards on mother-infant interaction. In many parts of the world the tradition of separating the mother and baby at birth persists. The traditional practice in Russian maternity wards includes swaddling, which is the practice of using six cotton cloths in a specific manner to tightly wrap the baby, leaving only the front of the face visible. During the time of this study (1995-1998) the hospital practice was changing and the researchers were able to randomly assign newborns to a group that was swaddled, or a group that was dressed in loose fitting baby clothes. The groups were further divided into babies who stayed with their mothers for 2 hours in the delivery room, where breastfeeding could be

started, and babies who were separated from their mothers for 2 hours and then reunited. The parent-child interaction was assessed at the 12 month checkup, using the Parent-Child Early Relational Assessment, which provides an assessment of the affective and behavioral characteristics that a mother and infant each bring to an interaction. A significant overall effect of nonseparation versus separation was found (Wilk's $\lambda = 0.87$, $F(8,114) = 2.13$, $p = 0.039$). The practice of contact during the first 2 hours after birth along with breastfeeding positively affected the variables of maternal sensitivity, infant's self-regulation, dyadic mutuality, and reciprocity at 12 months of age (Bystrova et al., 2009). Additionally, the mothers of swaddled infants showed less positive affective involvement in the interaction than mothers of infants dressed in clothes ($F(1,119) = 4.88$, $p = 0.027$) (Bystrova et al., 2009). However, it has been shown that repeated episodes of physical closeness between mother and baby can compensate for separation during the early period (Anisfeld, Casper, Nozyce & Cunningham, 1990; Feldman et al., 2003). The researchers concluded that there may be a period immediately after birth that is "sensitive, but not critical" (Bystrova et al., 2009).

Length of Stay in the Neonatal Intensive Care Unit

There is a wide range of length of stay in the Neonatal Intensive Care Unit, and the average length of stay is difficult to quantify. The average length of stay for an uncomplicated newborn in the maternity ward is 1.9 days (Kornhauser & Schneiderman, 2010). Currently, 30 percent to 35 percent of NICU admissions have a NICU length of stay of fewer than 4 days; typically the cost for those infants is bundled with the maternity payments (Kornhauser & Schneiderman, 2010). The remaining 65 percent to 70 percent of NICU admissions have an average length of stay nationwide of

approximately 20 days (Kornhauser & Schneiderman, 2010). Data from California shows an average length of stay at 20.8 days (Colby, 2006). Data for infants with a principal diagnosis of prematurity shows an average length of stay of 24.7 days (Kornhauser & Schneiderman, 2010). However, distribution of the length of stay is skewed with a long right tail, with the 90th percentile being 99 days, principally due to the advances in medical care which increase the survival of very low birthweight infants of 22-23 weeks gestation, who can have an extended length of stay (Kornhauser & Schneiderman, 2010).

In human subjects, there have been studies linking infant separation to attachment (Chang et al., 1982; Robertson, 1953a), maternal-infant proximity to maternal representations of attachment (Bialoskurski et al., 1998; Feldman et al., 2003), intensification or reduction of maternal behaviors as affected by conditions of proximity (Feldman et al., 1999), as well as studies linking the compensatory intervention of skin-to-skin contact (Bystrova et al., 2009; Feldman et al., 2003) but to date there have been no studies that have examined the association between length of time of separation due to admission to the NICU and maternal representations of attachment. A newborn baby has the capacity to interact socially with its caregivers and to influence the development of attachment to its caregivers through mutually reciprocal interaction (Brazelton, 1984). The instinctive behaviors become organized into goal-oriented systems through learning and goal-corrected feedback (Mash & Barkley, 1996). In monkeys, the attachment behavior of infants was affected by short separations from their mothers and longer separations were shown to cause a greater amount of distress (Karen, 1994). Proximity between mother and infant provides the tactile and sensory cues which activate the

release of the hormones which contribute to the maintenance phase of maternal behavior (Keverne, 1996). The duration of the maintenance phase is dependent on the frequency of sensory stimulation (Keverne, 1996). In animals and humans, the absence of social and sensory stimuli has been shown to result in an increase in anxiety and proximity-seeking behaviors, followed by feelings of despair (Keverne, 1996). Researchers (Bowlby, 1969, 1973; Bystrova et al., 2009; Feldman, Weller, et al., 1999; Graves et al., 2002; Harlow et al., 1963; Hofer, 1987; McCarthy, 1990; O'Conner et al., 2003; Shayit et al., 2003) have speculated that there is a certain point on the continuum where the highly arousing state of separation changes into the diminished activity of loss, although that elusive point has not been identified.

Data on infants in NICUs nationwide reveals that they fall into three groups based on length of stay: (a) those that are discharged from the NICU in 4 days or less; (b) those that are discharged between 5 days and the mean of 20 days; and (c) those that are discharged after the mean of 20 days (Kornhauser & Schneiderman, 2010). Approximately 30 to 35 percent of NICU admissions have a length of stay of fewer than 4 days; the remaining 65 percent to 70 percent of NICU admissions have an average length of stay of approximately 20 days. Length of stay is influenced by low birthweight, degree of prematurity, and the severity of the medical condition. Infants who are in the NICU for 4 days or less typically have birthweights of 2500 grams (5 pounds 8 ounces) and are considered full term but have had some difficulty with breathing or sucking immediately after birth. Infants who are in the NICU for 5 to 20 days typically require support for breathing and/or eating and weigh at least 2500 grams (5 pounds 8 ounces) upon discharge. The infants whose length of stay is greater than the

mean of 20 days are those with increased medical risks; including low birth weight (below 2500 grams), surgical needs, congenital abnormalities, respiratory distress, and other complications (Colby, 2006). The average length of stay in the NICU is increasing due to several factors, including: an increase in the number of late preterm infants, advances in maternal age, growth in multiple gestation births, increases in Cesarean births, and changing maternal health risk such factors such as increases in obesity, diabetes, and excessive weight gain (Kornhauser & Schneiderman, 2010). Advances in medical technologies have made survival possible for infants as young as 23-24 weeks gestation, however these infants require extended lengths of stay and intensive medical interventions. The interaction between these infants and their mothers is restricted until the infant is stable enough to be touched and held. During the time of restricted interaction, the infant and mother are not able to participate in the mutually reciprocal interaction and they are not able to experience the tactile and sensory cues that activate the hormonal changes required for the maintenance phase of maternal behavior. The reduction in the interaction of mother and infant caused by greater length of stay in the NICU would, therefore, indicate that the greater the length of stay, the greater the difficulty in establishing a secure attachment.

Summary

The nature and development of attachment has been the focus of a substantial body of work. A century ago the prevailing thought was that an infant forms an attachment to its caregiver when its primary needs are met. Ethological studies of animals have demonstrated the inborn propensity to form attachment. Through observing the physiological and behavioral events correlated to bonding, it became

evident that the feeling of security, or lack thereof, was more important than nursing in the development of attachment (Bronfenbrenner, 1968; Graves et al. 2002; Harlow et al., 1963).

Animal studies have also shed light on the neurobiological events related to maternal bonding (Blass, 1990; Insel, 2000; Keverne, 1996; Larsson, 1994; McCarthy, 1990; Peredery, et al. 1992; Shayit et al., 2003). By manipulating and studying the levels of hormones in laboratory animals, it has been shown that hormones and neuropeptides which regulate maternal activity and attachment increase sharply with the stress of separation, then gradually decrease as the length of separation increases.

Attachment representations have been shown to be affected by trauma or change in relationships (Gloger-Tippelt & Huerkamp, 1998; Lowe, 2002; Posada et al., 1999; Robertson, 1953b; Zeanah et al., 2002). Although attachment representations are fairly stable throughout life (Ainsworth et al., 1978; Main et al., 1985), a traumatic experience may alter representations of attachment.

Having an infant who is admitted to the NICU is a traumatic experience for a mother and it can result in maternal feelings of incompetence and changes in maternal behavior. Studies have focused on various maternal characteristics that may affect attachment (Huth-Bocks et al., 2004; Jacobsen et al., 2000; Koren-Karie et al., 2002; Lyons-Ruth et al., 1997; Martins & Gaffan, 2000; Peterson et al., 1998; Repacholi & Trapolini, 2004; Stams et al., 2002; van Ijzendoorn, 1995). This research suggests that maternal factors of depression, sensitivity, insightfulness, and accessibility are related to the quality of attachment. These maternal factors are also affected by the traumatic experience of an infant's admission to the NICU.

Further studies have examined the relationship between separation due to admission to the NICU and maternal attachment behaviors. (Bialoskirski, et al., 1998; Bystrova et al., 2009; Feldman, Weller et al., 1999; Feldman et al., 2003; Greenberg et al., 1973; O'Conner et al., 2003). Several variables related to separation were examined, such as immediately holding the baby after birth, breastfeeding, skin-to-skin contact, and potential loss of the baby. However, the length of stay in the NICU was not a variable included in any of these studies.

The nationwide average length of stay in the NICU is approximately 20 days, and the average length of stay in the NICU is increasing due to advances in medicine and technology. There is abundant research on the development of attachment in infants and mothers. More recently, studies have focused on maternal representations of attachment and its relationship to infant attachment. A small number of studies have examined the effect of proximity and separation on maternal representations of attachment. To date, there are no studies that examine the relationship between the length of time of separation and maternal representations of attachment.

The present study was developed to fill this gap in the literature. The researcher will explore the effect that conditions of proximity and separation have on the maternal representations of attachment as expressed in warmth/ affection, aggression/hostility, neglect/indifference, and undifferentiated rejection. The subjects will be divided into groups consisting of proximity, separation of 5 to 20 days (Separation A), and separation greater than 20 days (Separation B). It is predicted that mothers who have been separated from their infants will differ from mothers who have not been separated from their infants on a measure of maternal representations of attachment. It is predicted that

the length of separation will have an effect on maternal representations of attachment and that there will be a difference between Separation A and Separation B on maternal representations of attachment. It is also predicted that attachment style will be related to levels of parental acceptance-rejection.

Chapter III

METHOD

Subjects

Criteria for Inclusion

Because mother-infant proximity cannot be experimentally manipulated in human subjects, two groups of mothers were selected based on differences in components of proximity. Feldman, Weller et al. (1999) defined six essential components of proximity. The first component of proximity is mode of delivery, either vaginal or Cesarean. Cesarean delivery precludes immediate contact and may interfere in the process of bonding (Klaus & Kennell, 1976). The second component of proximity is nursing style: exclusive breastfeeding, partial breastfeeding, or bottle feeding. The third component is touch, which is defined as the availability of contact within the first day. The fourth component is caretaking, which refers to the mother's responsibility for caregiving activities during the first week of life. The fifth component of proximity is whether the mother and child had been separated overnight since birth. Finally, the sixth component is whether the loss of the child was implied at any point since birth. The component of loss is not included in this study. None of the infants included in this study were at risk of dying.

Subjects were divided into two groups reflecting variations in the first five

components of proximity and thus approximating the conditions of proximity and separation in the human mother. The first group (Proximity) was comprised of mothers of healthy full-term infants for whom all five components that promote attachment were present. They delivered vaginally, nursed exclusively, touched, provided full care, and maintained proximity to their infant. All infants were discharged from the hospital with their mothers within 72 hours of their birth.

The second group (Separation) included mothers of infants who had not experienced all of the five components mentioned above. These mothers had cesarean deliveries. They experienced separation from their infants, as the infants had remained hospitalized for more than 4 days due to low birthweight, respiratory distress, or feeding difficulties. They did not breastfeed, and were not able to touch their infants immediately after birth. Because these babies did stay in the NICU, mothers were not fully responsible for caregiving during that time.

Recruitment

Participants were invited to participate in the study via an informational flyer provided to mothers who were bringing their children for outpatient services at a large pediatric hospital in New Jersey. Several occupational therapists and speech therapists, who were blind to the study, asked the mothers of their patients if they would be willing to participate in the research by completing the questionnaires. If a mother agreed to participate, this researcher handed her an envelope that included a letter of introduction to the researcher and the study, a letter of informed consent, an instruction page on how to complete the questionnaire, a copy of the Maternal Parental Acceptance-Rejection Questionnaire (M-PARQ), a copy of the Relationship Questionnaire (RQ), a list of

demographic questions, and a self-addressed return envelope with no identification of the respondent. Demographic information included maternal age, education, socioeconomic status, ethnic background, marital status, employment, income, infant gender, birth order, gestational age and age at interview. The infants included in this study were approximately one year of age at the time the questionnaires were completed.

Ideally, the subjects would have been recruited through the Neonatal Intensive Care Units at various hospitals, however this researcher is not affiliated with a hospital containing a NICU and thus did not have access to a hospital population. Random selection greatly enhances generalizability to all possible mothers within the geographic region; however, due to restrictions of practicality and cost considerations of the present study, participants for this non-randomized study were a convenience sample. Exclusionary criteria included a maternal history of psychiatric disorder or serious physical illness, drug use during pregnancy, and infant illness requiring surgical intervention.

Confidentiality was insured by instructing the participants to not include their names or other identifying information on the questionnaires. The completed packet was sealed by the participant and sent to the researcher. Each completed questionnaire was assigned a number. This examiner scored each questionnaire and entered the data on a computer spreadsheet. The data were stored on a USB memory key. The returned questionnaires were stored in a lockbox cabinet.

Instruments

Mother Parental Acceptance-Rejection Questionnaire

The Mother PARQ is a self-report questionnaire where a mother responds to her

perceptions about the way she treats her child. These perceptions are measured in terms of four scales: (a) warmth/affection, (b) hostility/aggression, (c) indifference/neglect, and (d) undifferentiated rejection (Rohner, 1999). Parental acceptance-rejection is a bipolar dimension of parental behavior with acceptance (warmth) defining one end of the continuum and parental rejection defining the other (Rohner, 1999). Warmth may be expressed physically (hugging, kissing) or verbally (complimenting, praising, or saying nice things to or about one's child). Parental rejection, which is the absence or withdrawal of warmth and affection, is expressed throughout the world in three different ways: hostility/aggression, neglect/indifference, and in an undifferentiated form where the parent is rejecting without being clearly hostile/aggressive or neglecting/indifferent.

Subscale a.: Perceived Parental Warmth/Affection Scale

Warmth/affection refers to parent-child relationships where parents are perceived to give love and affection without qualification. Accepting parents are seen as liking their child, approve of his or her personality and are interested in the child's activities and well-being. Perceived parental aggression/hostility, perceived neglect/indifference, and perceived undifferentiated rejection are forms of behavior falling at the negative end of the warmth dimension. Perceived parental rejection refers to the perceived absence or significant withdrawal of warmth and affection. Parents who are rejecting seem not to like their child, disapprove of the child, resent the child and view him/her as a burden rather than a pleasure.

Subscale b.: Perceived Hostility/Aggression Scale

Hostility/aggression refers to conditions where the parents are angry, bitter or resentful, or to conditions where the child believes the parents intend to hurt him/her,

either physically or verbally. Hostile/aggressive parents are seen as impatient, irritable, or antagonistic toward the child, and make disapproving or derogatory remarks about the child. Other expressions of aggression may include rough handling, hitting, cursing at the child, or speaking in a harsh, deprecating tone.

Subscale c.: Perceived Neglect/ Indifference Scale

Neglect/indifference refers to conditions where the parents are unconcerned with the child or uninterested in him. They spend a minimum amount of time with the child and may ignore the child's requests for help, attention, or comfort. Indifferent parents are not necessarily seen to be hostile, but may be viewed as cold, distant, or unconcerned about the child's happiness or well-being.

Subscale d.: Perceived Undifferentiated Rejection Scale

Undifferentiated rejection refers to conditions where the parent withdraws warmth, but where such rejection does not clearly reflect either perceived aggression/ hostility or perceived neglect/ indifference.

The Warmth/Affection scale contains 20 items, the Hostility/Aggression scale and Neglect/Indifference scale each contain 15 items, and the Undifferentiated Rejection scale contains 10 items. Respondents are instructed to ask themselves if an item is basically true or untrue about the way they treat their children. They are to respond on a Likert-type scale, marking if an item is "almost always true" (4), only "sometimes true" (3), "rarely true" (2), or "almost never true" (1). A high score on each scale indicates low perceived warmth/affection (i.e. high perceived rejection), high perceived hostility/aggression, high perceived neglect/indifference and high perceived undifferentiated rejection.

Cross Cultural Development and Usage

The PARQ was constructed to be usable cross-culturally as well as within the United States (Rohner, 2004), and was constructed on a rational-theoretical basis (Goldberg, 1972). Cross cultural evidence (Rohner, 2004) shows that all children experience more or less acceptance-rejection at the hands of their parents. Parental acceptance and parental rejection are experienced in four principal ways throughout the world, namely as warmth/affection, hostility/aggression, neglect/indifference or as undifferentiated rejection. These may be expressed verbally or physically. Additional considerations guided the development of the instrument to be used cross-culturally. First, the scales must have universal applicability; second, the terms must have common international referents; and third, the phraseology of the items must be decentered from standard, idiomatic American English. These conditions were satisfied through Rohner's work (1975, 1986) on a cross-cultural survey using a sample of 101 societies. Test items were screened and decentered from idiomatic American English in 1971.

Analysis of Validity and Reliability of the PARQ

Formal validation procedures were applied to the Mother PARQ. Concurrent validity is a kind of predictive validity, assessed by a second, known and validated measure. Convergent validity implies that agreement exists between different measures of a single trait construct. Discriminant validity implies that two traits are distinguished from each other. Cronbach's coefficient alpha was used as the principal measure of reliability (Rohner, 1999). Coefficient alpha is a measure of internal consistency of items within a scale. A high alpha indicates that all items in a scale are internally

consistent with one another. PARQ reliability coefficients (alphas) range from .86 to .95 with a median reliability of .905. Concurrent validity of the PARQ was studied by comparing items on the PARQ with scales from Shaefer's (1964) Child's Report of Parent Behavior Inventory (CRPBI) and Bronfenbrenner's Parental Behavior Questionnaire (BPB). These were used as external (criterion) measures of concurrent validity for the four PARQ scales. All four scales were significantly related to their validation scales (Rohner, 1999). Warmth/Affection correlated with acceptance ($r^2 = .90$); Hostility/Aggression correlated with physical punishment ($r^2 = .43$); Neglect/Indifference correlated with hostile detachment ($r^2 = .86$); Undifferentiated Rejection correlated with rejection ($r^2 = .81$) (Rohner, 1999).

The Relationship Questionnaire

The Relationship Questionnaire (Bartholomew & Horowitz, 1991) is a self report checklist that describes adult attachment styles based on the work of Mary Main and her colleagues. Bartholomew and Horowitz identified four distinct attachment styles: Secure (valuing intimate relationships); Insecure-Dismissing (dismissing the value of close relationships); Insecure-Preoccupied (over-involvement in close relationships); and Insecure-Fearful (avoidance of close relationships for fear of rejection). Respondents use a 7-point Likert scale ranging from 0 ("not at all like me") to 7 ("very much like me") to indicate the degree to which each of the four categories applies to him or her, rather than choosing one prototypical form of attachment. There are four statements by which participants describe their general relationship style. After reading each statement, participants are asked to circle the one description which is most like them. Thus, respondents can be classified by their most prominent attachment style with respect to

the degree that they endorse each of the four styles. The Relationship Questionnaire is a reliable measure, with relatively high alphas from family relationships (.75 to .86) and peer relationships (.74 to .88) (Bartholomew & Horowitz, 1991). Concurrent validity on the RQ was studied by comparing a worldwide sample of the Model of Self score with Rosenberg's (1965) Self Esteem Scale. Model of Self correlated with Self Esteem (r^2 .32) (Schmitt, 2004).

The RQ was selected for inclusion in the study for several reasons. It is an innocuous and efficient manner of assessing an individual's current relationship style and its brevity was thought to be more conducive to participation in this study. Other measures of attachment were not chosen for this study. While Mains Adult Attachment Interview (AAI, Main, 1995) yields clinically rich information and has demonstrated excellent predictive validity, it is costly to administer and requires extensive training and time to administer and score. The Adult Attachment Scale (AAS, Collins & Read, 1990) was also considered because it is a valid and reliable, brief self-report measure of attachment. However, it is too narrow in its examination of attachment in that it focuses on relationships with romantic partners.

Procedure

As previously noted, mothers were contacted via an informational flyer to participate in this study. A questionnaire packet was hand-delivered to each of the mothers who agreed to participate in the study. Each packet included: a letter of introduction to the researcher and the study, a letter of informed consent, an instruction page on how to complete the questionnaire, a copy of the Maternal Parental Acceptance-Rejection Questionnaire, a copy of the Relationship Questionnaire, a list of demographic

questions, and a self-addressed return envelope with no identification of the respondent. The letter of introduction (see Appendix C) informed the participants that the research was focused on the way mothers and children interact with each other and instructed the participants to complete the packet of questionnaires and return them in the self-addressed, stamped envelope provided. Participants were instructed not to provide their names or other identifying information and they were assured that any information would be strictly confidential. The letter of introduction also stated that participation in the study was completely voluntary, and that the participants could withdraw from the study at any time.

Study Design

Hypothesis I in this study concerns the main effect of Proximity on Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection. It was predicted that the Separation group will score lower than the Proximity group on Warmth/Affection, and higher on Hostility/Aggression, Indifference/ Neglect, and Undifferentiated Rejection.

Hypothesis II in this study concerns the main effect of Length of Separation on Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection. It is predicted that as the length of separation increases, the scores on Warmth/Affection will decrease, while the scores on Hostility/Aggression, Indifference/ Neglect, and Undifferentiated Rejection will increase.

Hypothesis III concerns the main effect of relationship style on Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection. It is predicted that mothers with a secure attachment style will score higher on

Warmth/Affection and will score lower on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection.

Statistical Analyses

Hypothesis I has more than one continuous dependent variable (Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection) and a single categorical independent variable (Proximity). The groups are Separation and Proximity. Hypothesis I can be answered with a multivariate analyses of variance (MANOVA). The MANOVA analysis examined whether or not significant differences existed between the groups of Separation/Proximity on Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection (using a Wilk's Lambda test).

Length of Separation is a continuous independent variable. Length of Separation was measured in the number of days that the infant and mother were separated. Due to the very large range of length of stay in the NICU, this group was divided into two subgroups: those with a length of stay shorter than the mean for the subjects in this study, and those with a length of stay greater than the mean. The mean length of stay in the NICU for the infants in this study was 21.24 days, therefore the Separation group was divided into the subgroups of babies in the NICU from 4-20 days, and babies in the NICU for 21 days or more. This subdivision of the length of stay provided two discrete groups of infants with similar lengths of stay in the NICU, and allowed the researcher to examine the effect that Length of Separation had on the four dependent variables.

Hypothesis II has more than one continuous dependent variable (Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated

Rejection) and a single linear independent variable (Length of Separation). Hypothesis II can be answered with four simple linear regression analyses, which examined the strength of the relationship between Length of Separation and Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection.

Hypothesis III has more than one continuous dependent variable (Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection) and a single categorical independent variable (Attachment Style). The groups are Secure; Insecure-Dismissing; Insecure-Preoccupied; and Insecure-Fearful.

Hypothesis III can be answered with a multivariate analyses of variance (MANOVA). The MANOVA analysis examined if there are significant differences between the groups of Attachment Style on Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection (using a Wilk's Lambda test).

Power is the probability of rejecting the null hypothesis when it should be rejected. The following is an estimate of power and recommended sample size. Assuming a choice of alpha of .05, and an effect size of .15, a sample size of 90 gives a power estimate of .90 (Erdfelder, Faul & Buchner, 1996). Therefore, at least 90 participants (with complete responses) were included in this study. Sampling was continued until there were approximately an equal number of subjects in each group so that the F tests can be robust to violation of the equal variance assumption. Statistical tests were robust enough to avoid violation of the normality assumption as the sample size was 30 or more.

Chapter IV

RESULTS

There were 90 respondents in this study. The respondents were recruited from the population of a children's outpatient rehabilitation hospital in New Jersey. An informational flyer was posted in the waiting rooms, and mothers voluntarily completed the questionnaire packets. A total of 90 participants were included in this study.

With respect to race, 87.8% of the respondents described themselves as Caucasian, 6.7% described themselves as African American, 4.4 % described themselves as a more specific group (Arab), and 1.1% described themselves as Other. The majority of the respondents, 97.8%, reported English as their primary language, 2.2% reported Other. Regarding employment status, 40% were Employed Part-Time, 37.8% were Unemployed Not Looking For Work, 20% were Employed Full Time, 1.1% were Unemployed Looking for Work, and 1.% were Other. The majority of the respondents, 53.3%, reported their religious affiliation as Catholic, 22.2% reported None, 10% reported Christian, 4.4% were Jewish, 4.4% were Methodist, 2.2% were Baptist, 2.2% were Muslim, and 1.15 reported Not Applicable. A strong majority (88.9%) was Married and Living With Husband, 6.7% was Not Married But Living With Partner, 2.2% was Not Married and Living Without Partner, 1.1% was Separated, and 1.1% was Other. Regarding income among the respondents, 3.3% earned less than \$15,000, and 2.2% earned \$16,000-30,000, 10% earned \$31,000-

45,000 20% , 15.6% earned \$46,000-60,000, 15.6% earned \$61,000-75,000, 20% earned \$76,000-90,000, 8.9% earned \$91,000-105,000, 20% earned \$106,000-120,000, 4.4% earned over \$121,000 per year. This was a highly educated sample, with a total of 73.4% of the respondents having a college or graduate degree. A slight majority of the babies 53.3%, were boys while 46.7% were girls. A slight majority of the sample were Full Term (53.3%) while 46.7% were Premature. There was an even distribution of delivery method, with 50% each Vaginal Delivery and Cesarean delivery. Subsequently, there was an even distribution of Admission to NICU, with 50% of the babies being admitted to the NICU, and 50% of the babies staying with the mother.

Creation of Composite Scores

The Mother Parental Acceptance Rejection Questionnaire (PARQ) subscale scores were created using the procedures outlined in the Parental Acceptance Rejection Questionnaire Manual (Rohner, 1999). The overall Parental Acceptance Rejection Score was derived by first calculating the four subscales (Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection). The scores for Warmth/Affection were reverse coded so that higher scores indicated less of those tendencies when combined into the Total PARQ score. The Attachment Style scores were derived using the procedure described in the Relationship Questionnaire Manual (Bartholomew & Horowitz, 1991).

Results

Effect of Proximity and Separation on Measures of Parental Acceptance-Rejection

Table 12 displays the descriptive statistics for PARQ by Proximity and Separation. The means for Separation and Proximity were very similar on Warmth/Aggression, Indifference/Neglect, and Undifferentiated rejection. The means for Separated and Proximity differed most on Hostility/Aggression, where the Separated group was the highest. For Warmth/Affection, the Separated group score was $M = 77.78$, $SD = 2.90$; the Proximity group score was $M = 77.60$, $SD = 2.10$. For Hostility/Aggression, the Separated group score was $M = 26.44$, $SD = 6.20$; the Proximity group score was $M = 23.16$, $SD = 4.36$. For Indifference/Neglect, the Separated group score was $M = 19.76$, $SD = 5.28$; the Proximity group score was $M = 18.84$, $SD = 3.05$. For Undifferentiated Rejection, the Separated group score was $M = 13.82$, $SD = 1.86$; the Proximity group score was $M = 13.38$, $SD = 1.90$.

A Multivariate Analysis of Variance (MANOVA) was used to examine if there are differences between the groups of the independent variable Proximity/Separation on the several dependent variables of Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. MANOVA produces an overall significance test (Wilk's Lambda) for differences between groups. This was nonsignificant, $F(4, 85) = 2.38$, $p = .058$. There is no overall difference between the groups on Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. In addition to the multivariate Wilke's lambda test, MANOVA output gives univariate F tests for each dependent

variable separately. When there are more than two groups on the independent variable, such as when Proximity is compared to the two Separation groups, post hoc comparisons were used to examine which groups were significantly different from one another.

Table 13 displays the univariate F tests. Each is a test of significant difference between groups on Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. The univariate F test was significant only for the variable F Hostility/Aggression ($F(6, 96) = 8.46, p = .005$). It was nonsignificant for Warmth/Affection $F(1, 90) = .11, p = .740$, Indifference/Neglect $F(1, 90) = 1.01, p = .319$, and Undifferentiated Rejection $F(1, 90) = 1.26, p = .265$. The overall test was nonsignificant.

Due to the large range of the number of days the babies were separated from their mothers, the Separation group has been further divided into “Separation A” and “Separation B” groups. Descriptive statistics of the groups Proximity, Separation A and Separation B are given in Table 14. The group means differed on several variables. On Warmth/Affection, the group means from highest to lowest were: Separation A $M = 78.55, SD = 2.08$; Proximity $M = 77.6, SD = 2.10$; and Separation B $M = 76.38, SD = 3.65$. On Hostility/Aggression the group means from highest to lowest were: Separation A $M = 26.55, SD = 6.98$; Separation B $M = 26.25, SD = 4.70$; and Proximity $M = 23.16, SD = 4.36$. On Indifference/Neglect the group means from highest to lowest were: Separation B $M = 22.5, SD = 6.23$; Proximity $M = 18.84, SD = 3.05$; Separation A $M = 18.24, SD = 4.05$. There were very small differences between groups on Undifferentiated Rejection: Separation A $M = 13.83,$

$SD = 2.25$; Separation B $M = 13.81$, $SD = .83$; Proximity $M = 13.38$, $SD = 1.90$. Of concern is that the group sample sizes differ markedly, which suggests that the usual statistical tests may not give reliable results as the homogeneity of variance assumption has been violated. Therefore the Kruskal-Wallis test was used to evaluate the three groups of Proximity, Separation A, and Separation B on the given variables of Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. The Kruskal-Wallis test can be used when the assumptions of MANOVA have not been met (for example, equal variances and linearity of the data). The Kruskal-Wallis is calculated as follows: On each variable, the computer ranks all of the scores from lowest to highest, regardless of group membership. Then the computer calculates the average of the ranks for each group. These scores are not measurements of the variables (warmth/affection, etc.), but reflect the rank order in the data file. If the null hypothesis (that there is no difference between the groups) were true, then the average of the ranks within the groups would be equal. If the null hypothesis is false then the groups do not all have the same average rank. The Kruskal-Wallis test follows a chi-square distribution. The average rank statistic is useful for seeing which groups were higher or lower when the chi-square statistic was significant.

Table 15 shows the sample size (N) and average rank for Proximity, Separation A, and Separation B. For Warmth/Affection, Separation A had the highest rank, followed by Proximity, then Separation B. For Hostility/Aggression, Separation B had the highest rank, followed by Separation A and then Proximity. For Indifference/Neglect, Separation B had the highest rank, followed by Proximity, then

Separation A. For Undifferentiated Rejection, Separation B had the highest rank, followed by Separation A, then Proximity.

The Kruskal-Wallis chi-square test was used to evaluate if the difference among mean ranks were statistically significant (Table 16). The chi-square statistic was significant for Warmth/Affection $X^2(2, N = 90) = 7.79, p = .05$, and Hostility/Aggression $X^2(2, N = 90) = 8.02, p = .05$, which suggests that there were significant differences among the Proximity, Separation A and Separation B groups on these variables. It was not significant for Indifference/Neglect $F(2, N = 90) = 5.39, p = .068$, or Undifferentiated Rejection $F(2, N = 90) = 1.66, p = .436$.

Further testing is required to evaluate which groups differ on Warmth/Affection and Hostility/Aggression. The Mann Whitney U is a nonparametric statistical method that is used to evaluate the difference between two independent groups. Table 17 shows the difference between Proximity and Separation A on each variable. The difference between Proximity and Separation A was statistically significant on Warmth/Affection ($Z = -2.14, p < .05$), and Hostility/Aggression ($Z = -2.255, p < .05$). Recall that the mean rank of Separation A was higher than Proximity on both variables.

Table 18 shows the difference between Proximity and Separation B on each variable. There was a significant difference between Proximity and Separation B on Hostility/Aggression ($Z = -2.42, p < .05$). Recall that the mean rank of Separation B was higher than Proximity on Hostility/Aggression.

Table 19 shows the difference between Separation A and Separation B on each variable. There was significant difference between the Separation groups on

Warmth/Affection ($Z = -2.676, p < .01$). Recall that the mean rank of Separation A was higher than Separation B on Warmth/Affection.

Therefore, Hypothesis I was partially supported by this data. There were significant differences among the Proximity/Separation groups on the dependent variables of Warmth/Affection and Hostility/Aggression. There was not a significant difference among the Proximity/Separation groups on Indifference/Neglect and Undifferentiated Rejection. Specifically, on Warmth/Affection, there was a significant difference between Proximity and Separation A. Separation A was higher. On Warmth/Affection there was a significant difference between Separation A and Separation B. Separation A was higher. On Hostility/Aggression there was a significant difference between Proximity and Separation A. Separation A was higher. On Hostility/Aggression there was a significant difference between Proximity and Separation B. Separation B was higher.

Length of Separation on Measures of Parental Acceptance-Rejection

A linear regression analysis was used to test if there is a relationship between the independent predictor variable (Days Separated) and the continuous dependent variables of Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. Table 20 shows the Pearson correlation between length of separation and each variable of Warmth/Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection. There was a significant negative correlation between Days Separated and Warmth/Affection ($r = -.35, p < .001$). The negative relationship implies that the higher scores on Days Separated correspond with lower scores on Warmth/Affection. There was a significant positive

correlation between Days Separated and Hostility/Aggression ($r = .33, p < .01$). Higher scores on Days Separated correspond with higher scores on Hostility/Aggression. There was not a significant correlation between Days Separated and Indifference/Neglect ($r = .13, p = n.s.$) or Undifferentiated Rejection ($r = .11, p = n.s.$). The Pearson correlation alone cannot be used to evaluate the hypothesis, as the Pearson correlations are descriptive statistics. Further analysis was used to evaluate if the independent variable was a significant predictor of the dependent variable.

Table 21 is the model summary which shows the proportion of variance in Warmth/Affection that was predictable from Days Separated. Table 22 shows the linear regression for Warmth/Affection on Days Separated. The overall F test was significant ($F(1, 88) = 12.6, p < .001$), accounting for 12.6% of the variance ($R = .35$). Table 23 shows the regression coefficients for Warmth/Affection on Days Separated. Days Separated was a significant predictor of Warmth/Affection, with a negative relationship between Days Separated and Warmth/Affection ($B = -.35, p < .001$). As Days Separated increased, the scores on Warmth/Affection decreased.

Table 24 is the model summary which shows the proportion of variance in Hostility/Aggression that was predictable from Days Separated. Table 25 shows the linear regression for Hostility/Aggression on Days Separated. The overall F test was significant ($F(1, 88) = 10.6, p < .01$), accounting for 10.7% of the variance ($R = .33$). Table 26 shows the regression coefficients for Hostility/Aggression on Days Separated. Days Separated was a significant predictor of Hostility/Aggression, with a positive relationship between Days Separated and Hostility/Aggression ($B = .33, p$

<.01). As Days Separated increased, the scores on Hostility/Aggression increased.

Table 27 is the model summary which shows the proportion of variance in Indifference/Neglect that was predictable from Days Separated. Table 28 shows the linear regression for Indifference/Neglect on Days Separated. The overall F test was nonsignificant ($F(1, 88) = 1.6, p = n.s.$), accounting for 1.8% of the variance ($R = .13$). Table 29 shows the regression coefficients for Indifference/Neglect on Days Separated. Days Separated was not a significant predictor of Indifference/Neglect ($B = .13, p = n.s.$).

Table 30 is the model summary which shows the proportion of variance in Undifferentiated Rejection that was predictable from Days Separated. Table 31 shows the linear regression for Undifferentiated Rejection on Days Separated. The overall F test was nonsignificant ($F(1, 88) = 1.14, p = n.s.$), accounting for 1.3% of the variance ($R = .11$). Table 32 shows the regression coefficients for Undifferentiated Rejection on Days Separated. Days Separated was not a significant predictor of Undifferentiated Rejection ($B = .11, p = n.s.$).

Hypothesis II predicted that Length of Separation had an effect on the measures of Parental Acceptance-Rejection. Hypothesis II was partially supported by these results. The prediction that as Length of Separation (Days Separated) increases, the scores on Warmth/Affection will decrease was supported ($B = -.35, p < .001$). The prediction that as the Length of Separation increases, the scores on Hostility/Aggression will increase was also supported ($B = .33, p < .01$). However, the prediction that as the Length of Separation increases, the scores on Indifference/ Neglect will increase was not supported ($B = .13, p = n.s.$). The prediction that as the Length of Separation increases, the scores

on Undifferentiated Rejection will increase was not supported ($B = .11, p = n.s.$).

Attachment Style and Measures of Parental Acceptance-Rejection

Table 33 shows the descriptive statistics for the variables on the PARQ by four attachment styles: Secure, Insecure-Dismissing, Insecure-Preoccupied and Insecure Fearful. The Insecure groups have a very low sampling. For Preoccupied, the sample size of two is inadequate to calculate formal statistical tests. The sample size for Fearful and Dismissing are also very low, at 9 and 15, respectively. Given these concerns the Insecure-Dismissing, Insecure-Preoccupied and Insecure-Fearful groups were collapsed into one Insecure group, so the scores may be compared with the Secure group. The resulting table of descriptive statistics is presented in Table 34. On Warmth/Affection, the Secure attachment group, $M = 76.36, SD = 2.29$ was higher than the Insecure attachment group $M = 76.04, SD = 2.32$. On Hostility/Aggression, there was a very slight difference where Insecure $M = 24.69, SD = 5.61$ was higher than Secure $M = 24.84, SD = 5.62$. On Indifference/Neglect, the Secure group $M = 19.62, SD = 4.76$ was higher than the Insecure Group $M = 18.5, SD = 2.85$. On Undifferentiated Rejection, the Insecure group $M = 14.5, SD = 1.88$ was higher than the Secure group $M = 13.23, SD = 1.77$.

Each of the corresponding Levene's test was nonsignificant (Table 35), suggesting that the equal variance assumption was not violated, thus a parametric test could be used. The MANOVA shown in Table 36, was statistically significant $F(4, 85) = 8.81, p = .000$. Table 37 show that the difference between Secure and Insecure was significant for Warmth/Affection $F(1, 88) = 18.82, p < .000$ and Undifferentiated rejection $F(1, 88) = 9.13, p < .01$. Recall that Secure was higher

than Insecure on Warmth/Affection. Insecure was higher than Secure on Undifferentiated Rejection. There was no significant difference between Secure and Insecure on Hostility/Aggression $F(1, 88) = .02, p = n.s.$ and Indifference/Neglect $F(1, 88) = 1.26, p = n.s.$

Therefore, the hypothesis that there would be a significant difference between the groups of Secure attachment and Insecure attachment on the scales of the Parental Affection Rejection Questionnaire was supported by this data. There was a significant difference between groups on the Warmth/Affection scale, $F(1, 88) = 18.82, p < .000$. Secure was higher than Insecure. There was significant difference between groups on the Undifferentiated Rejection scale, $F(1, 88) = 9.11, p < .01$. Insecure was higher than Secure.

Table 1

Ethnicity

	Frequency	Percent	Valid Percent	Cumulative Percent
African American	6	6.7	6.7	6.7
Caucasian	79	87.8	87.8	94.4
A More Specific Group	4	4.4	4.4	98.9
Other	1	1.1	1.1	100.0
Total	90	100.0	100.0	

Table 2

Language

	Frequency	Percent	Valid Percent	Cumulative Percent
English	88	97.8	97.8	97.8
Other	2	2.2	2.2	100.0
Total	90	100.0	100.0	

Table 3

Employment

	Frequency	Percent	Valid Percent	Cumulative Percent
Unemployed, not looking for work	34	37.8	37.8	37.8
Unemployed, looking for work	1	1.1	1.1	38.9
Employed part-time	36	40.0	40.0	78.9
Employed full time	18	20.0	20.0	98.9
Other	1	1.1	1.1	100.0
Total	90	100.0	100.0	

Table 4

Religion

	Frequency	Percent	Valid Percent	Cumulative Percent
Baptist	2	2.2	2.2	2.2
Catholic	48	53.3	53.3	55.6
Christian	9	10.0	10.0	65.6
Jewish	4	4.4	4.4	70.0
Methodist	4	4.4	4.4	74.4
Muslim	2	2.2	2.2	76.7
N/A	1	1.1	1.1	77.8
None	20	22.2	22.2	100.0
Total	90	100.0	100.0	

Table 5

Marital Status

	Frequency	Percent	Valid Percent	Cumulative Percent
Married and living with husband	80	88.9	88.9	88.9
Not married but living with partner	6	6.7	6.7	95.6
Not married and living without partner	2	2.2	2.2	97.8
Separated	1	1.1	1.1	98.9
Other	1	1.1	1.1	100.0
Total	90	100.0	100.0	

Table 6

Income(k = \$1,000)

	Frequency	Percent	Valid Percent	Cumulative Percent
0-15k	3	3.3	3.3	3.3
16-30k	2	2.2	2.2	5.6
31-45k	9	10.0	10.0	15.6
46-60k	14	15.6	15.6	31.1
61-75k	14	15.6	15.6	46.7
76-90k	18	20.0	20.0	66.7
91-105k	8	8.9	8.9	75.6
106-120k	18	20.0	20.0	95.6
121k +	4	4.4	4.4	100.0
Total	90	100.0	100.0	

Table 7

Gender of Baby

	Frequency	Percent	Valid Percent	Cumulative Percent
Boy	48	53.3	53.3	53.3
Girl	42	46.7	46.7	100.0
Total	90	100.0	100.0	

Table 8

Prematurity

	Frequency	Percent	Valid Percent	Cumulative Percent
Premature	42	46.7	46.7	46.7
Not Premature	48	53.3	53.3	100.0
Total	90	100.0	100.0	

Table 9

Educational Degree

	Frequency	Percent	Valid Percent	Cumulative Percent
	2	2.2	2.2	2.2
B.A.	33	36.7	36.7	38.9
Diploma	1	1.1	1.1	40.0
High school	21	23.3	23.3	63.3
M.A.	24	26.7	26.7	90.0
M.A. Ed.S.	1	1.1	1.1	91.1
M.S.	5	5.6	5.6	96.7
Ph.D.	3	3.3	3.3	100.0
Total	90	100.0	100.0	

Table 10

Delivery Method

	Frequency	Percent	Valid Percent	Cumulative Percent
C-Section	45	50.0	50.0	50.0
Vaginal	45	50.0	50.0	100.0
Total	90	100.0	100.0	

Table 11

Admission to NICU

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	45	50.0	50.0	50.0
No	45	50.0	50.0	100.0
Total	90	100.0	100.0	

Table 12

Descriptive Statistics for PARQ by Proximity and Separation

	Proximity and Separation Groups	Mean	Std. Deviation	N
Warmth/Affection	Separated	77.78	2.899	45
	Proximity	77.60	2.104	45
	Total	77.69	2.520	90
Hostility/Aggression	Separated	26.44	6.203	45
	Proximity	23.16	4.364	45
	Total	24.80	5.583	90
Indifference/Neglect	Separated	19.76	5.284	45
	Proximity	18.84	3.045	45
	Total	19.30	4.312	90
Undifferentiated Rejection	Separated	13.82	1.862	45
	Proximity	13.38	1.898	45
	Total	13.60	1.883	90

Table 13

Univariate Tests of PARQ by Separation and Proximity

Source	Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Separation	Warmth/Affection	.711	1	.711	.111	.740
Proximity	Hostility/Aggression	243.378	1	243.378	8.462	.005
	Indifference/Neglect	18.678	1	18.678	1.005	.319
	Undifferentiated Rejection	4.444	1	4.444	1.257	.265

Table 14

Descriptive Statistics for PARQ by Proximity and Two Separation Groups

	Proximity and Two Separation Groups	Mean	Std Deviation	N
Warmth/Affection	Proximity	77.60	2.104	45
	Separation A	78.55	2.080	29
	Separation B	76.38	3.649	16
	Total	77.69	2.520	90
Hostility/Aggression	Proximity	23.16	4.364	45
	Separation A	26.55	6.972	29
	Separation B	26.25	4.698	16
	Total	24.80	5.583	90
Indifference/Neglect	Proximity	18.84	3.045	45
	Separation A	18.24	4.050	29
	Separation B	22.50	6.229	16
	Total	19.30	4.312	90
Undifferentiated Rejection	Proximity	13.38	1.898	45
	Separation A	13.83	2.253	29
	Separation B	13.81	.834	16
	Total	13.60	1.883	90

Table 15

Ranks for PARQ by Proximity and Two Separation Groups

	Three Groups	N	Mean Rank
Warmth/Affection	Proximity	45	42.83
	Separation A	29	55.57
	Separation B	16	34.75
	Total	90	
Hostility/Aggression	Proximity	45	37.73
	Separation A	29	53.21
	Separation B	16	53.38
	Total	90	
Indifference/Neglect	Proximity	45	46.22
	Separation A	29	38.16
	Separation B	16	56.78
	Total	90	
Undifferentiated	Proximity	45	42.02
Rejection	Separation A	29	48.88
	Separation B	16	49.16
	Total	90	

Table 16

Kruskal Wallis Tests for PARQ by Proximity and Two Separation Groups

	Chi-square	df	Sig.
Warmth/Affection	7.974	2	.019
Hostility/Aggression	8.015	2	.018
Indifference/Neglect	5.387	2	.068
Undifferentiated Rejection	1.662	2	.436

Table 17

Mann-Whitney Tests for PARQ by Proximity and Separation A

	Mann-Whitney U	Z	Sig.
Warmth/Affection	468.000	-2.140	.032
Hostility/Aggression	449.500	-2.255	.024
Indifference/Neglect	519.000	-1.493	.136
Undifferentiated Rejection	570.000	-.927	.354

Table 18

Mann-Whitney Tests for PARQ by Proximity and Separation B

	Mann-Whitney U	Z	Sig.
Warmth/Affection	295.500	-1.075	.282
Hostility/Aggression	213.500	-2.417	.016
Indifference/Neglect	259.000	-1.668	.095
Undifferentiated Rejection	286.000	-1.255	.210

Table 19

Mann-Whitney Tests for PARQ by Separation A and B

	Mann-Whitney U	Z	Sig.
Warmth/Affection	124.500	-2.676	.007
Hostility/Aggression	211.500	-.491	.623
Indifference/Neglect	152.500	-1.903	.057
Undifferentiated	216.500	-.378	.706
Rejection			

Table 20

Correlations Among PARQ Variables and Length of Separation

		Days Separated	Warmth/ Affection	Hostility/ Aggression	Indifference/ Neglect	Undifferentiated Rejection
Days Separated	Corr.	1	-.354	.328	.132	.113
	Sig.		.001	.002	.213	.290
Warmth/Affection	Corr.	-.354	1	-.242	-.123	-.325
	Sig.	.001		.022	.250	.002
Aggression/Hostility	Corr.	.328	-.242	1	.289	.492
	Sig.	.002	.022		.006	.000
Indifference/Neglect	Corr.	.132	-.123	.289	1	.278
	Sig.	.213	.250	.006		.008
Undifferentiated/ Rejection	Corr.	.113	-.325	.492	.278	1
	Sig.	.290	.002	.000	.008	

Table 21

Model Summary for Warmth/Affection on Days Separated

R	R Square	Adjusted R Square	Std. Error of the Estimate
.354	.126	.116	2.370

Table 22

Linear Regression for Warmth/Affection on Days Separated

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	71.015	1	71.015	12.643	.001
Residual	494.274	88	5.617		
Total	565.289	89			

Table 23

Regression Coefficients for Warmth/Affection on Days Separated

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Days Separated	-.052	.015	-.354	-3.556	.001

Table 24

Model Summary for Hostility/Aggression on Days Separated

R	R Square	Adjusted R Square	Std. Error of the Estimate
.328	.107	.097	5.305

Table 25

Linear Regression for Hostility/Aggression on Days Separated

	Sum of Squares	df	Mean Square	F	Sig.
Regression	298.025	1	298.025	10.591	.002
Residual	2476.375	88	28.141		
Total	2774.400	89			

Table 26

Regression Coefficients for Hostility/Aggression on Days Separated

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
Days Separated	.107	.033	.328	3.254	.002

Table 27

Model Summary for Indifference/Neglect on Days Separated

R	R Square	Adjusted R Square	Std. Error of the Estimate
.132	.018	.006	4.298

Table 28

Linear Regression for Indifference/Neglect on Days Separated

	Sum of Squares	df	Mean Square	F	Sig.
Regression	29.025	1	29.025	1.571	.213
Residual	1625.875	88	18.476		
Total	1654.900	89			

Table 29

Regression Coefficients for Indifference/Neglect on Day Separated

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Days Separated	.033	.027	.132	1.253	.213

Table 30

Model Summary for Undifferentiated Rejection on Days Separated

R	R Square	Adjusted R Square	Std. Error of the Estimate
.113	.013	.002	1.882

Table 31

Linear Regression for Undifferentiated Rejection on Days Separated

	Sum of Squares	df	Mean Square	F	Sig.
Regression	4.018	1	4.018	1.135	.290
Residual	311.582	88	3.541		
Total	315.600	89			

Table 32

Regression Coefficients for Undifferentiated Rejection on Days Separated

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Days Separated	.012	.012	.113	1.065	.290

Table 33

Descriptive Statistics for PARQ by Four Attachment Styles

	Attachment Style	Mean	Std. Deviation	N
Warmth/Affection	Secure	78.36	2.291	64
	Insecure - Dismissing	76.13	2.416	15
	Insecure - Preoccupied	80.00	.000	2
	Insecure - Fearful	75.00	1.225	9
	Total	77.69	2.520	90
Hostility/Aggression	Secure	24.84	5.615	64
	Insecure - Dismissing	24.07	5.257	15
	Insecure - Preoccupied	16.00	.000	2
	Insecure - Fearful	27.67	4.528	9
	Total	24.80	5.583	90
Indifference/Neglect	Secure	19.62	4.763	64
	Insecure - Dismissing	17.27	2.219	15
	Insecure - Preoccupied	17.00	.000	2
	Insecure - Fearful	20.89	2.619	9
	Total	19.30	4.312	90
Undifferentiated	Secure	13.23	1.771	64
Rejection	Insecure - Dismissing	14.87	1.642	15
	Insecure - Preoccupied	13.00	.000	2
	Insecure - Fearful	14.22	2.333	9

Descriptive Statistics for PARQ by Four Attachment Styles

	Attachment Style	Mean	Std. Deviation	N
Warmth/Affection	Secure	78.36	2.291	64
	Insecure - Dismissing	76.13	2.416	15
	Insecure - Preoccupied	80.00	.000	2
	Insecure - Fearful	75.00	1.225	9
	Total	77.69	2.520	90
Hostility/Aggression	Secure	24.84	5.615	64
	Insecure - Dismissing	24.07	5.257	15
	Insecure - Preoccupied	16.00	.000	2
	Insecure - Fearful	27.67	4.528	9
	Total	24.80	5.583	90
Indifference/Neglect	Secure	19.62	4.763	64
	Insecure - Dismissing	17.27	2.219	15
	Insecure - Preoccupied	17.00	.000	2
	Insecure - Fearful	20.89	2.619	9
	Total	19.30	4.312	90
Undifferentiated	Secure	13.23	1.771	64
Rejection	Insecure - Dismissing	14.87	1.642	15
	Insecure - Preoccupied	13.00	.000	2
	Insecure - Fearful	14.22	2.333	9
	Total	13.60	1.883	90

Table 34

Descriptive Statistics for PARQ by Attachment Style

	Attachment Style	Mean	Std. Deviation	N
Warmth/Affection	Insecure Attachment	76.04	2.323	26
	Secure Attachment	78.36	2.291	64
	Total	77.69	2.520	90
Hostility/Aggression	Insecure Attachment	24.69	5.613	26
	Secure Attachment	24.84	5.615	64
	Total	24.80	5.583	90
Indifference/Neglect	Insecure Attachment	18.50	2.846	26
	Secure Attachment	19.62	4.763	64
	Total	19.30	4.312	90
Undifferentiated	Insecure Attachment	14.50	1.881	26
Rejection	Secure Attachment	13.23	1.771	64
	Total	13.60	1.883	90

Table 35

Levene's Tests for PARQ by Attachment Style

	F	df1	df2	Sig.
Warmth/Affection	.011	1	88	.915
Hostility/Aggression	.193	1	88	.662
Indifference/Neglect	3.632	1	88	.060
UndifferentiatedRejection	.039	1	88	.844

Table 36

MANOVA for PARQ Variables by Attachment Style

Effect	Wilk's Lambda	F	Hypothesis df	Error df	Sig.
Attachment	.707	8.811	4.000	85.000	.000

Table 37

Univariate Tests for PARQ by Attachment

Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Attachment Warmth/Affection	99.593	1	99.593	18.820	.000
Hostility/Aggression	.424	1	.424	.013	.908
Indifference/Neglect	23.400	1	23.400	1.262	.264
Undifferentiated Rejection	29.616	1	29.616	9.113	.003

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

Current advances in medical care have greatly improved the survival of very premature babies as young as 22 to 23 weeks gestational age. Advances in medical care and technology have also increased the number of preterm babies due to advances in maternal age, growth in multiple gestation births, increases in the number of Cesarean births and changes in maternal health risks. These factors combine to create a growing population of infants who are admitted to the NICU, along with an increase in the average length of stay.

There has been a history of study of prematurity and its sequelae (Hornby & Seligman, 1991; MacFadyen, 1994; Wilson, 2001; Woody, 1993). The life-saving medical care and treatment provided in the NICU has made survival possible for an increasing number of preterm babies. However, admission to the NICU interrupts the natural course of interaction immediately following birth. Babies admitted to the NICU are separated from their mothers, and those mothers and babies do not experience the post-partum behaviors that occur immediately after a normal, healthy birth. In the event of separation, the attachment between mother and baby develops along a different trajectory.

Attachment style in babies has long been studied (Ainsworth, 1963, 1978). More recently studies have focused on the mother-infant attachment, both the neurobiological effects (Graves, et. al., 2002; Keverne, 1996; Shayit, et al., 2003) as well as the behavioral interactions (Bialokursky et al., 1998; Bystrova, et. al., 2009; Feldman, Weller et al., 1999; Feldman, et al., 2003).

To date there are no studies that have examined the association between length of time of separation due to admission to the NICU and maternal representations of attachment. This study was designed to explore the effect that infant-mother proximity and separation may have on mothers' mental representations of their relationship to their babies. This research investigated the following questions: When comparing mothers who have been separated from their infants due to admission to the NICU with mothers who have experienced no separation from their infants, is maternal representation of attachment (as described by the four scales of Warmth/ Affection, Hostility/ Aggression, Indifference/Neglect, and Undifferentiated Rejection) influenced by early infant-mother proximity or separation? Is there a directional relationship between the length of time of the separation and level of maternal representation of attachment, as described by the four scales of Warmth/ Affection, Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection? Is there a relationship between self-report of previous relationship style and maternal representations of attachment?

It was predicted in Hypothesis I that a mother's proximity to, or separation from, her infant would have an effect on the four measures of maternal representation of attachment of Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. It was predicted that the Separation group would score lower

than the Proximity group on Warmth/Affection. It was predicted that the Separation group would score higher than the proximity group on Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection. The Separation group was further divided into Separation A, which was comprised of those infants who were in the NICU for less than 20 days, and Separation B, which was comprised of those infants who were in the NICU for longer than 20 days.

It was predicted in Hypothesis II that length of separation would affect scores on the four measures of maternal representations of attachment. It was predicted that as the length of separation increases, the scores on Warmth/Affection would decrease. It was predicted that as length of separation increases, the scores on Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection would increase.

It was predicted in Hypothesis III that the mother's attachment style would affect the scores on the four measures of maternal representations of attachment. It was predicted that mothers with a secure attachment style would score higher than mothers with an insecure attachment style on Warmth/Affection. It was predicted that mothers with a secure attachment style would score lower than mothers with an insecure attachment style on Hostility/Aggression, Indifference/Neglect, and Undifferentiated Rejection.

Hypothesis I was partially supported by the results of this study. There were significant differences between the Proximity/Separation groups on the dependent variables of Warmth/Affection and Hostility/Aggression. Specifically, on Warmth/Affection, there was a significant difference between the mean rank of

Proximity, Separation A, and Separation B. Separation A had the highest score, followed by Proximity, and then Separation B. This shows that mothers who were separated from their babies for less than 20 days reported a higher level of warmth and affection than mothers who were not separated from their babies. However, mothers who were separated from their babies for more than 20 days reported the lowest levels of warmth and affection. On Hostility/Aggression there was a significant difference between the mean rank of Proximity, Separation A, and Separation B. Separation B had the highest score, followed by Separation A, then Proximity. This indicates that the mothers who were separated from their babies for less than 20 days reported a higher level of hostility and aggression than the mothers who were not separated from their babies. However, mothers who were separated from their babies for more than 20 days reported the highest levels of hostility and aggression. There was not a significant difference between the Proximity/Separation groups on either Indifference/Neglect or Undifferentiated Rejection.

Hypothesis II was partially supported by the results of this study. As the length of separation increased, the scores on Warmth/Affection decreased. As the length of separation increased, the scores on Hostility/Aggression increased. This indicates that as the length of time of the separation increased, the mothers reported lower levels of warmth and affection, while they reported higher levels of hostility and aggression. However, there was no significant change in scores for Indifference/Neglect or Undifferentiated Rejection.

Hypotheses III was partially supported by the results of this study. The Secure group was higher than the Insecure group on the scores of Warmth/Affection. The

Insecure group was higher than the Secure group on Undifferentiated Rejection. This indicates that mother who had secure attachment style tended to report more feelings of warmth and affection for their babies, while mothers who had an insecure attachment style reported more feelings of undifferentiated rejection. There were no significant differences on Hostility/Aggression or Indifference/Neglect. The following discussion will examine these findings in more detail.

Integration of the Findings

The Relationship Between Proximity/Separation and Warmth/Affection

In this study, Warmth/Affection was affected by Proximity/Separation. The Separation A group had the highest score, followed by the Proximity group, then the Separation B group. Therefore, the level of Warmth/Affection that was felt by the mothers toward their infants was at a high level among the Proximity group, increased to a higher level in the Separation A group, and decreased to a level which was the lowest in the Separation B group. This effect follows the intensification-reduction pattern of maternal behavior during separation that has been found in studies of maternal behavior of humans (Feldman, Weller et. al., 1999; Robertson, 1953b), as well as animals (Carlson, 1994; Harlow et. al., 1963; Hofer, 1997; Keverne, 1996; Larsson, 1994). Bowlby (1982) hypothesized that a majority of maternal behavior is a stress reaction, designed to reduce the stress of separation. The primary motivation is to reduce the distance between infant and mother, thus keeping the infant in close physical proximity. Maternal behavior that has been observed in both humans and animals includes repetitive checking, touching, cleaning, and retrieval behavior with the goal of keeping the young close to the mother. In this

study, mothers had the most intense feelings of warmth and affection during the initial separation from their infants. During that time, the mothers felt recurrent thoughts of the baby, with an “exclusive mental focus” (Winnicott, 1956) on the baby. This heightened feeling of warmth and affection serves to keep the mother close to the baby.

The Relationship Between Proximity/Separation and Hostility/Aggression

In this study, Hostility/Aggression was affected by Proximity/Separation. The Separation A group had the highest score, followed by the Separation B group, then by the Proximity group. Therefore, the level of Hostility/Aggression that was felt by mothers toward their babies was at a low level in the Proximity group, increased to the highest level in the Separation A group and decreased slightly in the Separation B group. This effect follows the intensification pattern of behaviors during separation, discussed in the previous section. However, interaction with the infant is required in order to stimulate the biobehavioral regulators that influence the continuation of maternal behavior. In this study, the mothers who were separated from their infants for more than 20 days did not experience interaction with their babies for an extended period of time; therefore, the normal maternal behaviors did not develop, and the feelings of hostility and aggression tended to remain at a high level as the length of separation increased.

This researcher was intrigued by the result that both Warmth/Affection and Hostility/Aggression were the highest during the initial phase of separation. It could be that the stress of having a baby admitted to the NICU intensifies emotional experience in general, and that mothers reported increased awareness of a variety of

feelings. It is interesting to note that on the raw data, all of the mothers rated themselves very high in Warmth/Affection, regardless of how they rated themselves on Hostility/Aggression, Indifference/Neglect, or Undifferentiated Rejection. It appears that all the mothers in this study felt they were warm and affectionate toward their child. This could be related to the nature of self-report. The questions on the PARQ which rated Warmth/Affection were overtly positive, such as "I make my child feel wanted and needed" and "I am interested in the things my child does." The majority of the questions on the Warmth/Affection scale were scored "Almost always true" by all the mothers in the study. Questions which rated Hostility/Aggression, such as, "I am irritable with my child," and "I nag or scold my child when he/she is bad," prompted a range of responses from "Never true," "Rarely true," "Sometimes true," to "Almost always true." Although all of the mothers reported that they had a great deal of affection for their child, it appears that some of the more negative questions prompted a more subtle exploration of feelings.

The Relationship Between Proximity/Separation and both Indifference/Neglect and Undifferentiated Rejection

In this study neither Indifference/Neglect nor Undifferentiated Rejection were significantly affected by Proximity/Separation. There was very little difference between groups on both Indifference/Neglect and Undifferentiated Rejection. Of note is that both Indifference/Neglect and Undifferentiated Rejection had mean scores on the PARQ which were lower than those of Warmth/ Affection and Hostility/Aggression. This researcher speculates that the demographics of this particular sample group may be responsible for this result. With regard to income,

53.3% of the participants in this study had a family income of over \$75,000 per year, of those, 24.4% had a family income of over \$105,000 per year. They were also highly educated (36.7% had a graduate degree). A majority were married (88.9%). This relatively high socioeconomic status may be responsible for the insignificance of Indifference/Neglect and Undifferentiated Rejection in all the results of the current study. Poverty and low socioeconomic status have been noted as stressors and linked to problems in parenting and caregiving behaviors (Greenberg et al., 1993; Huthbocks et al., 2004). There is an increased incidence of disorganized and disoriented forms of attachment disorder among families at social risk (Main & Solomon, 1990). Disorganized attachment behavior increases as the severity of family risk factors increases, and it is more likely to include pronounced avoidant behaviors as family risk factors become more severe (Lyons-Ruth et al., 1991). Chronic socioeconomic stress exacerbates dysfunctional caregiving (Valenzuela, 1997). Indifference, neglect, and rejection are more pronounced among families where socioeconomic stressors are more severe. Conversely, they are less pronounced where socioeconomic factors are positive.

The Relationship Between Length of Separation and Warmth/Affection

In this study a relationship was found between the length of separation (Days Separated) and Warmth/Affection. As the length of separation increased, the scores on Warmth/Affection decreased. Mothers felt less Warmth/Affection as the number of Days Separated increased. This result contradicts the results of Chang et. al. (1982), but partially supports the work of Bialoskirski et al. (1998), who found that bond formation may be delayed if the infant was not able to play his/her part in the

establishment of attachment. The results obtained in the current study support the work of Feldman, Weller et al. (1999), who found that primary maternal preoccupation would diminish under prolonged separation with potential loss. A greater length of stay in the NICU indicates that the infant is more medically involved, with a greater potential for loss, which may inhibit the development of maternal attachment. As one mother wrote of her son, born at 32 weeks gestation, "I was afraid to see him, because I thought I would lose him."

The Relationship Between Length of Separation and Hostility/Aggression

In this study there was a relationship between length of separation (Days Separated) and Hostility/Aggression. As length of separation increased, so did the scores on Hostility/Aggression. This effect has previously been seen in animals (Carlson, 1994; Keverne, 1996; Larsson, 1994). The tactile, olfactory and auditory cues from the newborn offspring are required to link into the maintenance phase of maternal responding by activating the release of neurotransmitters (Keverne, 1996). Tactile stimuli also play an important role in the maintenance of maternal behavior (Blass, 1990). Without the stimuli provided by close contact with the infant, the maintenance phase of maternal behavior is not achieved; perhaps the additional stress of having an infant in the NICU increases negative feelings without the benefit of positive feelings.

The Relationship Between Length of Separation and both Indifference/Neglect and Undifferentiated Rejection

In the current study, length of separation did not have a significant effect on either Indifference/Neglect or Undifferentiated Rejection. As stated previously, the

population in this study reported a high family income, as well as high levels of education and marital stability. These factors may have mitigated the effects of Separation on Indifference/Neglect and Undifferentiated Rejection.

The Relationship Between Attachment Style and Warmth/Affection, Hostility/Aggression, Indifference/Neglect and Undifferentiated Rejection

In this study there was a significant difference between groups of attachment style on the Warmth/Affection scale. The Secure group scored higher than the Insecure group. There was also a significant difference between groups on the Undifferentiated/ Rejection scale. The Insecure group was higher than the Secure group. The ability to assess how style of parenting contributes to individual differences in relatedness is in concordance with the work of Ainsworth (1963) and Main (1975). Mothers who have a secure style of attachment feel confident in their ability to form lasting, meaningful bonds. Muller (1996) found that only a small amount of postnatal attachment was explained by prenatal attachment and that other variables were influential in the development of mother-infant attachment.

There was not a significant difference between the Secure and Insecure groups on the Aggression/Hostility scale and the Indifference/Neglect scale. This finding must be viewed with caution. Recall that the Insecure groups had a very low sampling. The Insecure-Dismissing (sample size of 15), Insecure-Preoccupied (sample size of 2) and Insecure-Fearful (sample size of 9) groups were collapsed into one Insecure group. However, the majority of subjects in the collapsed Insecure group were from the Insecure-Dismissing group. An Insecure-Dismissing style of attachment does relate to the Undifferentiated Rejection representation of attachment,

therefore a significant difference was noted in this study between the groups of attachment style and Undifferentiated Rejection. However, the Insecure-Preoccupied and Insecure-Fearful samples, with a total of 11 subjects, did not constitute a large enough portion of the collapsed Insecure group to exert an effect on Aggression/Hostility and Indifference/Neglect.

Implications of the Study

It seems apparent from the results of this study that proximity or separation from the infant does have an effect on maternal representations of attachment. Specifically, separation and proximity have an effect on the representations of warmth and affection, as well as hostility and aggression. The feelings of warmth/affection as well as hostility/aggression are exacerbated by the initial period of separation. As the length of separation increases, the feelings of warmth/affection are reduced to a level that is lower than that reported by mothers who are in proximity to their infants, while the level of hostility/aggression remains at a fairly high level.

There are several implications of this study. It is well known that following premature birth, mothers experience higher levels of depression and anxiety, and a lower sense of competence, while caretaking and touch are reduced (Feldman, Weller et al, 2003). These patterns persist after discharge. Mothers often increase the level of talking, toy presentation, and physical manipulation, while being less perceptive to the child's cues. These behaviors lead to a higher level of intrusiveness and lower level of sensitivity, leading to a maternal style that has been described in terms of guilt and overcompensation (Feldman, Greenbaum & Yirmiya, 1999; Minde, 2000). Interventions can be implemented to increase proximity while an infant is in the

NICU, along with psychoeducation and training for the mother, to improve the quality of reciprocity in the relationship. A program that encourages increased skin-to-skin contact, such as Kangaroo care, should be integrated into the treatment of all infants in the NICU.

Mothers of infants in the NICU need additional support to help in facilitating a positive attachment. The process of attachment in the NICU should be considered an individualized process (Bialoskuski, et. al., 1999). The mother's health status, cultural background, financial circumstances, and social support are some of the factors which need to be considered when assessing each mother's potential risks in establishing a strong attachment to her baby.

Poor attachment has been linked with many psychological disorders, among them are Conduct Disorder (Erickson and Stroufe, 1985; Greenberg et al., 1993; Lyons-Ruth et al., 1993), Anxiety (Bowlby, 1973; Rohner, 2004), Depression (Hamman et. al., 1996), Failure to Thrive (Crittenden, 1987; Valenzuela, 1990), personality disorders and psychopathology (Bowlby, 1973; Hospitz, et. al., 1997; Rosenstein & Horowitz, 1996). It is conceivable that an attempt to improve attachment among high-risk infants may prevent psychological disorders from developing.

Admissions to the Neonatal Intensive Care Unit are among the most expensive types of hospitalizations (Rogowski, 1999). A shorter length of stay in the NICU has been associated with a better outcome as well as reduced cost (Colby, 2006). The goal of reducing the length of stay in the NICU is also supported by the results of this study. A shorter length of stay in the NICU not only lessens the

financial cost overall, it also lessens the risk of a poor attachment.

Limitations of the Study

To date, no studies have examined the effect of proximity and separation on measures of maternal representations of attachment, specifically how the length of stay in the NICU affects these measures of attachment. Participants in this study were recruited by placing fliers in the waiting rooms of a large pediatric rehabilitation hospital. The participants were willing to complete the questionnaires due to their understanding that it could benefit society in general. The subjects in this study comprised a group that was remarkably well educated, had high incomes, and marital security. An examination of the most current facts from the United States Census Bureau (2011) reveals that the population in the current study differs from the population of the county and state in several ways. In the current study 87.8% of the respondents were Caucasian, which is a higher figure than that reported for the county (69.1%) and the state (75.8%). The number of African American participants, 6.7%, is lower than the numbers reported for the county (20.6%) and the state (14.5%). The current study did not clearly identify participants who may have been of Asian or Latino ethnicity, although those groups are represented in the county and state figures. Asian people represented 8.3% of the population in the county and 7.8% of the population in the state; Latino persons represented 13.8% of the population in the county and 16.7% of the population in the state. The average total household income of the participants in this study ranged from \$76,000 to \$90,000, while the average household income for the county was \$72,883 and the state was \$70,347. A very

large discrepancy was noticed in the level of education, with 76.7% of participants of the study holding a bachelor's degree or higher, while the numbers for the county (34%) and the state (29.8%) are much lower (U.S. Census Bureau, 2011). These differences between participants in the study and the general population of the county and state indicate that the results of this current study may not be generalized to the population at large, and must be interpreted with extreme caution. The results of this study can be applied to this particular population which is predominantly Caucasian, with high income and highly educated.

The variables of educational degree, marital status, and income were not examined in this study. Several researchers have examined the nature of attachment in families with high social risk factors of poverty, family adversity and infant undernutrition (Greenberg, Speltz, & DeKlyen, 1993; Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Main & Solomon, 1990; Valenzuela, 1997). Their findings indicate that disorganized infant attachment behavior increases as the severity of risk factors increases. The current study focused on conditions of proximity and separation as the primary variables; an examination of the aforementioned variables may well have affected the outcomes of this study.

Women of color and minorities are conspicuously underrepresented in this study. The challenges of recruiting women and minorities to clinical studies must be viewed in the context of historical and ongoing controversies about the ethics of clinical studies that have exploited minority populations. The infamous Tuskegee syphilis study left many Black Americans distrustful of the healthcare system,

especially medical research. There has been a long history of abuse of Black women by physicians seeking to advance their knowledge (Killien, Bigby, Champion, Fernandez-Repollet, Jackson, Kagawa-singer, Kidd, Naughton, & Prout, 2000). In the 1800s, Dr. J. Marion Simms purchased Black African slaves to perfect gynecological surgical procedures before he would try them on White women (Killien et al., 2000). In the early 1900s it was legal for poor White, unmarried women to be involuntarily sterilized, in order to prevent the reproduction of inferior genes. As late as the 1970's, poor minority women underwent unnecessary hysterectomies without their informed consent. More recently, oral contraceptives have been tested in developing countries where illiteracy is common. The crack cocaine epidemic of the 1980s and 1990s led to the disproportionate drug testing of pregnant Black women without their knowledge or consent (Killien et al., 2000). Researchers experience great difficulty in overcoming conceptual barriers to participation in medical studies such as women's lack of perceived benefit from medical studies, feelings that partners or families would not approve, and fear of giving the health care system too much information or too much control over their health. Additionally, there is fear of unwanted involvement of social service agencies and unwanted attention to some women's undocumented status.

Special strategies are necessary to enhance participation in clinical trials. Effective involvement of underrepresented groups of women in clinical trials requires a reconceptualization of the research process from having a focus on recruitment of subjects to having a focus of improving involvement of communities (Killien et al., 2000; Robinson & Trochim, 2007). To that end, the research team itself should be

multicultural. Investigators should strive to link with communities by identifying key leaders within the community, become knowledgeable about the community by becoming an active member beyond the scope of the research, and having community members involved in planning the research project. These strategies were unfortunately beyond the scope of the current study.

An area of concern for the present study is the small number of participants represented in the attachment style groups of insecure-dismissing, insecure-preoccupied, and insecure-fearful. A much larger sample size would be necessary to provide a large enough number for each of those groups to be represented in the study. A larger sample size may yield more information about the relationship of attachment style to the representations of hostility/aggression and indifference/neglect.

Another area of concern regarding this study is the nature of self-report measures and the accompanying risk of response bias. Participation was entirely voluntary; it is possible that mothers who felt uneasy in their feelings of attachment toward their babies may have excluded themselves from this study. It is possible that those who chose to participate were overly positive in rating themselves as warm and loving mothers. It would, in fact, be difficult to find a mother who does not feel that she does all she can for her baby. Mothers may also be reluctant to acknowledge feelings (or actions) of hostility, aggression, neglect, or rejection toward their babies, for a variety of reasons. Although the instructions specified that participation was entirely voluntary and anonymous, mothers may have been wary of revealing any information that might have been cause to notify child welfare agencies. Additionally,

there is a tendency among some people to have an “acquiescence response style” in which they tend to agree or disagree with questionnaire items regardless of content (Rohner, 1999). Some people also tend to respond to questionnaire items in a way that portrays them in the most favorable light, which is “social desirability response style” (Rohner, 1999). It may appear that some of the items on the PARQ are obviously pulling for information a certain type of behavior, such as “I hit my child even when he or she does not deserve it,” or “I let my child know I love him/her.” The PARQ was chosen for this study, in part, because of its high concurrent validity with external measures. Concurrent validity of the PARQ was studied by comparing items with scales from the Child Report of Parent Behavior Inventory and the Parent Behavior Questionnaire. All four scales of the PARQ were significantly related to their validation scales (Rohner, 1999).

The response bias explanation of results is difficult to rule out in research utilizing only self-report measures. In order to reduce the risk of response bias, it would be more effective to augment self-report measures with external evidence such as independent behavior observations. The addition of an observational study would have yielded a more accurate assessment of mothers’ overt behaviors. However, this study did focus on the maternal representations of attachment. Recall that maternal representation of attachment is the mother’s interpretation and understanding of the way she feels toward her child. The mother’s representation of attachment may indeed be different from her overt behaviors.

The results of this study may benefit the field of psychology in several ways. Although adult attachment style is relatively stable, it can be influenced by traumatic

events. Having a baby born prematurely and then admitted to the NICU is a traumatic event for many mothers. As shown in the present study, length of stay in the NICU affects maternal representations of attachment in reported levels of warmth, affection, hostility, and aggression. It may be beneficial to provide therapy to those mothers and babies while they are in the NICU. Education and training for the mothers could focus on the development and expected behaviors that are exhibited by premature infants. Interventions to specifically target the emotional needs of the mothers should be provided. Additional opportunities for close physical contact, such as is provided in Kangaroo Care, should be encouraged and attended by a therapist who could coach the mother-infant pair in mutual reciprocity.

A clinical tool or measure should be implemented to screen and assess maternal representations of attachment. Those mother-infant pairs that are identified as at risk for poor attachment should continue to participate in therapy after discharge from the NICU. Additional assessments of attachment should be administered at the baby's medical appointments to monitor progress, with therapeutic intervention provided as necessary.

The results obtained in this study may also influence the diagnosis and treatment of psychological disorders present in childhood, specifically Reactive Attachment Disorder, Oppositional Defiant Disorder, Conduct Disorder, Anxiety, Depression, Failure to Thrive and, as adults, the presence of Personality Disorders. A child with a history of admission to the NICU may benefit from therapy that addresses the mother's representations of attachment.

Future Research

The results of this study indicate that there is a difference in maternal representations of attachment as affected by conditions of proximity and separation. It also indicates that the length of separation has an effect on maternal representations of attachment. Additionally it indicates that there is a relationship between attachment style and maternal representations of attachment. In order to further examine these effects and to gain a more detailed understanding of the relationships, it would be beneficial to reproduce this study with a much larger sample size. The length of stay in the NICU for the current study was divided into two groups; Separation A was less than 20 days and Separation B was more than 20 days. A future study could collect data from more participants to be able to have groups with more discrete lengths of stay, such as 5-9 days, 10-14 days, 15-19 days, and so forth. Analyzing the data from these proposed groups could be more useful in determining the exact length of time where a heightened sense of warmth/ affection changes to a downward decline.

With regard to infant gender, Broussard (1995) found that no gender differences emerged in infants' attachment style. Future research might also include a study of any differences that mothers might have in their representations of attachment toward boys and girls.

A larger sample size would also cast more light on the effect of attachment style on maternal representations of attachment. Since the insecure groups were a small portion of the entire sample, many more subjects would be required to capture the effects of insecure-dismissing, insecure-preoccupied and insecure-fearful on maternal representations of attachment. Care should be given to ensure that the sample population represents the diversity of the community at large. Perhaps

participants could be recruited at an array of locations across the country.

Hormonal levels can change drastically during pregnancy, birth, and lactation. The current study did not include any medical assessments that could monitor the levels of hormones in the mothers' bloodstream at various states of proximity and separation. The inclusion of such data in a study of maternal representations of attachment could yield information regarding any relationship between hormonal levels and feelings of attachment.

Conclusion

The current study has revealed some important relationships between proximity/separation and maternal representations of attachment. Specifically, maternal representations of warmth/affection and hostility/aggression have been shown to be significantly affected by conditions of proximity or separation. Additionally, as the length of separation increases, the levels of warmth/affection decrease while the levels of hostility/aggression remain high. These results may be used to support interventions designed to foster maternal-infant attachment among high-risk groups. A mother's risk status may be identified by observation and assessment of her attachment style while her baby is in the hospital. As medical technology continues to improve, the number of viable early-term babies will continue to rise, along with the number of high-risk mothers. Therefore an understanding of the conditions necessary for maternal-infant attachment may be beneficial in helping facilitate positive attachment relationships.

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Appendix A
Approval for Dissertation Proposal

SETON HALL UNIVERSITY
COLLEGE OF EDUCATION AND HUMAN SERVICES
OFFICE OF GRADUATE STUDIES

APPROVAL FOR DISSERTATION PROPOSAL

Candidate, Karen Monaw, has successfully completed all requisite requirements. This candidate's proposal has been reviewed and the candidate may proceed to collect data according to the approved proposal for dissertation under the direction of the mentor and the candidate's dissertation committee.

If there are substantive differences between what has been approved in the proposal and the actual study, the final dissertation should indicate, on a separate page in the Appendix, the approval of the committee for those changes.

Title of Proposed Dissertation: Maternal Representations of Attachment as Affected by Conditions of Proximity and Separation

Dissertation Committee:

Mentor (sign/date): [Signature] 4-5-08

Committee Member (sign/date): [Signature] 3/31/08

Committee Member (sign/date): [Signature] 4-5-08

Committee Member (sign/date): _____

Approved by Seton Hall University Institutional Review Board on _____

Department Chairperson (sign/date): [Signature] 4.9.08

Waived by IRB by: _____ on this date _____

**REQUEST FOR APPROVAL OF RESEARCH, DEMONSTRATION OR
RELATED ACTIVITIES INVOLVING HUMAN SUBJECTS**

All material must be typed.

PROJECT TITLE: Maternal Representations of Attachment as Affected by Conditions of Proximity and Separation

CERTIFICATION STATEMENT:

In making this application, I(we) certify that I(we) have read and understand the University's policies and procedures governing research, development, and related activities involving human subjects. I (we) shall comply with the letter and spirit of those policies. I(we) further acknowledge my(our) obligation to (1) obtain written approval of significant deviations from the originally-approved protocol BEFORE making those deviations, and (2) report immediately all adverse effects of the study on the subjects to the Director of the Institutional Review Board, Seton Hall University, South Orange, NJ 07079.

Karen Monaco 3/26/08

Karen Monaco DATE
RESEARCHER(S) OR PROJECT DIRECTOR(S)

**Please print or type out names of all researchers below signature.
Use separate sheet of paper, if necessary.**

My signature indicates that I have reviewed the attached materials and consider them to meet IRB standards.

Dr. Olivia Lewis-Chang 3-26-08

Dr. Olivia Lewis-Chang DATE
RESEARCHER'S ADVISOR OR DEPARTMENTAL SUPERVISOR

Please print or type out name below signature

The request for approval submitted by the above researcher(s) was considered by the IRB for Research Involving Human Subjects Research at the 14 May 2008 meeting.

The application was approved not approved by the Committee. Special conditions were _____ were not set by the IRB. (Any special conditions are described on the reverse side.)

Mary J. Reingold, Ph.D. 6/30/08

DIRECTOR, DATE
SETON HALL UNIVERSITY INSTITUTIONAL
REVIEW BOARD FOR HUMAN SUBJECTS RESEARCH

Appendix B
Institutional Review Board Approval Letter



OFFICE OF INSTITUTIONAL
REVIEW BOARD

SETON HALL UNIVERSITY

June 26, 2008

Karen Monaco
48 Saddle Way
Chesterfield, NJ 08515

Dear Ms. Monaco,

The Seton Hall University Institutional Review Board has reviewed the information you have submitted addressing the concerns for your proposal entitled "Maternal Representations of Attachment as Affected by Conditions of Proximity and Separation". Your research protocol is hereby approved as revised through exempt review. The IRB reserves the right to recall the proposal at any time for full review.

Please note that, where applicable, subjects must sign and must be given a copy of the Seton Hall University current stamped Letter of Solicitation or Consent Form before the subjects' participation. All data, as well as the investigator's copies of the signed Consent Forms, must be retained by the principal investigator for a period of at least three years following the termination of the project.

Should you wish to make changes to the IRB approved procedures, the following materials must be submitted for IRB review and be approved by the IRB prior to being instituted:

- Description of proposed revisions;
- *If applicable*, any new or revised materials, such as recruitment fliers, letters to subjects, or consent documents; and
- *If applicable*, updated letters of approval from cooperating institutions and IRBs.

At the present time, there is no need for further action on your part with the IRB.

In harmony with federal regulations, none of the investigators or research staff involved in the study took part in the final decision.

Sincerely,

Mary F. Ruzicka, Ph.D.

Mary F. Ruzicka, Ph.D.

Professor

Director, Institutional Review Board

cc: Dr. Olivia Chang
Dr. Thomas Massarelli



OFFICE OF INSTITUTIONAL
REVIEW BOARD

SETON HALL UNIVERSITY

February 9, 2011

Karen Monaco
48 Saddle Way
Chesterfield, New Jersey 08515

Dear Ms. Monaco,

The IRB hereby approves the requested reactivation of your research protocol, "Maternal Representations of Attachment as Affected by Conditions of Proximity and Separation".

Your new recruitment flyer and Letter of Solicitation are enclosed. Make copies only of these stamped documents.

Sincerely,

Mary F. Ruzicka, Ph.D.
Professor
Director, Institutional Review Board

cc: Dr. Olivia Lewis-Chang
Dr. Thomas Massarelli

Please review Seton Hall University IRB's Policies and Procedures on website (<http://www.provost.shu.edu/IRB>) for more information. Please note the following requirements:

Adverse Reactions: If any untoward incidents or adverse reactions should develop as a result of this study, you are required to immediately notify in writing the Seton Hall University IRB Director, your sponsor and any federal regulatory institutions which may oversee this research, such as the OHRP or the FDA. If the problem is serious, approval may be withdrawn pending further review by the IRB.

Amendments: If you wish to change any aspect of this study, please communicate your request in writing (with revised copies of the protocol and/or informed consent where applicable and the Amendment Form) to the IRB Director. The new procedures cannot be initiated until you receive IRB approval.

Completion of Study: Please notify Seton Hall University's IRB Director in writing as soon as the research has been completed, along with any results obtained.

Non-Compliance: Any issue of non-compliance to regulations will be reported to Seton Hall University's IRB Director, your sponsor and any federal regulatory institutions which may oversee this research, such as the OHRP or the FDA. If the problem is serious, approval may be withdrawn pending further review by the IRB.

Renewal: It is the principal investigator's responsibility to maintain IRB approval. A Continuing Review Form will be mailed to you prior to your initial approval anniversary date. Note: No research may be conducted (except to prevent immediate hazards to subjects), no data collected, nor any subjects enrolled after the expiration date.

Appendix C
Letter of Solicitation

FEB 09 2011

Approval Date

Dear Potential Participant:

My name is Karen Monaco, and I am a doctoral candidate in the Clinical Psychology Program in the Department of Professional Psychology and Family Therapy at Seton Hall University in South Orange, NJ. I am currently working on my doctoral dissertation which will study the influence of separation on the relationships of mothers with their babies. I would like to encourage you to join in this research.

Purpose of Research

I am interested in doing research on the way mothers and children interact with each other. I am interested in the personality development of children, especially in their ability to form attachment relationships to the people closest to them. Of particular interest in this study is to gain information about the way mothers perceive their relationship with their babies. The work that I am doing will be added to a much larger study which is looking at the similarities and differences in children's development in various parts of the world.

Duration of Your Participation

Your participation involves completing a packet of questionnaires, which will take approximately 30-40 minutes of time.

Procedures

You will be asked to complete the following questionnaires: The Parental Acceptance-Rejection Questionnaire (PARQ) for mothers, the Relationship Questionnaire (RQ) and the background data form. The estimated participation time is approximately 30-40 minutes. Also, an envelope has been enclosed for you to return the materials.

I have provided some examples of the items that will be encountered on these questionnaires. The PARQ includes statements such as: "I enjoy having my child around me", "I make sure my child has the right kind of food to eat" and "I am irritable with my child." The Relationship Questionnaire asks you to identify your relationship style from among four choices.

Voluntary Participation

Participation in this study is completely voluntary. You may withdraw your participation from the study at any time without consequence.

Anonymity Preservation

Anonymity will be maintained. You will be instructed not to include your name or any other identifying information on the questionnaires. There will be no way of identifying you. Results presented or published professionally will be in group form only. All

material will be collected in the strictest confidence. The completed survey packet will be sent directly to me to maintain confidentiality. Returned questionnaires will be kept in a locked cabinet and will be accessible only to myself and my advisor. Data will be stored electronically only on a USB memory key, and kept in a locked, secure cabinet. You may receive a copy of the study's results if interested.

Anticipated Risks and Discomfort

There are minimal risks involved in the study because the study is simply an exploratory project, not a treatment study. Mothers may find that participation is interesting and worthwhile, and could possibly benefit from the experience of participating in a study that may advance our understanding of mother-baby relationships. Should you experience any discomfort during or after completing the survey, please contact me or my research advisors noted below.

Research Contact

I would like to thank you in advance for your willingness to consider participating in the study. If you would like to receive a copy of study results, please send your request to me at the University address at the close of this letter. If you have any questions about this study or what to expect about your participation, please feel free to contact me at (973)761-9451. If you have any questions about your rights to participate in this study or feel that you have been placed at risk, you may contact Dr. Olivia Lewis-Chang, Ph.D. or Dr. Thomas Massarelli, Ph.D. at (973)761-9451 or the Office of the IRB, Dr. Ruzicka, Ph.D., Director, at (973) 313-6314.

Thank you again for your invaluable support.

Sincerely,

Seton Hall University
Institutional Review Board

FEB 09 2011

Approval Date

Karen V. Monaco, M.A., L.P.C.
Licensed Professional Counselor
License #37PC00315700
Doctoral Candidate: Clinical Program
Department of Professional Psychology and Family Therapy
Seton Hall University
400 South Orange Avenue
South Orange, NJ 07079
(973) 761-9451

Appendix D

Maternal Parental Acceptance-Rejection Questionnaire



**Ronald and Nancy Rohner Center
for the Study of Parental Acceptance and Rejection**

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To Whom It May Concern:

Permission is granted to Karen Monaco to reproduce and use measures purchased from Rohner Research for her dissertation research.

A handwritten signature in black ink, which appears to read "Ronald P. Rohner".

Ronald P. Rohner, Professor Emeritus
Family Studies and Anthropology
Director, **Ronald and Nancy Rohner Center**

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RPR/n

MOTHER PARQ

	ALWAYS TRUE	SOMETIMES TRUE	RARELY TRUE	NEVER TRUE
1. I say nice things about my child.....	_____	_____	_____	_____
2. I nag or scold my child when he/she is bad.....	_____	_____	_____	_____
3. I ignore my child.....	_____	_____	_____	_____
4. I wonder if I really love my child.....	_____	_____	_____	_____
5. I discuss general daily routines with my child and listen to what he/she has to say.	_____	_____	_____	_____
6. I complain about my child to others when he/she does not listen to me.....	_____	_____	_____	_____
7. I take an active interest in my child.....	_____	_____	_____	_____
8. I encourage my child to bring friends home, and I try to make things pleasant for them.....	_____	_____	_____	_____
9. I make fun of my child.....	_____	_____	_____	_____
10. I ignore my child as long as he/she does not do anything to disturb me.....	_____	_____	_____	_____
11. I yell at my child when I am angry.....	_____	_____	_____	_____
12. I make it easy for my child to confide in me.....	_____	_____	_____	_____
13. I am harsh with my child.....	_____	_____	_____	_____
14. I enjoy having my child around me.....	_____	_____	_____	_____
15. I make my child feel proud when he/she does well.....	_____	_____	_____	_____
16. I hit my child even when he/she may not deserve it.....	_____	_____	_____	_____
17. I forget things I am supposed to do for my child.	_____	_____	_____	_____
18. My child is a burden for me.....	_____	_____	_____	_____
19. I praise my child to others.....	_____	_____	_____	_____

	TRUE OF ME		NOT TRUE OF ME	
	ALMOST ALWAYS TRUE	SOMETIMES TRUE	RARELY TRUE	ALMOST NEVER TRUE
20. I punish my child when I am angry.....	_____	_____	_____	_____
21. I make sure my child has the right kind of food to eat.....	_____	_____	_____	_____
22. I talk to my child in a warm and affectionate way	_____	_____	_____	_____
23. I am impatient with my child.....	_____	_____	_____	_____
24. I am too busy to answer my child's questions....	_____	_____	_____	_____
25. I resent my child.....	_____	_____	_____	_____
26. I praise my child when he/she deserves it.....	_____	_____	_____	_____
27. I am irritable with my child.....	_____	_____	_____	_____
28. I am concerned who my child's friends are.....	_____	_____	_____	_____
29. I take real interest in my child's affairs.....	_____	_____	_____	_____
30. I say unkind things to my child.....	_____	_____	_____	_____
31. I ignore my child when he/she asks for help.....	_____	_____	_____	_____
32. I am unsympathetic to my child when he/she is having trouble.....	_____	_____	_____	_____
33. I make my child feel wanted and needed.....	_____	_____	_____	_____
34. I tell my child that he/she gets on my nerves.....	_____	_____	_____	_____
35. I pay a lot of attention to my child.....	_____	_____	_____	_____
36. I tell my child how proud I am of him/her when he/she is good.....	_____	_____	_____	_____
37. I hurt my child's feelings.....	_____	_____	_____	_____
38. I forget events that my child thinks I should remember.....	_____	_____	_____	_____
39. When my child misbehaves, I make him/her feel I don't love him/her anymore.....	_____	_____	_____	_____

	TRUE OF ME		NOT TRUE OF ME	
	ALMOST ALWAYS TRUE	SOMETIMES TRUE	RARELY TRUE	ALMOST NEVER TRUE
40. I make my child feel what he/she does is important.....	_____	_____	_____	_____
41. When my child does something wrong, I threaten or frighten him/her.....	_____	_____	_____	_____
42. I like to spend time with my child.....	_____	_____	_____	_____
43. I try to help my child when he/she is scared or upset.....	_____	_____	_____	_____
44. When my child misbehaves, I shame him/her in front of his/her playmates.....	_____	_____	_____	_____
45. I avoid my child's company.....	_____	_____	_____	_____
46. I complain about my child.....	_____	_____	_____	_____
47. I respect my child's point of view, and encourage him/her to express it.....	_____	_____	_____	_____
48. I compare my child unfavorably with other children.....	_____	_____	_____	_____
49. When I make plans, I take my child into consideration.....	_____	_____	_____	_____
50. I let my child do things he/she thinks are important, even if it is inconvenient for me.....	_____	_____	_____	_____
51. When my child misbehaves, I compare him/her unfavorably with other children.....	_____	_____	_____	_____
52. I leave my child to someone else's care (e.g. a neighbor or relative).....	_____	_____	_____	_____
53. I let my child know he/she is not wanted.....	_____	_____	_____	_____
54. I am interested in the things my child does.....	_____	_____	_____	_____
55. I try to make my child feel better when he/she is hurt or sick.....	_____	_____	_____	_____
56. I tell my child I am ashamed of him/her when he/she misbehaves.....	_____	_____	_____	_____

	TRUE OF ME		NOT TRUE OF ME	
	ALMOST ALWAYS TRUE	SOMETIMES TRUE	RARELY TRUE	ALMOST NEVER TRUE
57. I let my child know I love him/her.....	_____	_____	_____	_____
58. I treat my child gently and kindly.....	_____	_____	_____	_____
59. When my child misbehaves, I make him/her feel ashamed or guilty.....	_____	_____	_____	_____
60. I try to make my child happy.....	_____	_____	_____	_____

Appendix E
The Relationship Questionnaire

The Relationship Questionnaire

The following statements ask you to identify your relationship style. For each statement, please rate how descriptive it is of you using the following scale. **Please give EACH statement a number from 1 to 7 and circle the ONE description which is most like you.** *There are no right or wrong answers.*

Not at all like me				Somewhat like me			Very much like me
1	2	3	4	5	6	7	

1. ____ It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

2. ____ I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

3. ____ I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as I value them.

4. ____ I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

Appendix F
Demographics

Background Data

To be completed by the mother

1. Your Birthday: Month _____ Day _____ Year _____
2. Baby's Birthday: Month _____ Day _____ Year _____
3. Baby's birth order in the family (first child, second, third) _____
4. Is this child from a single or multiple birth? _____
5. Is this child a boy or a girl? _____
6. Birthweight _____
7. Type of birth
_____ Full term, vaginal delivery
_____ Premature vaginal delivery
_____ Full term, cesarean delivery
_____ Premature, cesarean delivery
_____ Number of weeks gestation

Please describe your pregnancy and birth experience, including any complications, planned or emergency cesarean, were you prepared for the child's birth, or any other events which you feel impacted your birth experience:

Name of the hospital _____

8. Please describe the type of separation (if any) you experienced :

- _____ Home birth, no separation
_____ Hospital birth, baby remained in your room at all times
_____ Hospital birth, baby slept overnight in the nursery
_____ Hospital birth, baby was in the NICU
_____ Number of days in NICU

When did you first hold the baby? _____

If applicable, please specify how many days before you could hold the baby in your arms: _____

How many days were you in the hospital? _____

How many days did the baby remain in the hospital? _____

Please describe any information or events which affected when you could hold the baby:

Was the baby breastfed or bottlefed? _____
Did the baby have a medical condition which necessitated care in the NICU? Please specify: _____

9. Do you identify yourself as a member of a cultural or ethnic group?

_____ No
_____ Yes

_____ African American
_____ Asian
_____ Caucasian or White
_____ Latina
_____ Native American
_____ Other

_____ A more specific cultural group. If so, please describe:

10. What is the major language spoken at home?

_____ English
_____ Other. Please specify: _____

11. What is your religious preference? _____

12. What is the number of years you completed in school? _____

13. Degree earned

_____ Grammar School
_____ High School
_____ Some College
_____ Graduated from College
_____ Postgraduate Degree, specify (M.A., Ph.D., M.D., etc)

14. Are you currently employed?

- Unemployed, not looking for work
- Unemployed, looking for work
- Employed part-time
- Employed full-time
- On leave from job (medical, maternity, etc.)
- Other. Please specify _____

15. What is (was) your occupation? (Including homemaker) _____

16. Marital Status

- Married and living with husband
- Not married but living with partner
- Not married and living without partner
- Separated
- Divorced
- Widowed
- Other

17. How many children do you have? _____ Ages? _____

18. Family Income Level: 0 – \$15,000 _____

- \$16,000 – \$30,000 _____
- \$31,000 - \$45,000 _____
- \$46,000 - \$60,000 _____
- \$61,000 - \$75,000 _____
- \$76,000- \$90,000 _____
- \$91,000- \$105,000 _____
- \$106,000- \$120,000 _____
- \$121,000 + _____

19. Have you experienced any significant losses, such as the death of a family member, child or close friend, divorce, illness, family conflict or any other serious difficulties or problems?

20. Please feel free to include any thoughts, comments or events that you feel might help the researchers gain a better understanding of your experience with this baby:
