Antecedents of maternal-infant attachment: A longitudinal study

Jacqueline Jeanne White

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Antecedents of maternal-infant attachment: A longitudinal study

White, Jacqueline Jeanne, Ed.D.
The College of William and Mary, 1991

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ANTECEDENTS OF MATERNAL-INFANT ATTACHMENT:
A LONGITUDINAL STUDY

A Dissertation
Presented to
The Faculty of the School of Education
The College of William and Mary in Virginia

In Partial Fulfillment
Of the Requirements for the Degree
Doctor of Education

by
Jacqueline Jeanne White
May 1991
ANTECEDENTS OF MATERNAL-INFANT ATTACHMENT:
A LONGITUDINAL STUDY

by

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Dedication

This dissertation is dedicated to the family and friends whose love, support, encouragement, and guidance made the completion of this dissertation a reality.

First, my husband Larry gave support, encouragement, and valuable input into the planning and design of this study. My closest friends, Janna and Irwin Levinstein, spent countless hours of time helping with the design and implementation of this dissertation. Irwin succeeded in making my computer "user friendly." Janna served as an editor, statistician, and most of all my best friend who helped me to keep going when times got rough. Finally, this dissertation is dedicated to my Godchildren Ben and Marjorie, who gave the unconditional love that constantly reminded me of the importance of children growing up in a healthy environment.
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ABSTRACT

This dissertation was designed to measure the longitudinal effects of several maternal and infant variables on the security of attachment as assessed by the Strange Situation. The sixty mother-infant dyads who participated in this study were recruited from three Tidewater prenatal clinics. The goal of this dissertation was to determine the correlation of maternal and infant constructs with the criterion variables of maternal perception of her baby and the Strange Situation. The statistical technique of path analysis was utilized to analyze data collected over five periods: prenatal, postpartum, three-, six- and sixteen-months. The results of the path analysis revealed that the prenatal variables, maternal sources of social support and perception of early childhood experiences predicted a significant amount of the variance in the Strange Situation classifications (secure versus insecure) when the infants were sixteen months old. The path analysis interpretation also demonstrated that the maternal variables: 1) sources of social support; 2) emotional status; 3) knowledge of
infant growth and development; 4) maternal personality integration; 5) maternal age; and 6) measures of stress all influenced the maternal perception of her infant during at least one of the data collection periods. Finally, the path analysis demonstrated that infant variables: 1) gender; 2) differences in neonatal responsiveness; 3) temperament; and 4) maternal-infant interaction also impacted upon the mother's perception of her baby. The only variable that was not related to either the Maternal Perception of the Infant or the Strange Situation was the Infant Developmental Status as measured by the Bayley Scales of Infant Mental and Motor Development Behavior Record.

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ANTECEDENTS OF MATERNAL-INFANT ATTACHMENT:
A LONGITUDINAL STUDY
CHAPTER ONE: THE PROBLEM

Introduction

Since the quality of maternal-infant attachment has both immediate and long term implications it has been a popular topic in recent psychological literature. An immediate implication of the security of attachment is the association between insecure attachment and abusive mother-child relationships (Crittenden, 1985, 1988; Speiker & Booth, 1987). Beyond this critical concern the quality of maternal-infant attachment has also been linked with early childhood development and achievement (Arend, Gove, & Sroufe, 1979).

This dissertation has explored the antecedents of maternal-infant attachment. If the precursors of insecure attachment can be identified early, support and specific clinical interventions for these mothers and infants can be initiated.

The antecedents of maternal-infant attachment are very broad and complicated measures to assess. Since there are many different variables that comprise these measures, definitions of some of the more complex
concepts will be discussed before other aspects of this dissertation are presented.

Maternal-infant attachment describes an emotional and physical bonding that develops between a mother and her infant (Campbell, 1989). This bond is crucial to infants since they cannot survive without the affection and protection of the mother or other competent caregiver. Infants demonstrate behaviors that promote bonding such as smiling, clinging, vocal signals and crying when in distress. For an adaptive bond to form, these infant signals must be correctly interpreted and acted upon by a competent caregiver (Campbell, 1979).

To explore the foundations of maternal-infant attachment a number of areas were examined. Most of the maternal and infant constructs were evaluated during a minimum of two of the five data assessment periods: prenatal, postpartum, three months, six months, and sixteen months.

Maternal variables which were assessed included: 1) sources of social support; 2) emotional status; 3) perception of the infant; 4) knowledge of infant growth and development; 5) personality integration; 6) age; 7) perception of early childhood experiences; as well as 8) measures of stress. The infant variables included: 1)
gender; 2) differences in neonatal responsiveness; 3) temperament; and 4) developmental status.

Maternal and infant assessments will be evaluated to determine the antecedents of the secure and insecure attachment classifications as measured by the Strange Situation. The Strange Situation is a laboratory procedure in which babies 12 to 24 months old are observed interacting with their mothers (Ainsworth & Wittig, 1969). This assessment focuses on the way in which the baby utilizes his or her mother as a source of security in a mildly stressful situation. The setting in which the Strange Situation takes place is a comfortable laboratory playroom containing many attractive toys. The mother is instructed by the researchers to respond naturally to the infant's social bids, but not to initiate interaction with the baby.

The element of stress is introduced into the Strange Situation by placing the child in a strange playroom, by having an unfamiliar person enter the room on two occasions, and also by having the mother leave the child briefly. When stressed, infants this age usually seek comfort and/or reassurance in proximity to or contact with their mothers. Having obtained this reassurance, the baby can then resume exploration of the novel toys.
Patterns of infant behaviors exhibited during the Strange Situation are evaluated and classified as being indicative of secure or insecure attachment with the mother or other caregiver. There are five classifications of infant responses to the mother: Secure, Anxious-Avoidant, Anxious-Resistant, and Avoidant-Ambivalent, and Disorganized-Disoriented (Speiker & Booth, 1988).

When children are Securely Attached they will try to remain in their mother's direct vicinity, especially during moments of fatigue, sadness, fear and/or tension (Ainsworth, Blehar, Waters, & Wall, 1978). In new surroundings the mother can act as a secure base from which the environment is explored. Especially under circumstances of stress, the child will resist the departure of and separation from the mother, and upon her return, the child will cling to her or express in one way or another joy at the renewed presence of this most important source of security and confidence (van IJzendoorn & Tavecchio, 1987).

While Securely Attached babies can obtain comfort from their caregivers, Anxious-Avoidant infants show their inability to use the mother as a secure base by actively turning away at reunion or aborted approaches and refusal to interact (Waters, Vaughn, & Egeland,
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1980). These infants focus their energy on exploration of the environment instead of seeking the comfort of their caregiver. Babies classified as Anxious-Avoidant continue to engage in exploratory behaviors even during separations from the mothers. These toddlers were also found to be friendly with the stranger and may treat this person more favorably than the mother (Main & Solomon, 1987).

Another form of insecure attachment is the Anxious-Resistant pattern of infant behavior (Ainsworth et al., 1978). Although Anxious-Resistant infants seek comfort from their caregivers, these babies show their inability to use the mother as a secure base by actively turning away upon reunion or aborted approaches and refusal to interact. Anxious-Resistant infants find it difficult to be comforted by contact with the mother after separation. While they actively seek contact, these gestures are mixed with stiffness, a struggle to be put down, continued crying, and often, signs of anger (Waters et al., 1980). These infants exhibit extreme dependence on the attachment figure by their exaggerated fear of the new setting of the playroom, the stranger, and separation from the caregiver (Main & Solomon, 1987).
The fourth classification of the Strange Situation is **Avoidant-Ambivalent** was created because it was discovered that some infants were exhibiting behaviors that were not typical of the traditional Secure, Anxious-Avoidant and Anxious-Resistant categories (Crittenden, 1985). Infants who are classified as Avoidant-Ambivalent demonstrate high levels of proximity-seeking and contact maintenance with the mother, which typifies the patterns of Secure infants, but these gestures are also mixed with moderate to high resistance (Crittenden, 1988). This resistance takes the form of non-contextual aggression and/or persistent crankiness. Some infants demonstrate stereotypic or maladaptive behaviors such as huddling on the floor, head cocking, face covering or rocking.

A final pattern of insecure attachment yielded by the Strange Situation is described as **Disorganized-Disoriented** (Main & Solomon, 1987). The Disorganized-Disoriented pattern of attachment is characterized by five behavioral sequences which were described by Main and Solomon (1987). The first behavior pattern involves a disordering of expected temporal sequences when the toddler is reunited with his or her mother. This pattern of behavior is typified by an infant who offers his or her mother a bright greeting immediately upon
their reunion, then backs away. A second pattern of behavior that may be observed is the simultaneous display of contradictory behavior patterns, such as walking sideways toward the mother. The third indication of a Disorganized-Disoriented classification is a toddler who exhibits incomplete or undirected movements and expressions. Some of these movements are intended to strike out at the mother but are never completed. Disorganized-Disoriented children also exhibit confusion and apprehension when they are reunited with their mothers. The final characteristic of Disorganized-Disoriented toddlers is "behavioral stilling." These children freeze in a position or appear to be dazed when they first come into contact with their mothers after a period of separation.

The Strange Situation scenarios within this dissertation were classified by an independent rater who was blind to the hypotheses which have been explored. Since the Strange Situation video tapes were recently rated (1989) all five classifications of attachment were included. Most studies that were reviewed for this dissertation do not include the Avoidant-Ambivalent or Disorganized-Disoriented classification of attachment since they have only recently been described in the psychological literature.
A second instrument that was used to evaluate maternal-infant interaction is the Child-Adult Experimental Index (CARE-Index) (Crittenden, 1981). The CARE-Index examines maternal-infant interaction within a semi-structured play situation. The mother and baby are introduced into a room which has many types of toys appropriate for different developmental ages. The mother is instructed to play as she normally would with her infant. This interaction between the mother and baby is videotaped and rated by trained observers. The categories which are evaluated for the mother, infant and dyad include: 1) facial expression; 2) vocal expression; 3) position and body contact; 4) expression of affection; 5) pacing of turns; 6) control; and 7) choice of activity.

Maternal behaviors and responses are evaluated within the context of each of these seven categories. The mother's contribution to the interaction with her infant within each of these categories is rated as being Sensitive, Controlling or Unresponsive.

A mother who receives a Sensitive rating is generally alert, active, attentive and responsive to her baby's mood. These mothers will select developmentally appropriate toys and pace their responses upon the signals and cues of their infants. Maternal body
positioning, facial and vocal expression facilitate the infant's involvement both with the mother and with the toys.

Mothers rated as being Controlling exhibit very different patterns of behavior. These mothers often express overt or covert hostility toward their infants. This may take the form of increased smiling when the infant is distressed or an expression of disgust when the baby does not comply or succeed at a task set by the mother. The mother introduces toys that are not developmentally appropriate for her infant's age and if the baby expresses pleasure with the toy, she will snatch it away. The maternal body positioning is often intrusive (in terms of face to face distance). She will often make sudden and unexpected moves into the baby's space by poking the infant or grabbing toys. A mother whose behaviors are controlling creates an environment in which her infant is generally wary or uncomfortable during interactions.

The final maternal rating is Unresponsive. Mothers within this category generally do not respond either to their infants or to the surroundings. These mothers exhibit a dull, inattentive and/or blank affect which functions to reduce the infants' interest in interacting with either their mother or the environment. These
mothers distance themselves from their babies both in terms of physical contact and interaction. An unresponsive mother will often sit behind her infant, inhibiting eye contact. After toys are introduced to the baby by the mother, there will be long empty pauses between instances of involvement or stimulation.

The CARE-Index also evaluates the infants' patterns of interaction with their mothers and the environment. This instrument yields four infant classifications: Responsive, Compulsive Compliant, Difficult or Unresponsive.

Responsive infants generally enjoy interaction with their mothers and the surroundings. The baby's pleasure during interaction is demonstrated in several different fashions. Infants who are comfortable during interaction with their mothers will seek eye and/or physical contact. When their mothers speak, these babies respond with increased attention, vocalization and/or excitement. These infants further demonstrate pleasure by their involvement with the toys. They eagerly accept and play with offered toys and include their mothers in their activities.

Babies who are evaluated as Compulsive-Compliant show patterns of interaction that initially seem similar to responsive infants. This pattern of behavior is
usually described in children over twelve months old.
It appears that over time compulsive-compliant toddlers
learn to interact successfully with their mothers.
Instead of protesting or actively avoiding an intrusive
and controlling mother, these babies learn to adapt to
her patterns of behavior. These toddlers avoid
intrusive face-to-face contact by lowering their heads
or turning away so as to achieve distance from the
mother. When playing these children accept abrupt
changes without any behavioral disorganization: they
immediately switch to the mothers' new interest.

Infants who are classified as being **Difficult** do
not adapt as readily to their mothers' intrusive
behaviors. These infants avoid either physical or eye
contact with their mothers. When a toy that they are
playing with is withdrawn these babies display anger and
frustration. These babies actively demonstrate their
displeasure with the situation by fussing, refusing to
play, or even throwing toys away or at the mother.

The final infant pattern of interaction is
classified as **Unresponsive**. Unresponsive infants
generally appear inattentive and bored during
interactions with their mothers. These babies usually
do not vocalize either to their mothers or during play.
If the infant does initiate contact with the mother it
is usually partial and does not include eye contact. An example of this pattern of behavior is an infant who reaches toward his or her mother while turning away.
The play patterns of unresponsive infants also differ from those of other babies. Some of these infants play alone without attention to, or actively avoiding, their mothers. Other infants choose not to play with the toys at all.

The maternal-infant dyad is also evaluated on these seven measures. The inclusion of the dyad rating within the CARE-Index allows for a more extensive evaluation of the maternal-infant interaction.

To enhance its sensitivity, the CARE-Index allows ratings of the maternal-infant interactions to be split over two categories. For example, during the three minute interaction segment a mother may demonstrate both sensitive and controlling behaviors toward her infant. Since both patterns may be exhibited the rater does not have to make a decision over which one was predominant and can note that both were present (Crittenden, 1981).

**Justification For This Study**

Maternal-infant attachment has been a very popular topic in the psychological literature during the last decade. This upsurge in interest has been linked with
longitudinal studies, e.g., Ainsworth, et al. (1978), which associated maternal and infant characteristics to different patterns of attachment behavior when the baby was twelve to twenty four months old. Characteristics of bonding have been described which have impacted upon attachment behaviors both adaptively and non-adaptively. The quality of attachment, i.e., secure or insecure, affects both the physical and psychological welfare of the child.

Researchers, such as Belsky and Isabella (1988), are beginning to define some of the maternal and infant characteristics that promote adaptive attachment. With the benefit of this knowledge clinicians can deliver earlier and more specific interventions and support to mother-infant dyads who are not bonding in an adaptive fashion.

Statement of the Problem

The purpose of this study was to examine antecedents of attachment and relate them to the different attachment classifications of maternal-infant bonding yielded by the Strange Situation (Ainsworth & Wittig, 1969). The research question was designed to determine whether there was any evidence of difference in the measured antecedents of attachment behavior.
between securely and insecurely attached mother-infant dyads.

**Research Question**

Is there any evidence of difference in the measured antecedents of attachment behavior between securely and insecurely attached mother-infant dyads?

**Specific Hypotheses Stemming from the Research Question**

It was predicted that a classification of secure attachment at sixteen months, as rated by the Strange Situation (Ainsworth & Wittig, 1969), would be associated with:

1. increased maternal age: in this case mothers over 19 years old. This hypothesis was based on finding from Field, Widmayer, Stringer, and Ignatoff, (1980); Jones, Green and Krauss, (1980); Ragozin, Bashman, Greenberg, and Robinson, (1982).

2. more mature motor and neurological responses as measured by the Brazelton Neonatal Behavior Assessment (Waters & Deane, 1982).

3. a mother who exhibited a positive attitude toward her infant prenatally and at three and six months. This attitude was measured by Broussard's Neonatal Perception Inventory A & B, the Parent-Infant
Antecedents of Attachment

Perception Profile and Emde's I Feel Picture Deck
(Broussard & Hartner, 1971; Emde, 1980).

4. the sex of the infant. Mothers have been found
to be more responsive to their female infants
(Crockenberg & Smith, 1982; Moss, 1967).

5. sensitive ratings of maternal-infant interaction
(as evaluated by the Care Index) at three, six and
sixteen months (Crittenden, 1981).

6. mothers who perceived their infants' temperament
more positively (based on data obtained by the Infant
Temperament Questionnaire for four to eight month old
infants) devised by Carey and McDevitt in 1978. This
hypothesis was based on research findings from Bates,
Olson, Pettit, and Bayles, (1982).

7. mothers who were knowledgeable about normal
infant health/development issues. This hypothesis was
based on data collected from the sixteen Parenting
Questions which has eight developmental and eight health
related questions. This hypothesis was based on
research findings from Feiring, Fox, Jaskir, and Lewis,
(1987); Svejda, Pannabecker, and Emde, (1982); Tronick,
Ricks, and Cohn, (1982).

8. lower scores on the Abidin's Parenting Stress
Index and the Holmes and Rahe Recent Life Changes
Questionnaire.
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9. support from spouse/boyfriend, family and friends as reported in the social history. This was based on research findings from Crockenberg, (1981); Crnic, Greenberg, Robinson, and Ragozin, (1983); Mitchell and Trickett, (1980); Powell, (1980).

10. mothers who expressed a greater degree of psychological integration as measured by the TAT cards presented (1, 2, 6GF, 7GF, 8GF).

11. mothers who had a generally positive outlook on life, especially after the early postpartum period (Fleming, Ruble, Flett, & Shaul, 1988; Main & Solomon, 1987; Robson & Kumar, 1980).

12. mothers who had a realistic perception of their early childhood experiences (Lyons-Ruth, Connell, Zoll, & Stahl, 1984; Main & Goldwyn, 1984).
CHAPTER TWO: REVIEW OF LITERATURE

Introduction

Maternal-infant attachment is a research topic that has only recently entered the psychological literature (Belsky & Isabella, 1988). This has been due, in part, to the common belief that the newborn was insensitive, helpless and entirely shaped by his or her environment (Brazelton, 1980). This depersonalization of the baby protected the parents from becoming too attached in an era when infant mortality was high (Beckman, 1977).

Since the overall infant mortality rate has radically decreased in recent decades parents are now encouraged to bond with their infants (Minde, 1986). Recent research has also demonstrated that neonates are very responsive to their environments and are born with inherent differences which can be measured soon after birth (Brazelton, 1980).

The term "attachment" was first adopted by Bowlby (1969) to describe a relatively durable affective relationship between a child and one or more specific persons with whom he or she interacts regularly.
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(Ainsworth et al., 1978; Bowlby, 1973). This bond has also been described as an affectional tie which tends to be enduring and independent of specific situations (Ainsworth et al., 1978). This affectionate bonding is characterized by reciprocity in the behaviors of both the mother and child. If the child faces strange objects or situations, the presence of the mother serves to alleviate distress and promotes comfort and security (Waters & Deane, 1982).

The role of the mother-infant relationship in the early social and cognitive development of the child has been a central question in the psychological literature (Belsky & Isabella, 1988). Although interest in maternal-infant bonding is strong, it is also relatively new since, as recently as a decade ago, students of infancy and early childhood were taught that individual differences in child development could not be predicted on the basis of information obtained during the child's first year of life. Researchers have subsequently found that individual differences in the quality of mother-infant attachment during this period can predict individual differences in the child's subsequent development (Ainsworth, Bell, & Stayton, 1971; Arend et al., 1978; Easterbrooks & Lamb, 1979; Lieberman, 1977;
Antecedents of Attachment


Although this branch of research is considered to be relatively new, the origins of maternal-infant bonding have already been explored by several different areas of psychology (Waters & Deane, 1982). Comparative ethnology, psychoanalytic theory, and behavioral learning theories have inspired the major investigations of infant-mother bonding. Unfortunately these different perspectives are not easily integrated. These areas of psychology make rather different assumptions, set dissimilar tasks for themselves, and utilize different research tools and data bases. In fact, the conceptualizations of infant-mother bonding within these perspectives 'are different enough to warrant distinct 'labels, almost as if each theory referred to a different phenomenon. Comparative ethnologists examined animal behaviors, such as imprinting, and looked for patterns of mother-infant ties in humans (Lorenz, 1950), while psychoanalysts used the mother-infant bond as the primary example of object relations (Mahler, Pine, & Bergman, 1975). Behavioral learning theorists conceptualized mother-infant relations in terms of learned behavioral dependency (Gewirtz, 1972). The term "attachment" was first employed by Bowlby (1969) as an
alternative to the theories of object relations and dependency.

Even though maternal-infant attachment has been extensively explored within the psychological community during the last decade, it is still in the early stages of development (Greenspan & Lieberman, 1988). Classification of major syndromes such as attachment disorders are only beginning to find their way into the psychiatric diagnostic manuals, e.g., Diagnostic and Statistical Manual III-Revised. Research in maternal-infant attachment is well established in the sense that it has generated more research during the last fourteen years than any other period in the life cycle, including adulthood.

The early stages of research in maternal-infant bonding focused on the link between the Strange Situation classifications (Secure, Anxious-Avoidant, or Anxious-Resistant) and later developmental milestones such as preschool performance (Arend et al., 1979; Crittenden & DiLalla, 1984; Hazen & Durrett, 1982; Matas et al., 1978; Pastor, 1981; Main & Weston, 1981; Thomas & Lamb, 1983). Although the strength of this correlation was important to establish, focusing more on the antecedents of maternal-infant attachment allowed insight into the formation of these early relationships
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(Belsky, Rovine, & Taylor, 1984; Crockenberg & McCluskey, 1986; Egeland & Farber, 1984). As the foundations of maternal-infant bonding are explored, earlier and more specific clinical intervention can take place if a maladaptive pattern of bonding is detected.

Although researchers began to examine antecedents of maternal-infant attachment, many studies focused on the influence of just one aspect of this relationship, such as the influence of infant temperament (Bates, 1980). These types of studies gave important insight into maternal-infant bonding since they usually explored the one concept in depth, but they did not consider how other factors also influence this relationship.

Exploration of the mother-infant relationship was especially difficult because there were maternal factors, infant characteristics and the unique interaction of these variables to consider (Osofsky & Conners, 1979; Parke, 1978; Pederson, Anderson, & Cain, 1980; Sameroff & Chandler, 1975; Schwartz, 1979; Thoman, Acebo, Dreyer, Becker, & Freese, 1979; Rutter, 1979; Yarrow, 1979).

Since the maternal-infant relationship begins when a woman discovers that she is pregnant (Leifer, 1977), it is important to examine maternal variables and to follow the changes that continue to take place through
pregnancy, the postpartum period and the child's first year (Belsky & Isabella, 1988; Egeland & Farber, 1984). It is the evaluation of these variables, such as age, social support, emotional status, and personality integration, that contribute to an understanding of the maternal factors that impact upon a mother's relationship with her child.

A crucial factor that influences the maternal-infant relationship is the woman's age when she becomes pregnant (Jones et al., 1980). This allows insight into the mother's developmental level and also gives some generalization into a woman's life experiences and level of emotional development. For example, a female who becomes pregnant at fifteen is probably still trying to establish her own identity in the world and is just beginning to experiment with intimate, longer-lasting relationships outside her family (Erickson, 1950). A woman who first becomes pregnant at age thirty has had time to work through earlier life stages such as establishing her own identity, achieving intimacy and commitment in a relationship with a man (Gatchel & Mears, 1982). Each of these women, just by virtue of their age, will enter into pregnancy and subsequent childcare with different life experiences and expectations (Jones et al., 1980).
Although age provides a guide post for emotional maturity, women at the same age differ as to their level of personality integration. Psychology can describe developmental stages that an individual of a particular age has probably experienced but it cannot determine if she has successfully resolved the conflict inherent to those stages (Coleman, 1979). Further measures of personality testing are needed to lend insight into how the many factors of the personality are integrated. Personality is an important measure to examine since it determines, at least in part, how one orders and perceives the world around her (Gatchel & Mears, 1982).

Even though personality integration is considered to be a relatively stable variable (Byrne & Kelley, 1981), a woman's emotional status is in flux during pregnancy and the early postpartum period (Field et al., 1985), a time of rapid physiological and psychological changes (Jensen, Benson, & Bobak, 1977). In addition, although pregnancy and postpartum periods mark the most rapid and dramatic changes (Fleming, Steiner, & Anderson, 1987) a woman's life is continually changing after the birth of the infant. These changes will be accompanied by differing emotional responses which could influence the mother's perception of her infant (Feldman
& Nash, 1984; Grossman, Eichler, & Winickoff, 1980; Kumar & Robson, 1984; O'Hara, Rehm, & Campbell, 1982).

Because of previous family experiences a mother enters pregnancy and childrearing with preconceived expectations of what roles she should assume (Jensen et al., 1977). These learned expectations include questions such as: a) should my baby be kept on a schedule for feeding and other infant care, b) will my infant be "spoiled" by picking him or her up when crying (Jensen et al., 1977). Some of these factors simply reflect personal or cultural differences, but some of the potentially dangerous expectations to child welfare involve discipline: how it should be administered and when should it be started. When the mother was raised in a family where child abuse was present, if there is no intervention or examination of these practices on the mother's part, she may repeat these patterns with her own children (Belsky & Isabella, 1988; Klaus & Kennell, 1983; Main & Goldwyn, 1984; Ricks, 1985; Sroufe, 1985; Tronick, Cohn, & Shea, 1986).

New mothers bring a lengthy history of experience which influences their expectation of effectiveness (Klaus & Kennel, 1983). Their expectations are initially derived from general levels of competence motivation, but will be enhanced, maintained or
depressed by their experiences with their own infants (Goldberg, 1977). Furthermore, in spite of being mothers, these women continue to interact with the environment in roles which may be unrelated to their behavior as mothers but may impact upon the relationship with their infants (Goldberg, 1977).

From the moment that a woman discovers that she is pregnant, sources of social support become important in the evaluation of herself and later her infant (Jensen et al., 1977). If the news of her pregnancy is welcomed by others and emotional and material support is offered, it helps the mother to feel important and accepted within her social structure. If the woman feels that she lacks support from others she may feel isolated and burdened by pregnancy and later infant care (Leifer, 1977).

A final maternal factor that was examined in this study is the mother's knowledge of normal infant growth and development. If a mother is not aware of infant needs or expects the infant to perform behaviors that are beyond his or her capacity, her perception of the infant will be inappropriate (Feiring et al., 1987; Svejda et al., 1982; Tronick et al., 1982).
Although infants have less life history to consider, they still strongly influence the relationships with their mothers. An initial factor that influences the mother's perception of her infant is the gender of the baby (Jensen et al., 1977). Although some parents do not express a sex preference, it is important to others that their infant be the "right" gender (Jensen et al., 1977). Regardless of parental preference, the sex of the infant colors the parent's expectations (Lamb, 1982).

Beyond their gender differences, infants, even in the earliest hours of life, respond to their environments in different fashions (Brazelton, 1980). Some infants are more alert, nurse eagerly, and are easily quieted by maternal attention which is reinforcing to the mother's sense of competence in her new role. Other infants are more irritable, do not respond to maternal soothing, and refuse to accept nourishment. An infant with this disposition can easily undermine a mother's confidence in her abilities (Goldberg, 1977; Grossman et al., 1980).

Each infant has his or her own rate and pattern of development. These patterns are not necessarily congruent with maternal expectations. For instance, a mother may feel that her infant is not developing as he
or she "should." This further influences the way that she perceives the infant (Tronick et al., 1982). Since each mother and infant are unique individuals, their patterns of interaction are governed both by their individual variables and by how these factors mesh together (Lerner & Lerner, 1983). For example, if an alert and playful infant has a mother who values these qualities there is a good match, but if the same infant has a mother who expects her baby to be quiet and sedate the dyad is unlikely to fulfill each others expectations.

Although each of these factors are assumed to play a role in maternal-infant relationships, the ways in which these variables interact are unique for each mother-infant dyad (Lerner & Lerner, 1983). Most research has attempted empirical descriptions of only small portions of this general model, and there have been only a few studies that have examined the interaction of multiple variables (Bates et al., 1982; Belsky & Isabella, 1988; Belsky, Rovine & Taylor, 1984; Egeland & Farber, 1984).
Maternal Age

A few studies (e.g. Grossman et al., 1980; Jones et al., 1980; Ragozin et al., 1982) have directly examined the effect that maternal age has on maternal-infant bonding. Researchers have found that since age is conceived as a marker for maturity, it is not surprising that the older primiparous mother interacted with their young infants in a more positively affectionate, stimulating manner.

Most of the focus on age and attachment has been based on studies involving teenage mothers. It is well documented that youth is a risk factor for insecure attachment (Field et al., 1980; Jones et al., 1980; Osofsky & Osofsky, 1970; Tronick et al., 1982). Specifically, it was found that teen mothers tended to be less responsive to, and engage in less verbal interaction with, their infants (Jones et al., 1980; Osofsky & Osofsky, 1970). Other studies have found that teen mothers expressed less desirable child-rearing attitudes and had less realistic expectations for infant development than did older mothers (Tronick et al., 1980). The less realistic development and undesirable child-rearing attitudes of teenage mothers as well as the greater measure of difficult infant temperament perceived by teenage mothers may be related to their
unfamiliarity with children due to their youth and primiparity (Field et al., 1980).

Ragozin, Basham, Crnic, Greenberg, and Robinson, (1982) also found a significant relationship between maternal age and maternal-infant attachment. Age was found to play a more significant role than other psychological or social variables examined. These researchers felt that older primiparous mothers, having had more experience in nonparenting roles, were more committed to the parenting experience.

In a study of forty mothers aged 17 to 24 years old, Jones, Green, and Krauss (1980) found that the age of the mother, unconfounded by socioeconomic status, race, or marital status, played a role in how responsive she was to her infant. Comparisons of mothers above and below age 19 found that mothers 19 years and older demonstrated more maternal responsiveness while feeding their infant and during the infant's physical exam. Mothers older than 19 years always made body contact with their infant during feeding. During the infant's physical examination, mothers aged 21 to 23 years old sought proximity to their infant whether or not the infant was distressed. Their findings suggest that the mother's age in itself was related to sensitivity of maternal response to her infant's signals. Prior to the
time of this study (1980) the age of the mother, as a potentially confounding factor influencing maternal responsiveness, had not previously been examined as a main effect in studies of maternal and/or infant attachment, nor has it always been controlled. At present many investigators still ignore maternal age as a potentially significant factor.

Maternal Personality Integration

A maternal factor that has been found to be related to the quality of the relationships they establish with their infants involves personality variables (Belsky & Isabella, 1988; Egeland & Farber, 1984; Speiker & Booth, 1987). It has been hypothesized that women who are skilled in providing sensitive care to their babies may simply be utilizing the empathy that they had successfully employed in other relationships, such as with mates or friends (Belsky & Isabella, 1988).

A woman's relationship with her baby begins during pregnancy (Jensen et al., 1977; Leifer, 1977). Those women who had adjusted better to the pregnancy itself—that is, those who had felt more positive and accepting of the physical and psychological changes and who had felt emotionally more prepared for motherhood—seemed better adapted as mothers of one-year-olds (Grossman et
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al., 1980). These researchers hypothesized that good mothering was facilitated most importantly by a woman's own psychological integration.

Many researchers, such as Belsky and Isabella (1988), Egeland and Farber, (1984) and Speiker and Booth (1988) have attempted to find a correlation between maternal personality factors and the security of attachment with their toddlers as measured by the Strange Situation (Ainsworth & Wittig, 1969).

There are several maternal personality factors which have been associated with Secure Attachment in the Strange Situation. Mothers of secure children tend to view their lives and life changes less negatively than mothers of children who display insecure patterns of attachment (Speiker & Booth, 1988). They also demonstrated higher levels of interpersonal affection (Belsky & Isabella, 1988). In a longitudinal study of 160 mother-infant pairs, Maslin and Bates (1983) found that mothers who appeared on a series of personality tests to be more nurturant, understanding, and autonomous were rated as having infants who were securely attached to them. These mothers also had test scores suggesting that they were less aggressive and more inquisitive. In addition these mothers seemed to enjoy physical sensation, and to be responsive to
stimuli. The level of self-esteem has also been related to the development of maternal-infant bonding. Researchers also found that mothers who displayed significantly higher levels of general self-esteem were much more likely to have securely attached infants at one year (Ricks, 1985; Tronick et al., 1982).

Personality factors have also been associated with insecure attachment classifications yielded by the Strange Situation. Mothers with infants who were classified as Anxious-Avoidant had significantly poorer levels of ego strength than mothers of either Secure or other insecure infants (Belsky & Isabella, 1988). Different personality measures were reported by mothers of Anxious-Resistant toddlers (Speiker & Booth, 1988). These mothers' expressed the most satisfaction with their overall life situation and circumstances but the least confidence in coping with motherhood tasks (Levitt, Weber, & Clark, 1986; Speiker & Booth, 1988). Mothers of infants destined to be Disorganized-Disoriented had similar scores to the mother of Secure infants on most measures, such as level of depression and satisfaction with partner participation in childcare, but the distinctions between the Disorganized-Disoriented and Secure groups increased over time (Speiker & Booth, 1988). The mothers of infants subsequently classified as
Disorganized-Disoriented were less satisfied with their partners participation in child-care and were much less likely to rate their infants as having an easy temperament. These mothers were also found to have internalized their depression while reporting mixed external perceptions. Mothers of Disorganized-Disoriented infants expressed relatively high overall satisfaction on the postpartum self-evaluation scales, including the measure of their partner's participation in child care, but then had contradictory low social support scores. In addition to fewer social resources, the mothers of Disorganized-Disoriented infants had fewer interpersonal skills, not only during adult-to-adult conversations but also in interactions with their infants (Spel'ker & Booth, 1988). Main and Solomon (1987) found that mothers of Avoidant-Ambivalent toddlers experienced more chronic life difficulties and reported higher levels of depression than other mothers. These mothers perceived their pregnancies as being more physically uncomfortable in comparison to other mothers in the sample. Overall, mothers of Avoidant-Ambivalent toddlers were found to have a greater level of insecurity and a more inadequate rearing environment than the other mothers included in their study.
Maternal Emotional Status

During pregnancy, the postpartum period and the first year of the baby's life, a mother experiences an emotional flux in response to her changing environment (Jensen et al., 1977). Although most changes, such as postpartum depression, are transient (Fleming et al., 1987), a mother's emotional status continues to influence the relationship with her baby (Fleming, 1989). Even before the birth of the child, researchers have found that there are differences in maternal behavior between depressed and nondepressed women identified on the basis of reported pregnancy problems, such as marital difficulties, ambivalence about having the child, and general state of mind (Crnic et al., 1983; Feldman & Nash, 1984; Field et al., 1985; Grossman et al., 1980; Kumar & Robson, 1984; O'Hara et al., 1982). This effect was evident even during the postpartum period (Grossman et al., 1980). A mother's mood not only influenced how physically affectionate she was with her infant, it also influenced the patterning of her interactions. At both the one- and three-month periods, the more contented mothers showed a contingency pattern in which they responded to the infant's vocalizations (both cry or noncry) by vocalizing
themselves and by engaging in caretaking activities (Fleming et al., 1988). A longitudinal study performed by Feldman and Nash (1984) found that a positive pregnancy experience in terms of mood and self-satisfaction was linked to a positive attitude toward the demand of parenthood. This positive attitude toward parenthood remained evident when the infant was six months old. The same researchers found that by sixteen months postpartum, however, no differences were found between formerly depressed and nondepressed mothers in either the mothers' or infants' behaviors. When examining the effect of a woman's emotional status it is important to consider factors such as fatigue that may affect mood after the birth of the child (Fleming et al., 1988; Grossman et al., 1980).

The infant may act as an active contributor to the mother's emotional status, especially over time (Cohn & Tronick, 1983; Robson & Kumar, 1980). Although the infant's state was not a significant predictor of maternal adequacy and feeling about caretaking at one month postpartum, it gained significance by three months postpartum (Fleming et al., 1988).
Maternal Perception of Early Childhood Experiences

Child development literature suggests that children learn through the powerful process of imitation or modeling (Coleman, 1979). Thus during her own childhood from the way she was mothered and through play, observation, and practice, a woman learned a repertoire of mothering behaviors (Jensen et al., 1977). By the time of conception, a future mother has already learned whether or not infants are to be picked up when they cry, how much they should be carried, and whether they should be chubby or thin (Tronick et al., 1986). Interestingly, these "facts," are obtained when children are very young, and become unquestioned imperatives for them throughout life (Sroufe, 1985). Unless women become aware of, and painstakingly reexamine these learned attitudes and behaviors, they will unconsciously repeat them when they become mothers (Klaus & Kennell, 1983).

A mother brings a wealth of experience and expectations into the maternal-infant relationship. She has as a child already been involved in a relationship with her own mother and has memories and perceptions of how they interacted. Main and Goldwyn (1984) performed a study involving thirty women, mostly in their thirties, who had been interviewed about their own early childhood
experiences. This study revealed that mothers who were unable to integrate memories and reactions of malignant experiences into current understanding were more likely to repeat these events with their own children. It was also found that the mother's apparent rejection by her own mother in childhood strongly related to her own infant's avoidance of her after a brief separation in the Strange Situation. Ricks (1985) reports that mothers of securely attached one-year-olds recalled significantly more acceptance and less rejection from each of their parents than did mothers of insecurely attached one-year-olds.

**Measures of Maternal Stress**

Since the mother-infant dyad exists in an open system, it is important to remain aware of areas of maternal stress which may impact upon the relationship with her infant (Crnic et al., 1983; Feiring et al., 1987; Sroufe, 1985). Sources of this stress may include both infant characteristics and events extrinsic to the maternal-infant dyad.

Although pregnancy can be an exciting time for the mother, it can also be a time of stress because of rapid physiological changes and perhaps ambivalence about having a child (Crnic et al., 1983; Field et al., 1985;
Leifer, 1977). Another type of stress that all mothers have to contend with is recovery from the process of childbirth. It was found that the mother's physical condition during the early postpartum period influenced maternal attitudes toward her child (Lips, 1985). This effect was still evident at two months postpartum (Grossman et al., 1980).

Although some sources of stress are intrinsic to the mother, the infant's characteristics such as temperament may also contribute to measures of maternal stress. While an easy baby can be reassuring to the mother, a difficult infant can be a constant source of stress (Crockenberg & McCluskey, 1986; Goldberg, 1977; Thomas & Chess, 1977). Another source of infant induced stress would be infant illness (Feiring et al., 1987; Levitt et al., 1986; Sroufe, 1985).

Finally, stress can be associated with factors that exist outside the mother-infant relationship such as a change in the relationship with the father of the baby (Belsky, 1984; Belsky & Isabella, 1988), a death in the family (Levitt et al., 1986; Waters, 1978) or moving to a new community (Crockenberg, 1981; Leifer, 1977).

Although most sources of stress can be buffered by an adequate support system (Belsky & Isabella, 1988), many mothers are not satisfied with the amount of social
support that they are receiving. In the Levitt, Weber, and Clark (1986) study over half of the sample of 43 mother-infant dyads expressed some dissatisfaction with their support networks.

**Sources of Maternal Social Support**

Social support is a variable that comes into play during the earliest stages of pregnancy and continues to influence the mother's perception of herself and her baby throughout the period of infancy (Belsky, 1984). Support in parenting provides: 1) emotional support; 2) instrumental assistance; and 3) social expectations (Mitchell & Trickett, 1980; Powell, 1980). Other factors associated with social support include: 1) guidelines to successful parenting; 2) a sharing of the responsibility placed on the mother for shaping her child's personality; 3) cultural support for the incorporation of the maternal role; 4) formal or informal preparation for parenthood; and 5) cultural support for the incorporation of the maternal role; all are important factors associated with a support system (Cohler, Weiss, & Greenbaum, 1970; Wortis, 1971).

In theory, the support that mothers have available to them should influence their availability and responsiveness to their infants. This finding has been
repeatedly replicated in the literature (Crnic et al., 1983; Crnic et al., 1984; Crockenberg, 1981; Cutrona, 1984; Levitt et al., 1986; Melges, 1968; Svejda et al., 1982; Tinsley & Parke, 1984). Particularly significant are the mother's relationship with the father of the baby (Belsky, 1981; Grossman et al., 1980; Levitt et al., 1986; Tronick et al., 1986) and her relationships with significant others (Cochran & Brassard, 1979; Crnic et al., 1983; Levitt et al., 1986). Although all forms of social support are beneficial to the foundation of maternal-infant bonding, the source of this support influences the relationship in different ways. Support from the father of the baby may make the mother feel that he is taking an active interest in both her and the baby, helping them to become a family (Belsky, 1984). Support from relatives and friends may reflect a situation in which the mother feels that she and the baby are secure and accepted within her social network (Feiring et al., 1987).

Systems of social support seem to be especially significant with isolated families living at a distance from their extended families (Leifer, 1977). There is often no one to assist the new mother so she must assume total responsibility for the infant whose need for mothering in the early months is most intense. Other
families in need of social support are those who experience major changes in the ecology of the family such as moving to a new community or death of a close relative, all of which can have a devastating effect on the pregnancy, early maternal caretaking, and affectionate interaction with the young infant (Klaus & Kennell, 1983).

Other studies have focused on who offers the mother social support. Beyond the immediate family (i.e. father of the baby), extended family members often give assistance in major crises, such as recovery from illness, whereas friends are more likely to give help for day-to-day problems of short duration (Croog, Lipson & Levile, 1972; Lee, 1979; Troll & Bengston, 1979).

The amount of social support that a mother receives can have a long-term impact on her relationship with the infant (Crockenberg, 1981). The adequacy of the mother's social support is clearly and consistently associated with the security of infant-mother attachment. Low social support was associated with high resistance, high avoidance, and with insecure attachment (Crockenberg & McCluskey, 1986). Moreover, lack of support had its strongest effect on the irritable babies and their mothers suggesting that the availability of social support is particularly critical when the family
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is under stress. It is noteworthy, in contrast, that less irritable infants appear somewhat impervious to the low support environments which disrupt the development of their more irritable peers (Crockenberg, 1981; Levitt et al., 1986).

Other longitudinal researchers (Belsky, 1981; Cutrona, 1984; Fleming et al., 1988; Power & Parke, 1984) have found that maternal sources of social support do not impact upon the maternal-fetal relationship but become a significant factor after the infant is born.

Although most studies find that social support has an important impact on maternal-infant bonding, another study has failed to verify this fact. Belsky and Isabella (1988) found no evidence that the social support systems of mothers of secure and insecure infants were different. This finding was consistent longitudinally over the three periods of measurement (prenatal, three and nine months).

Knowledge of Normal Infant Growth and Development

Since there is no formalized preparation for motherhood many women enter into it with a limited knowledge of normal infant growth and development (Tronick et al., 1982). It has been found that increased educational opportunities, including prenatal
education, may enable the mother to identify additional ways of relating to her infant and providing for his or her care (Svejda et al., 1982) while less education is a risk factor for insecure attachment (Feiring et al., 1987).

**Maternal Perception of the Infant**

Even prior to delivery a mother's age (Jones et al., 1980), level of personality integration (Jensen et al., 1977), emotional status (Fleming et al., 1988), perception of her own early childhood experiences (Lyons-Ruth, Connell, Gruenbaum, Botein, & Zoll, 1984) and knowledge of infant growth and development (Tronick et al., 1982) influence her perception of her fetus. These factors continue to color affect perception of the infant after birth.

During pregnancy, a mother's perception of the fetus has been found to influence later development of attachment to her infant (Fleming et al., 1987; Grossman et al., 1980). In a sample of nineteen white middle class primigravidas, with an age range of 22-33 years old, Leifer (1977) found a relationship between emotional attachment toward the fetus during pregnancy and maternal feelings toward the baby at postpartum. These findings indicate that the degree of affective
involvement of the mother by the third trimester of pregnancy is an accurate predictor of later maternal feelings towards the new infant for at least two months.

There is evidence to support the contention that it is not the infant's characteristics per se that influences maternal-infant attachment but the manner in which the mother perceived these attributes (Lerner & Lerner, 1983). The same temperamental attribute could be associated with either negative or positive parent-child interactions, depending on the mothers' orientation to that attribute. Hence, the mother of an irritable baby may provide more responsive caregiving if her personal beliefs predisposed her to view the irritability as an indication of the baby's special need rather than as evidence of spoiling or of her own incompetence (Belsky, 1984; Feiring et al., 1987; Tronick et al., 1986).

It has been well documented in the literature that how a mother perceives her infant's temperament influences the care that she administers. Several longitudinal studies examined the relationship between infant irritability and maternal attitudes. Maternal attitudes of unresponsiveness and inflexibility, linked with the actual amount of time it took the mother to respond her infant's crying, predicted the amount of
time an infant fussed (Bell & Ainsworth, 1972). The mothers who perceived their infants as being difficult were also found to spend less time vocalizing and interacting with them (Milliones, 1978). It was maternal attitudes, not neonatal irritability (as measured by the Brazelton Neonatal Assessment Scale), that predicted the total amount of infant fussing and crying from one to twelve months (Sameroff, Krafchuk, & Bakow, 1978). The less responsive mothers had infants who persisted in crying, while infants of sensitive mothers not only cried less, but also developed noncrying modes of communication (Belsky, Rovine, & Taylor, 1984; Campbell, 1979; Crockenberg & McCluskey, 1986; Crockenberg & Smith, 1982). It was proposed by Bell and Ainsworth (1972) that mothers' beliefs about *spoiling* determined their responsiveness or unresponsiveness to their babies' fuss and cry signals, and, thereby, the amount of time the babies were observed to fuss and cry.

In a longitudinal study Broussard and Hartner (1971) found that the way the mother relates to her infant will be influenced by her perception of his or her appearance and behavior. They further postulated that the infants' behavior would, in turn, be affected by the quality of care delivered by the mother. These
authors found that if the mother perceived her baby as being better than the "average infant" several days after delivery and at one month postpartum, there was a greater likelihood (82.4%) that the child would be diagnosed as healthy at age four and a half years old. Of the infants who were perceived by their mothers as being more bother than the "average infant" during the first month postpartum only 31.8% of these children were classified as being healthy at age four and a half years old. This study further revealed that the need for psychological intervention and probability of risk was unrelated to prenatal or postpartum complications, age of the mother at delivery, type of delivery, sex of the child, religious preference of the mother, the father's occupation, changes in family income since delivery, or finally the educational level of the either father or mother.

Belsky and Isabella (1988) found that over time, mothers whose infants developed secure attachments to them came to regard their babies as less of a challenge to care for (in terms of unadaptability and unpredictability), whereas those mothers whose infants developed insecure attachments experienced their infants as becoming more of a challenge.
Infant Gender

One of the first observations, classification, and often the first question asked by parents and others concerns the newborn's gender (Jensen et al., 1977). The child's gender, determined at conception, continues to influence his or her experience with the world.

Although the research findings have been mixed, some researchers found that mothers respond differently to their children because of their gender (Moss, 1967). It was reported that mothers demonstrated greater responsiveness to female infants when they cried relative to male infants (Crockenberg & Smith, 1982). The researchers hypothesized that this sex difference in responsiveness could have occurred because the female infants were 'more alert and potentially more rewarding' to their mothers.

Another study involving 168 mothers of six month old infants did not detect any differences in attachment that were related to sex of the infant (Bates et al., 1982). These researchers reported that while there have been several previous reports of differential maternal behavior, these results were likely to be affected by the age and social background of the mothers.
Although research reports on maternal responses to children related to their gender have been mixed, there are documented sex differences in infants' response to their environment (Egeland & Farber, 1984).

Observations of maternal-infant interactions indicated that male infants tended to be more vulnerable to caretaking differences. Mothers of Anxious-Avoidant boys were less sensitive and less cooperative than mothers of Securely Attached boys. These maternal behaviors had an impact on the attachment behaviors of male infants. Maternal cooperation and sensitivity did not, however, discriminate among attachment classification for female infants.

Conversely, stressful life events seemed to impact more upon female than upon male infants. The mothers of Anxious-Resistant girls experienced more turmoil in their lives during the first year after delivery than mothers of Anxious-Avoidant or Securely Attached girls. Life stress did not discriminate among attachment groups for boys.

The proportion of female babies classified as Secure or Insecurely Attached was similar and apparently not influenced by the mother's living arrangements. The majority of boys living in two-parent intact families were Securely Attached, and the majority of those living
with mother only were Insecurely Attached. Most of the mothers who were involved but not living with a man had boys who were classified as Anxious-Avoidant.

**Differences in Neonatal Responsiveness**

The Brazelton Neonatal Assessment Scale, used to assess neonates behavioral and neurological status, has allowed researchers to obtain an objective rating of an infant's interactive behavior with the environment.

Longitudinal research has attempted to correlate results of the Brazelton Neonatal Assessment Scale with subsequent maternal-infant bonding as classified by the Strange Situation. In one study (Waters et al., 1980) the Brazelton was administered to one hundred economically disadvantaged infants who were subsequently observed in the Strange Situation procedure at twelve months. Infants who were later classified as being Anxious-Resistant showed signs of motor immaturity, unresponsiveness, and had problems with physiological regulation as neonates. These infants were also less capable of orienting and regulating their state and demonstrated less motor maturity than babies who later developed Secure attachment relationships. The researchers hypothesized that while these infant characteristics may have not been directly correlated
with the Anxious-Resistant attachment, they may have influenced the mother's perception of the infant and thereby the attachment relationship.

Although correlations between the Brazelton Neonatal Assessment Scale and the Strange Situation have been found, it was also discovered that the Brazelton was most sensitive when administered within the infant's first week of life (Waters et al., 1980). Results of the Brazelton Neonatal Assessment Scale that were significant predictors of subsequent Strange Situation at seven days were no longer significant by the tenth day. It seems that all healthy infants reach a degree of neurological and behavioral maturity at some point (presumably about ten days) but not all newborns meet environmental demands with equal ease. It is possible that infants who have difficulty maintaining physiologic homeostasis and orientation to the outside world at seven days of life may experience subsequent difficulties in coping with demands encountered even in normal developmental circumstances (Waters, Vaughn, & Egeland, 1980).

Belsky and Rovine's (1987) study of 184 Caucasian middle- and working-class families correlated the Brazelton Neonatal Assessment Scale with the Strange Situation and found that newborns displaying more
tremors, startles, and less motor maturity on the 
Brazelton exam seemed most vulnerable to behavioral 
disorganization in the Strange Situation. These 
researchers also report that infants who displayed less 
distress in the Strange Situation behaved in a more 
alert and positively responsive manner as newborns and 
were rated by their mothers when three months of age as 
being less fussy, unadaptable, dull, and unpredictable, 
i.e. easier to care for.

Although some correlations between the Brazelton 
Neonatal Assessment Scale and the Strange Situation have 
been established, other researchers failed to replicate 
these findings, especially when the characteristics of 
the neonate fall within the normal range of functioning 
(Belsky & Isabella, 1988; Grossman et al., 1980).

**Maternal Perception of Infant Temperament**

Many studies that explored antecedents of maternal-
infant attachment included a classification of the 
infant's temperamental qualities ranging from easy to 
difficult. Although infant temperament was first 
described by Thomas, Chess, and Birch (1968), it has 
been elaborated upon by many researchers, such as, 
Campbell (1979); Crockenberg and Smith (1982);
Infant temperament has been described as a collection of objectively definable characteristics that: 1) can be identified shortly after birth; 2) show some degree of continuity throughout the life span; 3) are to a certain degree determined genetically; and 4) interact with life experience (Plomin & Rowe, 1979; Weber, Levitt & Clark, 1986). It is hypothesized that since temperamental dispositions serve to organize behavior into coherent patterns they should increase the predictability of the infant's behavior and accordingly modify caretaker behavior (Brazelton & Yogman, 1986; Goldsmith & Campos, 1982). Thomas and Chess (1977) hypothesized that temperamental individuality is well established by the time the infant is two to three months old and has its origins in genetic, prenatal and early postnatal parental influences. These researchers feel that familial influences exclusive of the parents can be considered to be of negligible behavioral significance for the first few months of life.

Even if infant temperament is rooted in factors that are not easily influenced by extrinsic factors, it seems that instruments utilized to measure this factor, such as the Infant Temperament Questionnaire (Carey,
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1970; Carey & McDevitt, 1978), are not. Researchers have found that temperament questionnaires are likely to be influenced by subjective factors of maternal personality variables such as anxiety, level of suspicion, and impulsiveness (Bates & Bayles, 1984; Sameroff, Seifer, & Elias, 1982; Vaughn, Bradley, Joffe, Seifer, & Barglow, 1987; Vaughn, Taraldson, Crichton, & Egeland, 1981), as well as by the child's actual behavior such as fussing and crying (Bates, 1980; Bates & Bayles, 1984; Kelly, 1976; Stifter & Fox, 1990).

Although a temperament questionnaire completed by the mother may not be substantiated by ratings of independent observers, it does give researchers insight into how she perceives her infant (Crockenberg, 1986). During the infancy period, maternal responses are strongly influenced by whether the infant has the temperamental constellation of the Easy or Difficult Child. If the mother believes that the child's development and disposition are influenced by her needs, motivations, and attitudes, an Easy Child will reassure her that she is an adequate, healthy and loving mother. In contrast, the mother can hardly ignore the increased demands placed upon her by a Difficult Child. Depending on the mother's personality structures and the socio-cultural pressures of her group, the special child-care
demands made by a difficult infant will probably create one of three types of maternal responses. The mother may feel threatened and anxious because she feels that the turmoil and difficulties of care expose her inadequacy in the maternal role. Another possibility is that the mother may blame the infant and resent the extra burdens and demands he or she puts on her. Finally, the mother may be intimidated by the infant's frequent loud screaming and resistance to her efforts to care for him or her (Chess & Thomas, 1983; Crockenberg, 1986).

The effect of the child's temperament was not determined in any uniform way by congruence or lack of congruence of the mother's and child's characteristics. In some instances it was difficult for a mother to understand a baby with temperamental traits different from her own (Lerner & Lerner, 1983). As a general rule, the nature of the mothers' response to the infant's temperament was determined not so much by the degree of congruence with her own personality characteristics as by consonance with her own goals, standards and values (Lerner & Lerner, 1983; Thomas & Chess, 1977).
Infant temperament influences the mother in two ways. First, the overall infant temperament (easy or difficult) impacts upon the mother's sense of competence as a caretaker. Secondly, the mother's perception of the infant's temperament influences her relationship with her baby (Egeland & Farber, 1984). Although the baby's temperamental characteristics play a role in maternal perception of her infant, it appears that mothers play the dominant role in shaping the quality of attachment (Crittenden & DiLalla, 1984).

**Maternal-infant interaction**

When evaluating mother-infant interaction it is important to remain aware that women, when they become mothers, have a lengthy history of previous relationships which determine their general expectation of being effective (Freese & Thoman, 1978). Furthermore, mothers still continue to interact with others and these interactions may impact upon the relationship with their infants. The infant has no prior experiences and bases his or her perceptions on the quality of interactions that take place with the mother and significant others (Goldberg, 1977).
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Although maternal-infant interaction cannot be evaluated by traditional methods utilized with adults, infants are born with a repertoire of interactive skills which can be measured. Not only are neonates capable of interaction, they come equipped with responses that facilitate interaction and bonding with their mothers (Appleton, Clifton, & Goldberg, 1975; Richards, 1974; Stern, 1974; Treverthen, 1973).

Soon after birth, a healthy neonate can focus his or her eyes and follow a human face, the infant's preference for looking behavior during states of alertness (Carpenter, 1974; Fantz, 1965; Fantz & Miranda, 1975; Haaf & Bell, 1967; Haith, 1981; Salapatek, 1968; Salapatek & Kessen, 1972; Spitz, 1965; Wolff, 1966). In the auditory mode, infants hear and attend to voices (Brazelton, 1980; Eisenberg, 1965; Klaus & Kennel, 1976), are able to discriminate different voices (Boyd, 1975), prefer female over male voices (Kagan & Lewis, 1965), and are able to make some of the discriminations which are unique to speech perception (Eimas, Siqueland, Jusczyk, & Vigorito, 1971; Trehub & Rabinovitch, 1972). To facilitate further interaction and attachment newborns tend to react with their entire body and were found to move their arms and legs synchronously with the rhythm of the speaker's
voice (Condon & Sandler, 1974). Neonates also smile and frown in response to pleasant or distressing events (Brazelton, 1980).

A baby must utilize the language of emotional expression to provide messages for survival as well as for loving and social bonding (Emde, 1984). The infant must express a range of emotions to engage the mother, including not only positively-toned emotions of happiness, surprise, and interest, but also negatively-toned ones such as anger, distress, disgust and sadness. The infant's emotional signaling allows the mother to assess both the current state of contentment and corresponding need for intervention.

Although it has been less often emphasized, the infant's emotional expressions in themselves satisfy an important need for the mother. For effective bonding to occur, it is important that the infant be emotionally available and responsive to the mother. The infant must make his or her needs known and also communicate to the mother that she is needed and appreciated. Optimally, infant emotional expressiveness lends itself to interactions that are varied, interesting, dynamic, and, on the whole, rewarding (Emde, 1980).
Although infants come well equipped to capture adult attention and to stimulate interaction, they are only competent to the extent that effective and appropriate care can be elicited from the environment. Thus, newborn's repertoire, although efficient in the age-appropriate sense, can be totally ineffective when paired with an unresponsive caretaker (Goldberg, 1977).

Patterns of interaction are crucial even during the earliest weeks, since it is theorized that the infantile and maternal behaviors that compose mutual bonding such as, gazing, affective sharing, vocalizing, holding, touching, clinging, and physical proximity subsequently lead to psychological interpersonal attachment (Mahler & Feur, 1968) and psychological structuring (Freud, 1965).

An infant uses his or her repertoire of interactive skills in attempt to control the social environment. Within the first two months researchers have found patterns of behavior that are already reserved for the mother and father (Brazelton, & Yogman, 1986; Yogman, 1982; Yogman, Lester, & Hoffman, 1983).

When the infant is successful in communicating his or her message to others, positive emotions are generated and the infant gains a sense of effectiveness. When the infant is unsuccessful,
negative emotions arise and a sense of helplessness results. Although the infant may be using age appropriate behaviors when interacting with the social environment, a mother who is insensitive may be obtuse to his or her signals. During interactions emotions are not magically transferred from mother to infant but rather the infant generates his or her own emotions. These emotional responses are based on the infant's interpretations of the emotional input provided by the mother in relation to his or her own interactive goal. From the emotions generated during social exchanges an emotional mood and interactive pattern become internalized in the child (Emde, 1983).

Attachment theory proposes that these skills permit children to begin to create internal representational models of their mothers based on their cumulative experience with them (Bowlby, 1969; Emde, 1983). These models consist of the infant's expectations of the mother's behavior in the context of the baby's own behavior and of the emotional flavor of the interaction. The models are considered precursors of future ego development and cognitive patterns. It is from these experiences that the infant shapes his or her preferred behavioral patterns. If these patterns are successful in early infancy, chances are they will be
then be repeated, learned, and eventually become a preferred pattern in the older infant. In this way the infant who processed past experiences as being fearful will tend to approach a novel situation in a fearful manner and disengage from it even before confronting it (Crittenden, 1984; Tronick et al., 1986).

An experiment was performed by Tronick, Als, Adamson, Wise, and Brazelton (1978) which illustrated the point that infants practice behavior patterns that have been successful in the past. In this study mothers were asked to distort the normal interaction pattern with their infant by maintaining a still-face. Infants who tried to elicit emotional expression from their mothers during the still-face were the infants of mothers who were more sensitive in their normal interactions. In contrast, infants of mothers who were insensitive did not attempt to elicit an emotional response. Under- and overcontrolling mothers did not allow their infant to have control over the interaction so their infants did not try to change the interactive environment. Thus as early as six months infants of more sensitive mothers came into a stressful situation with a sense of their own effectiveness, expecting what they did to make a difference. Infants at six month whose mothers have been nonreciprocal in their
interactions came into new stressful situations with feelings of helplessness.

A pattern of learned successful interaction patterns applies to the mother as well. When the mother correctly interprets her baby's signal she feels effective in her maternal role. When the mother tries different interventions that do not soothe the infant a sense of failure prevails (Demos, 1984). It is important to note that the predictable, readable, responsive infant has the potential for "capturing" the initially unresponsive mother into cycles of effective interactions by generating maternal feelings of efficacy. Similarly, the unpredictable, unreadable, unresponsive infant has the potential for "trapping" an initially responsive mother in cycles of ineffective interaction by generating parental feelings of failure and helplessness (Goldberg, 1977).

There are differences between how mothers and infants interpret their relationships as well (Tronick et al., 1986). Because of the differences in their development, the infant's reactions are largely affected by the immediate external and internal stimuli, while the mother is obviously more developed. The mother is not only capable of true empathy, she is affected by other factors, historical and social, that modify her
self-esteem and in turn her interactions with her infant. When these historical factors are positive, the mother's sensitivity to her infant is increased; if they are negative, her behavior is likely to be disrupted and less sensitive.

Although maternal-infant interaction is an important precursor to bonding, during the first year of life the baby's representative model of the mother usually remains open to change (Mahler et al., 1975). Sameroff and Chandler (1975) have noted that early developmental difficulties generally recover unless they are maintained by features of the caretaking environment. But to the extent that the mother's interactive behavior is a function of the infant's own behavior, early difficulties can be expected to limit the quality of the caregiving environment. This may be especially true when the caregiver is very young, not well, faced with competing demands, or otherwise under stress (Waters et al., 1980).

There are other factors to consider when evaluating maternal-infant interactions. When examining the interaction between mother and child, it is important to be aware of the infant's state since this will influence the infant's perceptions of the mother's actions. If an infant is well rested and fed he or she is more likely
to be in a positive state and will not be as aware of
the mother's "mistakes," such as bad timing,
inattentiveness, rough handling, or impatience. Indeed,
at such times it seems as if the mother's total gestalt
is more important as the sustaining source of any
particular response or behavior she may produce. If
however, the baby is fussy, tired, hungry, and generally
irritable, then he or she seems to become much more
discerning and demanding. This irritation is contained
only if the mother is well tuned to her infant's mood.
At such times even little "mistakes" are clearly
perceived by the infant and responded to with protest
behaviors (Demos, 1984). It should be noted that
sensitive mothers do not have perfect interactions with
their infants. But sensitive mothers do respond more
flexibly to their infant's feedback than insensitive
ones (Crittenden, 1981).

As the infant becomes older, the mother must be
flexible enough to change her patterns of interaction to
allow the infant to become more aware of his or her
burgeoning autonomy. When the infant is about six
months of age another social process, reciprocity,
begins to emerge (Emde & Harmon, 1972; Spitz & Wolf,
1946). Reciprocity becomes possible when the infant is
able to give the mother clear signals about his or her
enjoyment during the maternal-infant interaction. This gives the mother the necessary feedback to modify her behavior in order to maintain or regain her infant's interest. Thus, a cycle of signaling and adaptation was maintained. At the point where the mother can permit the baby to be the leader or signal giver, the mother can recognize and encourage the baby's independent search for and response to environmental cues. It is when these steps are taken that the infant's feeling of competence and voluntary control over his/her environment becomes realized. This leads to a sense of competence (Mahler et al., 1975).

Although both mother and baby contribute to their interactions the direction of effects is from caregiver to infant (Crittenden, 1984). This research finding is important because most of the therapeutic interventions involve the mother. It seems most likely that the modification in maternal behavior will result in the infant's changed behavior (Crittenden, 1985). The infant may contribute to better dyadic interactions by being more satisfied and cooperative (Egeland & Farber, 1984).
Infant Developmental Status

A unique study correlated the Brazelton Neonatal Assessment Scale and the Bayley Scales of Infant Development at ten weeks (Sostek & Anders, 1977). The subjects were eighteen normal, term infants residing in a foundling nursery. Their mothers ranged in age from 15 to 23 years. The total of an apriori Brazelton scoring dimensions and neonatal state of control were predictive of Bayley mental quotients at ten weeks. This study also included the caretakers' judgements of temperamental intensity and distractibility which correlated with the Bayley scales and the Brazelton dimensions.

Although the Bayley Scales of Infant Development are a good measure of infant development and progress, there was no evidence found to suggest that the Developmental Quotient (DQ) yielded by this scale is related to differences in attachment classifications by the Strange Situation (Egeland & Farber, 1984; Matas et al., 1978; Pastor, 1981; Waters et al., 1979).

Strange Situation

The Strange Situation was developed as a validating instrument to serve as the culmination point in the extended observations of 23 mother-infant dyads.
throughout the first year of life (Ainsworth et al., 1978). These observations were based on Bowlby's (1969, 1973) theory of attachment.

The Strange Situation is a laboratory procedure which takes place in eight carefully timed periods, each lasting approximately three minutes. Before the onset of the Strange Situation the mother and baby are introduced to the playroom by the experimenter. The Strange Situation is comprised of the following observations which all take place within the controlled setting of a playroom. First the mother and child are observed alone together. During the second phase a stranger to the child enters the room. After about three minutes the mother leaves the baby and stranger alone. During the fourth phase the mother returns and the stranger leaves. The mother then leaves child alone in the room full of toys. After the child is left alone for about three minutes the stranger again enters the playroom. Finally during the eighth phase of the Strange Situation the mother returns and stranger leaves (Ainsworth & Wittig, 1969).

Since this situation is stressful for the infant, the experimenter(s) can observe the infant's reactions to the mother, the stranger, and being left alone. The infants are given the following ratings concerning
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security of attachment Secure, Anxious-Avoidant, Anxious-Resistant, Disorganized-Disoriented, or Avoidant-Ambivalent based upon observations made during the different phases of the Strange Situation.

Attachment, as measured in the Strange Situation, is based upon the perception of attachment being a specific, enduring relationship characterized by the infant's use of adult proximity as a means of assuring care and protection. In order for a baby to rely upon or trust specific adults, those adults must have been responsible in early months for predictable and consistent behavior. This trust would develop when the adults concerned had demonstrated a propensity for consistent, appropriate and prompt responses to the infants' signals (Lamb, 1987). The Strange Situation assessment is usually carried out with infants after the first year of life since it gives evidence of the child's cumulated social and emotional history (Spitz, 1965).

Although maternal-child bonding is usually not classified until the end of the child's first year, there are earlier stages of attachment that must be successfully completed before a secure relationship can be developed (Ainsworth et al., 1978).
From birth, infants are most responsive to human stimuli, although during the preattachment phase the neonate does not discriminate from one person to another.

The phase of attachment in the making usually begins around the infant's eighth week of life. During this phase the infant not only can clearly discriminate unfamiliar from familiar figures, but can also discriminate between one familiar figure and another. If simple preference of one figure over another was the criterion of attachment, then one could identify a baby's attachment to a preferred figure during this phase.

When the child becomes mobile, usually by nine months of age, the phase of clear-cut attachment begins. During this phase the child can actively seek proximity and contact with the discriminated and preferred figures. It is also during this phase that the level of confidence in the preferred caregiver can be inferred by how active the child is in exploring and manipulating his or her environment (Goldsmith & Campos, 1982). At this point the child can also begin to use one environmental event as a cue that another environmental event will follow. This implies that he or she can begin to anticipate the mother's actions,
insofar as these have a reasonable degree of consistency (Piaget, 1937).

In order to promote secure attachment a mother must be able to interpret her infant's communications correctly. There are three essential components to this process: 1) the mother's attention to the baby's communications; 2) her ability to see the communications without distortion; and 3) her empathy with the infant. This empathy was described by as the ability to see and feel states and intentions from the baby's point of view (Ainsworth et al., 1974; Grossman, Grossman, & Schwan, 1986).

Secure Attachment

Secure Attachment implies that the infant is confident of a caregiver's availability and responsiveness to his or her signals. Secure Attachment also implies that the caregiver's presence supports interaction with the environment and reduces distress caused by discomfort, fear, or separation (Ainsworth et al., 1974; Crockenberg, 1981; Sroufe, 1979; Waters et al., 1980). Although the characteristics of Secure Attachment are described in many texts, there are only a few longitudinal studies (e.g., Belsky & Isabella, 1988)
which explored the antecedents of this pattern of bonding.

Several studies have measured the impact that maternal personality and other characteristics have upon security of attachment. Speiker and Booth (1988) performed a longitudinal study which involved 60 mother-infant pairs who were assessed in Ainsworth's Strange Situation when infants were thirteen months old. These finding indicated that at the prenatal intake period, mothers of infants later rated as Secure did not differ from the other subjects except that they expressed more depression than mothers of Anxious-Avoidant infants who tended to deny their feelings of depression. However, the mothers of secure infants did show the most improvement over time both in their relationships and self-esteem. These results supported the hypothesis that the mothers involved in secure relationships with their infants improved their social support and their social skills from the prenatal to three month postpartum periods. At six weeks and three months postpartum, mothers of secure infants had confidence in themselves as mothers, satisfaction with their partners as helpers, and positive perceptions of their infants' behaviors. Mothers whose infants were Securely attached
also had a tendency to view their life and life changes less negatively than insecure mothers.

Other studies have focused on maternal-infant interactive factors. One such longitudinal study performed by Egeland and Farber (1984) involved 267 low-income primiparous mothers. Results of this study indicated that Secure infants had mothers who were sensitive to their needs and encouraged reciprocity and positive face-to-face interactions. The mothers of Secure infants felt more positive about themselves and, consequently, had more to give their infants. These mothers were observed to be more skillful in feeding and playing with their infants, and had higher scores on the sensitivity and cooperation scales. Sensitive mothers were also found to be more responsive to infant cries, exhibiting greater sensitivity in beginning and terminating feeding, and holding their infants in an affectionate fashion (Ainsworth et al., 1978; Kiser, Bates, Maslin & Bayles, 1986).

Anxious-Avoidant Attachment

Anxious-Avoidant toddlers respond to their mothers differently than do their Securely Attached peers (Waters et al., 1980). An Anxious-Avoidant infant will demonstrate conspicuous avoidance of the mother upon
their reunion. These toddlers will not try to approach their mothers, or if this behavior is attempted it will be aborted before it is completed. If the child is picked up by the mother, there will be little or no contact maintaining behavior initiated by the baby. These toddlers tend to treat the mother in much the same way that they respond to the stranger. The Anxious-Avoidant child's response to the stranger is unusual since a toddler is usually hesitant and sometimes fearful in response to a new person.

This demonstration of behavior may be based, at least in part, on the response of the mother to the infant. Antonucci and Levitt, (1984) found that mothers of Anxious-Avoidant babies were generally less likely to vocalize to, 'look at, smile, touch or play with their infants during either the preseparation or reunion episodes of the Strange Situation. These mother were more likely to react or engage in other noninteractive neutral behaviors during both episodes.

Anxious-Avoidant infants focus their energy on exploration of the environment instead of seeking the comfort of their caregiver. These children continue to engage in exploratory behaviors even during separations from the mothers. These toddlers were also found to be
friendly with the stranger and may treat this person more favorably than the mother (Main & Solomon, 1987).

It could be that the pattern of avoidance demonstrated by an Anxious-Avoidant toddler is part of a coping pattern learned from the mother. Prenatally the mothers of Anxious-Avoidant infants reported significantly less depression and more partner involvement and social support than the other mothers (Speiker & Booth, 1988). This finding should be evaluated in light of other studies. Lyons-Ruth et al., (1984) revealed that mothers of Anxious-Avoidant children reported less family conflict and more fondness for school as compared to mothers of Secure infants. Main, Kaplan, and Cassidy (1985) also reported that mothers of Anxious-Avoidant babies tended to idealize their past relationships with their parents, even though when probed for specific examples, they recalled memories that contradicted their rosy generalizations.

There was a significant difference that separated mothers of Anxious-Avoidant and Secure toddlers (Speiker & Booth, 1988). None of the mothers who were destined to have Anxious-Avoidant toddlers perceived their infants temperament as being easy at three months. Perhaps the infants' signals were perceived as more demanding or difficult. These infants, in turn,
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developed less responsive and less clear ways of interacting with their mothers. A low level of reciprocity between the mother and baby during interaction was observable by three months, and by thirteen months, could have resulted in a pattern of mutual avoidance, such as was observed in the Strange Situation.

It is, of course, possible that the Anxious-Avoidant infants were more difficult from birth. However, they did not differ from the rest of the sample in terms of gestational age, Apgar score, or birth weight. It is more likely that a pattern of negative interactions began at birth, during which time the mothers of Anxious-Avoidant infants were impaired in their capacity to be sensitive to their babies (Speiker & Booth, 1988).

This hypothesis was supported by the findings of Egeland and Farber (1984) in their study of 267 mother-infant dyads. These research findings revealed that a certain set of maternal (and not infant) characteristics and caretaking skills seemed to be the predominant influence in the development of Anxious-Avoidant babies. Mothers of Anxious-Avoidant infants lacked confidence, tended to be tense and irritable, and reacted negatively to motherhood. They showed little
interest in their infants once they were born, as observed in the nursery and during feeding. They handled their infants only as much as was necessary to feed them. They did not adapt their feeding to the baby's pace and, in general were observed to have poor caretaking skills. Mothers of Anxious-Avoidant babies avoided physical contact except when necessary (e.g., feeding), and they were less responsive and effective in calming the infant when he or she cried.

Finally, in a study of 121 mother infant dyads, Crittenden (1988) reported that the mother's pattern of interaction during the play session was related to the child's pattern of attachment. Mothers whose relationships with their children were later rated as being Anxious-Avoidant were reported as being both controlling and unresponsive in interactions with their child.

Anxious-Resistant Attachment

This pattern of attachment behaviors has been linked both with infant behaviors and maternal response. Waters et al., (1980) have demonstrated that infant characteristics assessed during the first week after birth can be related to individual differences in attachment at twelve months. Infants who
were later classified as Secure or even Anxious-Avoidant were very successful in meeting challenges of neonatal adaptation as assessed by the Brazelton Neonatal Behavioral Assessment Scale. However infants later classified as Anxious-Resistant had difficulty during this early period with visual and auditory orientation tasks, measures of motor maturity, and regulatory maturity. Consequently, these neonates were less successful in tests of orienting toward objects and persons in the environment, their motor development was slow and their muscle tone was weak, and some of them had difficulty in physiological regulation.

These findings were also supported by the observations of nursery nurses (Egeland & Farber, 1984). Infants later rated as Anxious-Resistant were less alert and active in the nursery. While being fed, Anxious-Resistant infants were less socially engaging. At nine months, the Anxious-Resistant infants lagged behind the Securely Attached and Anxious-Avoidant infants mentally and in motor skills, according to the Bayley Scales of Infant Mental and Motor Development Behavior Record. These data indicate that Anxious-Resistant infants may be difficult to care for in early life.
All of these factors have relevance to the infant's potential as a partner in social interaction (Waters & Deane, 1982). Although all of the infants tested for their study were healthy and eventually met the demands of neonatal adaptation, these transient symptoms reflected difficulties in adaptive mechanisms that may have continued to influence the maternal-infant interaction throughout the first year.

In a study of 26 infants in the home during the first year, Ainsworth et al., (1978) assessed a wide range of early maternal behaviors that predicted later patterns of infant attachment. Mothers of infants later classified as Anxious-Resistant were rated as being less responsive to infant cries, less successful and to some extent averse to holding and bodily contact than other mothers. These mothers where also found to be have less skill in pacing face-to-face interaction and had more difficulty coordinating their behavior with their infants' during feeding.

The difficulties of mothers whose infants were later classified Anxious-Resistant articulate well with the picture of their infants presented in the neonatal data. Their apparent unresponsiveness to crying and ineptness in physical contact and feeding could be attributed to the fact that their infants' behavior was
not well organized. The classification of Anxious-Resistant may be due to an interaction of both maternal and infant variables. These infants apparently lack the early neurological and motor development to coordinate easily with the mother, especially if she is inexperienced. In turn, mothers of Anxious-Resistant infants appear to be less sensitive to their babies' signals, more prone to interfere with ongoing infant behavior, and less accessible than mothers of Securely Attached infants (Waters & Deane, 1982).

Other studies (Belsky et al., 1984; Crittenden, 1988; Speiker & Booth, 1988) suggest that the patterns of interaction characteristic of Anxious-Resistant infants may be learned. These studies found that the mothers of Anxious-Resistant infants tended to have mothers who were unresponsive to them. These mothers also had contradictory reports on self-esteem and social support measures. The mothers of Anxious-Resistant infants expressed the most satisfaction with their overall life situation and circumstances, but the least confidence in coping with motherhood tasks. These mothers also perceived their lives and infants in a positive light, but at the same time were more depressed and less sure of themselves (Speiker & Booth, 1988).
Avoidant-Ambivalent Attachment

Patterns of attachment observed in the Strange Situation have traditionally been rated as Secure, Anxious-Avoidant, or Anxious-Resistant. Crittenden (1985) created an Avoidant-Ambivalent classification of attachment after carefully studying some Strange Situation scenarios where severely maltreated infants were being classified as being Securely attached to their mothers. These infants demonstrated high levels of proximity-seeking and contact maintenance, which typified the patterns of secure infants, but these gestures were also mixed with moderate to high resistance.

Avoidant-Ambivalent children differed from their Securely Attached peers in two ways. The first difference was that Avoidant-Ambivalent toddlers avoided any direct contact with their mothers. These children were very upset when the mother left the room and would wait by the door for her return. Upon reunion with the mother the Avoidant-Ambivalent toddlers would turn or walk away while remaining extremely distressed. If the mother were approached, it would be in a backward or oblique fashion. If the mother attempted to make contact, the child would resist.
The second difference was that these children displayed resistance when they were reunited with their mothers. Instead of the overtly angry response demonstrated by Anxious-Resistant toddlers, these children had a whiny petulance. This resistance also took the form of non-contextual aggression and/or persistent crankiness. Some toddlers showed stereotypic or maladaptive behavior such as huddling on the floor, head cocking, face covering or rocking (Crittenden, 1985; Main & Solomon, 1987).

Mothers of Avoidant-Ambivalent infants perceived their pregnancies as being more physically uncomfortable than those of their peers. Mothers who reported the highest levels of depression also had infants who were classified as being Avoidant-Ambivalent during the Strange Situation (Speiker & Booth, 1988).

**Disorganized-Disoriented Attachment**

A final classification of attachment was proposed by Main and Solomon (1987). These researchers reviewed 55 tapes of Strange Situations (34 from a white middle class and 21 from a maltreated high risk samples) which could not be placed within the traditional Secure, Anxious-Avoidant, or Anxious-Resistant classifications. From these observations, five characteristics were found
to describe the Disorganized-Disoriented pattern of attachment.

First, some of the toddlers exhibited a disordering of the expected temporal sequences upon initial reunion with the caregiver. Normally a child, particularly after a long separation from the mother, will behave in a reserved manner during the initial contact due to apprehension regarding the current status of the relationship. Normally this initial hesitation is resolved quickly and a warm and full greeting is given to the mother. There are several ways in which deviations from this pattern may be expressed. Many children who were classified as Disorganized-Disoriented initially gave the parent a bright greeting, then turned away, dazed, and exhibiting strong avoidance. Some toddlers were very distressed by the separation from the mother, crying or calling for her to come back, then turned or even backed away immediately upon her return. Other children demonstrated angry and distraught behavior immediately upon reunion with the mother then turned their backs and strongly crept away. A final expression of temporal disorganization is the sudden, undirected, out-of-context crying following an apparently complete settling by the mother. These cries
were found to have no apparent rationale within the immediate environment.

A second characteristic which describes the behavior patterns of Disorganized-Disoriented toddlers were incomplete or undirected movement and expressions. These children were found to strike out occasionally at the mother's face but in a weak and incomplete movement. These limp, slow, "underwater" movements occurred in many of these toddlers, usually in a context which was suggestive of resistance.

Children within the Disorganized-Disoriented classification also exhibit direct indices of confusion and apprehension upon the approach of their mothers. This apprehension was expressed by a toddler by moving behind the mother's or stranger's chair or even by crawling under other pieces of furniture when the mother entered the room. The most marked expression of confusion and apprehension was demonstrated by a hand-to-mouth gesture (this motion was also accomplished by moving the hand to the ears or cheeks) which occurred immediately upon reunion with the mother.

A fourth expression which characterized the Disorganized-Disoriented toddler was the simultaneous display of contradictory behavior patterns. These behaviors usually occurred when the toddler attempted to
greet his or her mother. Some children reached out to their mothers but with their head down. Abused babies often walked toward the mother sideways, with head adverted or back toward the mother to avoid face-to-face contact. Other toddlers showed avoidance behavior while in contact with their mothers. Some babies sat quite comfortably on their mothers' laps while looking away, either dazed or sullen. These children appeared dazed, refusing interaction by silently looking away, perhaps while trying to recover from distress.

A final descriptive characteristic of the Disorganized-Disoriented toddler is called "behavioral stilling." Behavioral stilling is described as "dazed" behavior with indices of a depressed affect. The dazed behavior was described as an unfocused, "dead" stare, mouth and chin limp, with the body held still or sometimes the freezing of limbs which had been in motion. In its strongest forms behavioral stilling was demonstrated by babies who fell prone on the floor in a depressed posture prior to separation or upon reunion with the mother. Other infants responded to the sight of their mother entering the room by beginning to step towards her and then falling into an extremely depressed appearing posture which was maintained for several seconds.
Mothers of Disorganized-Disoriented were similar on most measures to mothers of Securely Attached infants during the prenatal period (Speiker & Booth, 1988).
Over time mothers' perception of infants who were subsequently classified as Disorganized-Disoriented began to change. By three months postpartum the mothers of Disorganized-Disoriented babies all reported negative perceptions of their infants' temperaments. During the three months postpartum assessment, mothers of Disorganized-Disoriented infants did not interact favorably with their babies or even other adults.

Frequency of Attachment Ratings

Most studies have reported that the rate of Secure Attachment classifications, as evaluated by the Strange Situation, tend to fall between 65% and 75% in most middle class samples studied (e.g. Ainsworth et al., 1978; Belsky et al., 1984; Maslin & Bates, 1983; Weber et al., 1986). Investigations such as that of Egeland and Farber (1984) report considerably lower rates (i.e. 55%) for lower class, high-risk samples. This lower rating of Securely Attached infants in lower class, high-risk samples was also reflected in Lyons-Ruth, et al. (1984) and Spieker and Booth, (1988) studies of attachment.
Summary

Maternal-infant attachment is a very difficult and complex construct to measure since it involves maternal and infant variables as well as their unique interaction. Although many studies have been cited examining each of the maternal and infant constructs assessed within this dissertation, there are only a few studies that are similar enough to allow direct comparisons.

In 1984 Egeland and Farber performed a longitudinal study designed to determine the antecedents of maternal-infant attachment. Data was collected on the initial 267 subjects (198 at 18 months) over seven assessment periods: prenatal, postpartum, three, six, nine, twelve and eighteen months. This longitudinal study utilized a similar sample and many of the same assessments of antecedents of maternal-infant attachment as this dissertation.

At the time of the baby's birth, the mothers ranged in age from 12-37 years old, with a mean age of 20.52 years. Sixty-two percent of the mothers were single, and 86% of the pregnancies were unplanned. Forty percent of the mothers had not graduated high school.
The majority of the mothers (80%) were Caucasian while 14% were black, and 6% Native American or Chicano.

At approximately 36 weeks of pregnancy and three months postpartum, a battery of tests were administered to assess the mother's intellect, personality characteristics plus perceptions of pregnancy, delivery and the infant. Other measures included questions about the mother's relationship with the father of the baby, living arrangements and stressful life events. These areas were assessed during the six, twelve and eighteen month postpartum periods. The Life Events Scale was administered and the Strange Situation assessments were made when the infant was twelve and eighteen months old.

Infant assessments were also made during most of these data collection periods. Naturalistic observations were made on the infants during their stay in the hospital nursery in 15 areas such as alertness, soothability and activity level. The Neonatal Behavioral Assessment Scale (Brazelton, 1973) was administered on the seventh day and again on the tenth day postpartum. Infant development was further assessed by the Bayley Scales of Infant Development (Bayley, 1963) at nine months. The baby's temperament was measured by the Carey Infant Temperament Scale (Carey, 1978) at six months.
Of the sixty or more tests relating maternal characteristics to the Strange Situation attachment classifications, only eleven yielded significant group differences. However, there were no measures that were significant predictors of both the twelve and eighteen month classifications. On nine of these measures, the Securely Attached maternal-infant dyads were significantly different from only one of the two insecurely attached classifications i.e. Anxious-Avoidant or Anxious-Resistant. The only exception to this finding was that the mothers of Securely Attached infants were found to be less aggressive than either the mothers of Anxious-Avoidant or Anxious-Resistant infants during one of the Strange Situation assessment periods. Further review of this study revealed that there were no infant characteristics that were predictive of maternal-infant attachment at both the twelve and eighteen month postpartum periods (Egeland & Farber, 1984).

Although this study failed to determine consistent antecedents of maternal-infant attachment it did have several strengths. First, it utilized both maternal and infant data on a large group of subjects. Also, the Strange Situation was measured at both the twelve and eighteen month assessment periods which allowed the researchers to evaluated changes in attachment
classification which may have occurred over time. Sixty percent of the infants maintained the same attachment relationship between twelve and eighteen month evaluations. This finding was consistent with Thompson, Lamb and Estes (1982) study but less than the 96% stability obtained by Waters (1978) utilizing a middle-class sample. A final strength of this study was that a number of factors related to the mother and infant were measured in both the laboratory and home settings.

A crucial factor which may have influenced the results of this study was that most of the maternal and infant assessments were taken before the Strange Situation attachment classifications were evaluated. Since this is a "high-risk" population in terms of stress and instability more measures (e.g. level of social support) should have been taken concurrently with the Strange Situation assessments. These measures could help to explain both the attachment ratings and changes that took place in attachment from the twelve to eighteen month time periods (Lamb, Thompson, Gardner, Charnov, & Estes, 1984).

Spieker and Booth (1988) also performed longitudinal research to determine the precursors of the different classifications of maternal-infant attachment. Although the biographical description of
the population was sketchy there were 85 maternal-infant dyads employed at the onset of the study. Data for this research project was collected during the twenty-second week of pregnancy, and at six weeks, three months and thirteen months postpartum. This study is similar to this dissertation since it is longitudinal and measures a number of maternal and infant variables. This is also one of the few studies which have employed the five classifications of the Strange Situation proposed by Crittenden (1985) and Main and Solomon (1987). Results of this research revealed possible antecedents for each of the Strange Situation attachment classifications.

Mothers of Anxious-Avoidant infants reported significantly less depression and more partner involvement and social support prenatally than mothers in the other attachment classifications. These reports of social support and partner involvement were less favorable by the time the infant was six weeks old. The mother's decreased satisfaction with her overall maternal role was also reflected at three months, when none of the Anxious-Avoidant mothers perceived their infants as being easy to care for. By three months postpartum it was found that both the mothers and the infants contributed less to their interactions than the other dyads participating in the study. At thirteen
months postpartum a pattern of mutual avoidance between mothers and infants was depicted within the Strange Situation.

Mothers of Anxious-Resistant infants presented a different clinical picture. Although there were no differences from other mothers detected on many of the antecedents of attachment measured, mothers of Anxious-Resistant infants expressed the most satisfaction with their overall life situation and circumstances but had the least confidence in coping with the tasks of motherhood. Further data analysis supported the contention that Anxious-Resistant mothers perceived their infants and life circumstances in a positive manner but at the same time were depressed and less sure of their coping abilities.

Mothers destined to have toddlers who were Avoidant-Ambivalent reported more depression and chronic life difficulties than their peers. These mothers also experienced the most physically uncomfortable pregnancies. Children who were classified as Avoidant-Ambivalent during the Strange Situation were associated with the most severely depressed mothers.

Mothers of Disorganized-Disoriented infants had similar scores to mothers of Securely Attached babies on most of the measures examined by this study. The
differences between these two groups became more pronounced over time. By three months the mothers of Disorganized-Disoriented infants were beginning to fall significantly behind mothers of secure infants both in interacting favorably with their babies and even with other adults. These mothers also expressed more negative perceptions of their infants' temperament than the mothers of babies in any other attachment classification.

Finally, mothers of Securely attached infants did not seem to differ from other attachment groups except that they reported more depression during the prenatal period. By three months postpartum these mothers reported the lowest levels of depression of the five Strange Situation classifications. They were also generally satisfied with their infants' behavior, and the social support and involvement of the father of the baby. Finally, mothers whose babies were Securely Attached rated their lives and life changes less negatively than mothers of Insecurely Attached infants.

This study has two points which strengthens the validity of its findings. First several measures were repeated to assess changes in the maternal-infant relationship over time in this longitudinal research. The second is that although 84 mother-infant dyads
Antecedents of Attachment

participated in this research project, 25 dyads were not included because they were felt to be borderline between two classifications of the Strange Situation. This enhanced the validity of the findings since no maternal-infant dyads were "forced" into a Strange Situation classification. Data analysis on the antecedents of attachment were performed only on those dyads who exhibited the strongest indices of the Strange Situation classification.

A major weakness of this study is that no data was collected concurrently with the Strange Situation evaluation. Although a wealth of information was collected during earlier periods (prenatal, six weeks and three months) there were ten months when unmeasured, potentially confounding factors may have influenced maternal-infant attachment. The Strange Situation has been found to be predictably related to changes in the life circumstances of the mother and baby so that these changes must be assessed along with the attachment classification (Lamb et al., 1984).

A final study was performed by Belsky and Isabella (1988) who examined longitudinal data on 55 mother-infant dyads. These mothers were different from those in this dissertation in two ways. First all of the mothers in the Belsky and Isabella's research were
married when they were enrolled in the study during the prenatal period. A second difference was that most of Belsky & Isabella's sample was considered to be "middle-class." Of the mothers in this study only 43% were married. Most of these mothers could not maintain a "middle-class" lifestyle since 58% of them had a total household income of less than $15,000 per year.

Although the composition of the samples are different, there are several similarities which make comparisons with the Belsky and Isabella (1988) research valuable. First this was a longitudinal study with similar data collection periods: the last trimester of pregnancy, one, three, nine and twelve months postpartum. Secondly, this study employed a number of maternal and infant variables which were analyzed using path analysis, the statistical procedure utilized with this dissertation.

Within Belsky and Isabella's 1988 study a number of maternal and infant characteristics were analyzed by path analysis. Maternal personality factors were found to have a direct effect on the adaptability of maternal-infant bonding. Data analysis revealed that self-esteem, nurturance, ego strength and interpersonal affection collectively accounted for 28% of the variance in security of attachment.
Antecedents of Attachment

Maternal perception of the infant's temperament was also found to be a significant predictor. Infants who were rated as being unpredictable and/or unadaptable at three months were rated more favorably by their mothers at the nine month assessment if the baby was destined to be rated as being Securely Attached. Mothers who rated their babies as becoming less adaptable and predictable (i.e. more difficult to care for) over time were subsequently found to have infants who were not Securely Attached to them.

Finally, mothers of insecure infants experienced a more pronounced decline in positive activities and sentiments in their relationship with the father of the baby than mothers of secure infants. Mothers of infants who developed secure and insecure attachments did not differ in their marital evaluations prior to the baby's birth, and essentially followed the same course of modest decline in their initial response during the transition period (i.e., the first three months). Although the birth of a child generally exerts a stress on the marital relationship during the first three months postpartum, mothers of secure infants subsequently managed to pool the resources necessary to maintain a degree of love for their spouses and satisfaction with their marriages which was conducive to
the development of secure mother-infant attachment relationships.

Three significant factors: maternal personality variables, changes in perception of the infant's temperament, and degree of marital satisfaction accounted for 48% of the variance in the attachment classifications as measured by the Strange Situation.

Maternal-infant attachment is a difficult construct to measure because it involves maternal factors, infant variables and the unique interactions of the mother and baby, all of which change and develop over time. Since the antecedents of attachment are difficult to discern, a longitudinal study which includes many diverse measures of this construct was utilized. The maternal measures include: sources of social support, emotional status, age, personality integration, stress, perception of early childhood experiences, knowledge of infant growth and development and perception of the infant. Infant assessment include: neonatal responsiveness, infant temperament, and developmental status. Finally the CARE-index allowed researchers to evaluate the quality and development of maternal-infant interaction.

The longitudinal data obtained from these instruments was analyzed by path analysis. Since the research design of this study is descriptive, the use of
path analysis allows causal inference from this non-experimental data.
CHAPTER 3: PROCEDURES

Sample Description and Data Gathering Methods

The sample for this study was comprised of 60 mother-infant dyads. Participants for this dissertation were a subsample of the 155 pregnant women who were recruited in 1964 from three Tidewater prenatal hospital clinics. This research project only included those 60 mother-infant dyads who completed the Strange Situation procedure during the sixteen month postpartum assessment. A description of the demographics of this final sample has been provided (please see Table 1).

As described in Table 1, most of the mothers in this study were single and had not planned to have a baby at this point in their lives. Although over 70% of these pregnancies were unplanned, all of the mothers reported that they were pleased about being pregnant by their third trimester. Table 1 also shows that most of the mothers (50%) had at least finished high school by the time they delivered their baby. Many of the families participating in this study had a lower than average annual income: 58% of these families had a
### Demographics of the Dissertation Sample

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Demographics of the Dissertation Sample

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total income of under $15,000 per year in 1984. Another demographic finding was that mothers with male babies seemed more inclined to remain in the study. More male babies were born within the original sample (59%), and they comprised 63.3% of the infants who participated in the Strange Situation. Finally, the age range of mothers whose infants participated in the Strange Situation was wide, from 14 to 37 years with an average age of 21.2 years old.

Attrition Rate From Original Sample

There was an attrition rate of 61.3% between the original 155 prenatal participants (Blackwood & Lodge, 1987), and the 60 mother-infant dyads that completed the Strange Situation assessment. Table 2 examines the demographic characteristics of the attrition group.

The mothers who were most likely to drop out of this study were unmarried Caucasians from 20 to 24 years old. The demographic profile of these mothers also indicates that they had finished high school and had a family income of 10,000 to 14,999 per year. The demographic profiles are a summary of all of the mothers which dropped out of the study and are not meant to describe any individual mother.
## Table 2

### Attrition of the Dissertation Sample

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<tr>
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<th>Number</th>
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<td>&lt; 9 Years</td>
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**Attrition of the Dissertation Sample**

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Attrition of the Dissertation Sample

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<tr>
<td>Male</td>
<td>54</td>
<td>34.1</td>
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<tr>
<td>Female</td>
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<td>27.2</td>
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<tr>
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</table>
Table 3 describes the different instruments of assessment which were utilized to measure the antecedents of maternal-infant attachment for this dissertation.

Reliability and Validity of the Instruments Utilized for This Dissertation

Prenatal Data Collection Period

Maternal Prenatal Social History

The Prenatal Social History (Blackwood & Lodge, 1967) is a 52 item questionnaire comprised of open-ended and multiple-choice type of questions. The Social History includes items about maternal: 1) living arrangements; 2) employment status; 3) relationship with the father of the baby; 4) perception of the infant; 5) emotional status; 6) social supports; and 7) early childhood experiences. The contents of these questions included areas which were felt to influence maternal-infant bonding based upon a review of the psychological literature and clinical experience.
## Table 3
Assessment Instruments of Antecedents of Maternal-Infant Attachment

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<td>Pre  PP  3mo.  6mo.  16mo.</td>
</tr>
<tr>
<td>Maternal Social History</td>
<td>X      X      X      X      X</td>
</tr>
<tr>
<td>Broussard Neonatal Perception Inventory</td>
<td>X      X</td>
</tr>
<tr>
<td>Bavolek Adult-Adolescent Parenting Inventory</td>
<td>X      X</td>
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<tr>
<td>Emde I-Feel Picture Deck</td>
<td>X      X</td>
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<tr>
<td>Thematic Apperception Test</td>
<td>X</td>
</tr>
<tr>
<td>Parent-Infant Perception Profile</td>
<td>X      X      X</td>
</tr>
<tr>
<td>Parenting Questions</td>
<td>X      X</td>
</tr>
<tr>
<td>Hospital Medical Records</td>
<td>X      X</td>
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<tr>
<td>Bonding Information</td>
<td>X</td>
</tr>
<tr>
<td>Brazelton Neonatal Behavioral Assessment Scale</td>
<td>X</td>
</tr>
<tr>
<td>Bayley Scales of Infant Mental and Motor Dev.</td>
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</tr>
<tr>
<td>Behavior Record</td>
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<tr>
<td>Parenting Stress Index</td>
<td>X      X</td>
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### Table 3 (Continued)

**Assessment Instruments of Antecedents of Maternal-Infant Attachment**

<table>
<thead>
<tr>
<th>Instrument</th>
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<tr>
<td></td>
<td>Pre</td>
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<td>Child-Adult Relationship</td>
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<td>Recent Life Changes</td>
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<td>Questionnaire</td>
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<tr>
<td>The Strange Situation</td>
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</tbody>
</table>
Reliability and Validity

Since this instrument was developed specifically for an earlier aspect of this research project no reliability or validity evidence was available.

Broussard Neonatal Perception Inventory

The Broussard Neonatal Inventory is comprised of two parts, the "Average Baby" and "Your Baby" perception inventories. This instrument was designed to represent a measure of the mother's perception of her neonate as compared to the average infant. There are six areas in which maternal perceptions are assessed: crying, spitting, feeding, elimination, sleeping, and predictability. A five point Likert-type scale is used to evaluate the behavioral frequency of each item. Total scores are computed for each perception inventory. The discrepancy in the total scores for "Your Baby" and the "Average Baby" perception inventories serves as an indicator of infant risk for subsequent emotional disorders. Since most mothers perceive their babies as being special, those infants who are rated as being average or below average are categorized as high-risk for future psychological problems. Infants who are rated by their mothers as
being better than average are considered to be at low risk in terms of future occurrence of psychopathology.

**Reliability and Validity**

The inventory has shown both construct and criterion validity. The Broussard Neonatal Inventory was administered to 318 primiparous mothers who delivered full term, healthy infants without recognized congenital abnormalities. This instrument was administered twice, within two days postpartum and when the infant was one month old. One hundred and twenty of these children were evaluated at age four and one half by two child psychiatrists who had no knowledge of the previous testing. Of those children evaluated as being at high risk at one month, 66% had psychopathology compared with 20.4% of children at low risk. There was a statistically significant association between prediction and outcome ($p < .001$). This instrument maintained statistical significance ($p < .04$) when these children were again evaluated at ten to eleven years old (Broussard, 1976).

**Bavolek Adult-Adolescent Parenting Inventory**

The Bavolek Adult-Adolescent Parenting Inventory is comprised of 32 items which are evaluated by a Likert-type scale. This instrument was created to measure
maternal feelings and beliefs within the context of four constructs often associated with abusive parenting. The constructs which are measured include: role reversal, inappropriate expectations of the child's ability to care for him/herself, belief in the value of physical punishment, and lack of empathy toward the child's feelings and needs.

**Reliability and Validity**

There was no published data on the reliability or validity of the instrument available.

**Emde I-Feel Picture Deck**

The Emde I-Feel Picture Deck (Emde, 1980) is a projective test in which mothers are asked to describe the emotions expressed by 30 photographs of infant faces. This instrument was designed to assess a mother's emotional availability to her infant. The Emde I-Feel Picture Deck was based on the hypothesis that parenting in early infancy involves a certain propensity for "reading in" one's own emotions according to situations. Thus, mother may sometimes attribute infant emotions on the basis of a notion like, "If I were in that situation I would feel angry...I would feel afraid...I would feel sad...". Within the context of
bonding, it makes adaptive sense for mothers to respond emotionally and affectionately to their newborn infants even in the absence of a range of clear cues for a variety of emotions. Acting in this way, perhaps using the mechanism of projective identification, a new mother could begin tuning-in to her baby's feelings.

This instrument was used during the different periods in the longitudinal assessment because different cues may be utilized in emotion judgements as the infant develops. Presumably, corrections take place with development as infant responses become increasingly specific, related to sequences of interaction, and act as confirmations of maternal interpretations. Situational features may be more important in early infancy while the baby's emotional responses begin to serve as an important cue as social developments emerge.

Reliability and Validity

The Emde I-Feel Picture Deck was standardized on a cross-sectional survey of 623 mothers in the Denver area. Mothers were surveyed with their infants every month from birth through 18 months. These mothers demonstrated a relatively high amount of emotional attribution in early infancy with more than one-half of mothers in the newborn period seeing interest, joy,
surprise, anger, and distress in their infants, and nearly one-half seeing fear (Emde, 1980).

The Emde I-Feel Picture Deck is comprised of photographs of three-and-a-half month old infants facial expressions that had been taken in the home environment. The infant photos involved low intensity, mid intensity, and high intensity emotional expressions. These photographs were shown to judges to obtain free response judgements about what emotions were seen. The judges were 25 women experienced with children who were asked to look at the pictures of facial expressions and report "the strongest...feeling the baby is expressing." The judges responses were categorized according to an accumulated dictionary of words for nine emotional categories plus a tenth of "no emotion." The correlations between replication studies ranged from 0.84 to 0.96 for these four major emotional categories (Emde, 1980). For scoring purposes within the original research upon which this dissertation is based, the mother's responses were placed in one of four categories: positive, negative, sleepy or other.

Thematic Apperception Test

The Thematic Apperception Test (Murray, 1943) is a projective devise in which an individual is asked to
make up stories about a series of pictures. The person is asked, within the story, to elaborate about the present, past and future happenings along with a description of the thoughts and feelings of the various characters depicted. The scenes presented are relatively ambiguous which encourages the interjection of one's own perceptual and verbal interpretations. Although the TAT consists of 20 cards, within the present study mothers were presented with cards 1, 2, 6GF, 7GF, and 8GF because these cards were most appropriate to maternal-infant bonding issues. The common themes and issues elicited by these cards are:

Card 1: need for achievement; autonomy, particularly with respect to parents and/or authorities; self-versus other-motivation.

Card 2: family relations; separation and individuation; achievement values and aspirations; pregnancy issues.

Card 6GF: daughter-father or male-female relationships; heterosexual relationships; interpersonal trust; employer-employee relationships.

Card 7GF: mother-daughter relationships; rejection issues; child-rearing attitudes and experiences.
Card 8GF: because of card ambiguity it elicits very diverse themes, aspirations; sense of future possibilities often noted (Ryan, 1985).

This selection of cards was presented to the mothers since they were particularly likely to elicit information relevant to underlying maternal needs and conflicts which could potentially undermine her ability to interact with the infant in a sensitive manner.

Reliability and Validity

The TAT is based on strategies of unknown and untested reliability and validity. A survey conducted by Wade and Baker (1977) revealed that 81.5% of projective test users employ "personalized" procedures for interpretation. The "personalized" interpretation of TAT responses is of limited value in research. Since the responses are not standardized, studies using this instrument cannot be compared if different authors interpreted the results (Ryan, 1985).

Parent-Infant Perception Profile

The Parent-Infant Perception Profile is comprised of two different questionnaires. The first questionnaire, "About Myself," is comprised of 20 items measuring the mother's self perception. The Liekert-type
scale utilized by this instrument yields two overall scores, maternal coping and level of satisfaction. The second questionnaire, "What Baby Will Be Like" measures how the mother perceives the characteristics of her baby-to-be such as physical attractiveness, intelligence, and temperament.

Reliability and Validity

No reliability or validity data was available on this instrument.

Parenting Questions

The Parenting Questions were created by Blackwood and Lodge (1987) to assess maternal knowledge of normal infant growth and development. The sixteen true-false questions are evenly divided over the areas of infant health and development.

Reliability and Validity

Since this instrument was developed specifically for an earlier version of this research project no reliability or validity evidence was available.
Prenatal Medical Data

Hospital records were examined to determine maternal age, marital status, the point when prenatal medical care was sought, previous gynecological history, use of drugs during pregnancy, and conditions concurrent with or complications of pregnancy.

Postpartum Data Collection Period

Postpartum Medical Records

The medical records of both the mother and infant were reviewed to determine if there were any complications during labor and delivery or in the postpartum period.

Bonding Information

Information was provided, usually by the nursing staff, regarding the length and timing of initial contact between the mother and infant as well as the mother's affect and baby's state during this experience.

Postpartum Maternal Social History

The Postpartum Maternal Social History (Blackwood & Lodge, 1987) was comprised of nine open ended questions which inquired about the birth experience, the mother's
emotional state and perception of her baby. These questions were utilized as a guide for an interview that was conducted with the mother during the early postpartum period.

**Reliability and Validity**

Since this instrument was developed specifically for an earlier phase of this research project, no reliability or validity evidence was available.

**Broussard Neonatal Perception Inventory**

This instrument was again utilized. See prenatal data period for a description.

**Brazelton Neonatal Behavioral Assessment Scale**

The Brazelton Neonatal Behavioral Assessment Scale (BNBAS) (Brazelton, 1973) was designed as a means of scoring interactive behavior in infants three days to four weeks old. This instrument measures an infant's available responses to the environment. For ease of analysis and comparison the test items are clustered into four behavioral dimensions of newborn organization. The first dimension, Interactive Capacities, measures the newborn's capacity to attend to and to process simple and complex environmental events.
Motoric Capacities is the second dimension which assesses the infant's ability to maintain adequate tone, to control motor behavior, and to perform integrated motor activities. A third dimension, Organizational Capacities with Respect to State Control, detects how well the infant maintains a calm, alert state despite increased stimulation. The final dimension of the Brazelton Neonatal Behavioral Assessment Scale is Organizational Capacities which measures the neonate's physiological responses to stress (Brazelton, 1976; Als, Tronick, Lester, & Brazelton, 1977).

Reliability and Validity

Since the early neonatal period is a time of rapid change and development it is difficult to assess the test-retest reliability for this instrument. Test-retest reliabilities were reported by Horowitz and Brazelton (1973) from day 3 and 4 to day 30 of .585 for 30 males and .645 for 30 females, computed for each subject and on each item, using a criterion of a plus or minus one point scale point as agreement (Als, Tronick, Lester, & Brazelton, 1977).

Inter-rater reliabilities of .85 have been reported after two days of training (Als, Tronick, Lester, & Brazelton, 1977). This high level of inter-rater
reliability can be maintained for one to two years after the initial training period (Brazelton, 1976).

Several types of statistical analyses have been applied to the Brazelton Neonatal Behavioral Assessment Scale. Factor analysis performed in a study of 140 infants, produced two main factors, attention-orientation and temperament-arousal, accounting for 20% and 18% of the variance, respectively (Lester, Emory, Hoffman, & Eitzman, 1976).

A second approach to analysis of the Brazelton Neonatal Behavioral Assessment Scale involved a system of typological and profile analyses. The scale items were clustered along four dimensions in this process: Interactive Processes, Motoric Processes, State Control, and Organizational Processes (Als, Tronick, Lester, & Brazelton, 1977).

**Parent-Infant Perception Profile**

The scale "About My Baby" was readministered to the mothers when the infants were about one month of age. For a complete description of this instrument please refer to the Prenatal Assessment Period.
Three Month Assessment Period

Three Month Social History

The Three Month Social History is comprised of nine open ended questions which address the mother's emotional state, social support and perception of her infant. Again this instrument was created by Blackwood and Lodge (1984) to obtain background information for their study.

Reliability and Validity

Since this instrument was developed specifically for this research project, no reliability or validity evidence was available.

Bayley Scales of Infant Mental and Motor Development

Behavior Record

The Bayley Scales of Infant Development (Bayley, 1969) is widely utilized to evaluate the motor and mental abilities of babies from one to thirty months. This measure yields evaluations of infant performance in the following areas: sensory responsiveness and orientation, gross and fine motor development, exploratory drive, competence motivation, social relatedness, imitation, perceptuo-cognitive and language
development. The infant's development age equivalent for each category is determined on the basis of the established normative data available for these test items (Lodge, 1972).

Reliability and Validity

The internal consistency of the Bayley Infant Scales, as measured by split-half coefficient, yielded r's of .79-.94 on the total mental scores and .57-.97 on the total motor scores with babies one to 15 months of age.

The Kuder-Richardson Formula 20 test for internal consistency was utilized to test the reliabilities of the total scores on the Bayley Infant Scales (1958-61 Edition). The test was repeated at one month intervals and yielded correlation coefficients of .79-.94 for the total mental scores and .57-.97 for the total motor scores with children one to 15 months of age.

Of the 59 mental test items that are applicable for infants aged 6-12 months, the mean percentage of tester-observer agreement is 89.4, SD 7.1. The test-retest agreement for these same items average 76.4, SD 13.7. There are 20 motor-test items that are appropriate for babies in this same age range. The average tester-observer percentage of agreement for these items is
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93.4, SD 3.2; the mean test-retest percentage of
agreement is 75.3, SD 14.5 (Werner & Bayley, 1966).

Parenting Stress Index
The Parenting Stress Index (Abidin, 1983) was
designed to identify parent-child system under stress in
families with children under 10 years of age. This self-
report instrument is comprised of 120 Liekert Scale
items which yields sixteen scores. The Parenting Stress
Index yields seven measures that are related to the
child which include: acceptability, adaptability,
demandingness, reinforcing parent, mood,
distractability/hyperactive, and a total score. Eight
constructs related to parents include: depression,
attachment, restriction of role, sense of competence,
sense of isolation, relationship with spouse, parental
health and a total score. Finally, this instrument
yields two overall scores the total and optimal life
stress score (Mitchell, 1985).

Reliability and Validity
The origin of the Parenting Stress Index was based
on research findings related to child development. Each
potential item of this instrument was evaluated for
relevance of content and adequacy of construction by a
panel of six researchers and clinicians trained in child psychology or development.

Although the final form of the Parent Stress Index has already been utilized in clinical practice and research, this instrument appears to be measuring a mixture of both stressors and stress response. To increase the value of the Parent Stress Index for stress research purposes, the definition of items, scales, and domains needs to be clarified. Researchers must be able to define stressors independently of stress reaction when the goal is to determine the effects of stressors on a family or an individual's behavior.

The Parent Stress Index does have useful applications in clinical practice since a high total stress score appears to correlate with both excessive stressors and stress, indicating a significant potential or actual problem. The subscales of this instrument can also be assessed as a guide to a particular form of intervention (McKinney & Peterson, 1985).

Emde J-Feel Picture Deck

This instrument was again administered to mothers to determine the pattern of development in recognition of infant states.
Carey Infant Temperament Questionnaire (ITQ)

The Carey Infant Temperament Questionnaire is a Liekert-style questionnaire which is based directly on the research interview of Thomas, Chess, and Birch (1968). It was designed to determine the general pattern of an infant's reactions to his or her environment. The mother is asked to indicate the frequency with which statements on the questionnaire described her infant's behavior pattern. The baby's temperament is rated in the areas of: activity, rhythmicity, approach, adaptability, intensity, mood, persistence, distractability, and threshold.

Reliability and Validity

Although the Carey Infant Temperament Questionnaire is often utilized in research, it remains a somewhat controversial instrument. The validity and reliability findings are mixed and sometimes contradictory, depending upon the researchers and the nature of the study that was performed.

Carey and McDevitt (1978) give extensive background on their revised version of the Carey Infant Temperament Questionnaire. This version of the instrument was standardized on 203 four- to eight-month old infants. Statistical analysis of the questionnaire yielded a test-
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retest reliability (at a two week interval) of (median category \( r = 0.84 \)) and an internal consistency reliability of the nine categories (median category = 0.47).

The age differences across the four to eight month period were not found to be statistically significant. There were several sex differences reported with female infants appearing to be less approaching than males (\( p < .01 \)). More female infants also comprised the group who were found to be difficult and slow to warm up to changes in their environment.

The mothers' general ratings of their babies in the nine temperament categories were correlated with the respective questionnaire scores. The categories ranged from the lowest category, distractibility, which had a correlation of \( r = 0.20 \) to the highest category, rhythmicity, which had a correlation of \( r = 0.52 \).

In this review the authors found that external validity of the ITQ was difficult to establish with certainty because of the lack of standardized observational techniques covering the phenomena described by this instrument (Carey & McDevitt, 1978). Although data on external validity of the Infant Temperament Questionnaire is limited, a study of 168 mothers and their six-month old infants demonstrated
that maternal perceptions of the baby as having a fussy, difficult temperament was moderately associated ($r = .30$) with an independent observation baby fussiness (Bates et al., 1982). Other researchers have found that the external validity of the ITQ can be improved when it is utilized with other data about the parents' perceptions of their relationship with children (Thomas et al., 1968; Thomas & Chess, 1977).

A study of predictive validity was performed by Carey and McDevitt (1978) with 187 infants 100 males and 87 females seen in Carey's private practice. When the children evaluated during infancy were again classified at the age of three to seven years old 29.9% of children still remained in the same diagnostic clusters (39.2% of the children 'aged three to five). Of the children whose diagnostic cluster changed during early childhood, most shifted toward easier clusters over time. Changes in diagnostic clusters reinforce the view that behavioral styles are not fixed entities, but evolve through continuous parent-child and child-environment interactions (Carey & McDevitt, 1978). Although there is evidence of predictive validity for temperament during early childhood, the responses to the Carey ITQ leading to a diagnosis of an easy or difficult temperament were not found to have either concurrent
behavioral validity or predictive validity to other antecedents of attachment assessed during the first year of life (Vaughn et al., 1981).

In a recent literature review, Belsky and Isabella (1988) only found one study (Frodi, 1983) which had a reliable association between mothers' reports of infant temperament and infant-mother attachment. In Frodi's (1983) study it was found that infants classified as Anxious-Resistant at twelve months were reported by their mothers as being more difficult than infants rated as Secure or Anxious-Avoidant during the Strange Situation evaluation. This study assessed both infant temperament (ITQ) and attachment (the Strange Situation) concurrently when the infant was 12 months of age. Thus, maternal reports of infant temperament cannot be considered an antecedent of the attachment relationship, and may indeed reflect more of the maternal-infant relationship than temperament per se (Belsky & Isabella, 1988).

A major criticism of the Carey Infant Temperament Questionnaire is that it measures maternal variables as well as infant temperament (Bornstein et al., 1986; Sameroff et al., 1982; Vaughn et al., 1981). A study illustrating this phenomenon was performed by Sameroff, et al., (1982). These researchers compared maternal
ratings of 227 four month olds on Carey's ITQ, with laboratory and home observations of babies' temperaments. These findings were then compared with measures of maternal variables such as socioeconomic status and anxiety level. Multiple regression analysis established that for this study, maternal variables were better predictors of temperament score variance than were infant variables. To further illustrate this point a study involving 233 mother-infant dyads found that anxious, suspicious, impulsive women tend to describe their babies in such a way as to yield the diagnosis of temperamental difficulty when they respond to the ITQ items (Vaughn et al., 1981; Vaughn et al., 1987).

Although several studies have reported that measures of infant temperament are confounded by maternal variables there are two possible explanatory alternatives that can be postulated. Some researchers, such as Thomas, Chess, and Korn (1982) and Carey and McDevitt (1980) speculate that maternal prenatal anxiety may have a biochemical effect on the mother that would be transmitted directly or indirectly on the fetus which might later influence the infant's temperament. It has also been postulated that primiparous mothers may be lacking the maternal experiences necessary to recognize
true temperamental difficulty in their infants (Vaughn et al., 1987).

There is another possible reason that measurements of infant temperament taken by the Carey ITQ are sometimes found to be invalid. The design of the instrument itself may be conducive to unreliability. Nearly all maternal report measures rely on single assessments of infant behaviors that are global. Mothers are asked to condense a wealth of experience with their infants into statements about the babies' average or typical behavior (Bornstein et al., 1986).

**Child-Adult Relationship Experimental (CARE) Index**

The CARE-index was designed to evaluate maternal-infant interactions (Crittenden, 1981; 1985). Rating of mother, infant and the dyad are based on a three minute segment of a semistructured play interaction between the mother and baby. After carefully watching the videotaped segment the trained observers make categorical judgements of the type of behaviors exhibited. Within the CARE-Index there are three types of maternal codes: sensitive, controlling, and unresponsive.
The items defining the sensitive pattern of interaction are associated with the mother's accommodation to her infant's behavior. A sensitive mother exhibits behaviors such as rhythmic voice tone, comfortable and accessible positioning with the baby, expressions of affection, and timing adult turns on the basis of infant signals.

A mother who is rated as being controlling exhibits behavior patterns which are generally covertly or overtly hostile. These mothers may demonstrate covertly hostile behaviors by pseudo-sensitive behaviors that appear playful but are irritating to the infant such as inappropriate laughter, teasing, or abruptly cutting off of the infant's activity by the offer of another. Overt hostility may be expressed by glaring at the infant, muttering profanity, or jerking the infant's body.

A third classification of maternal-infant interaction is the unresponsive pattern of maternal behaviors. The unresponsive pattern of behavior involves forms of facial, vocal and physical withdrawal such as extended gaze aversion from the infant, silence, or sitting at a distance from the infant.
The infant’s behaviors and responses are also evaluated by the CARE-Index. The baby’s initiations and responses to his or her mother and environment are classified as being cooperative, difficult or passive.

An infant who is rated as being cooperative exhibits behaviors that are associated with expressions of pleasure and the facilitation of turn-taking. Cooperative infant behaviors include bright or attentive facial expressions, initiation of contact with the mother, or acceptance of mother's overtures.

Items associated with the difficult infant patterns describe overt forms of resistance to maternal behavior. These behavioral patterns include the infant’s turning away, grimacing, crying, wincing, or pushing offered toys away.

An infant who exhibits the passive pattern of behaviors acts in a manner that functions to reduce contact with the mother. An infant rated as unresponsive may exhibit a vacant facial expression, ignore adult overtures, or lack the motivation to play (Crittenden, 1981).

The rating of the mother-infant dyad is based on the unique interaction of the mother and infant. Since the videotaped sessions sometimes have elements of different patterns of interaction, the ratings of the
mother, infant or dyad can be split over two categories such as cooperative and unresponsive. Scores for each of the categories described are computed after the maternal-infant interaction is observed and overall scores on the mother, infant, and dyad are yielded.

**Reliability and Validity**

This instrument was designed for research purposes only. Diagnostic statements based on this instrument are unwarranted because one interaction is too small a sample of behavior on which to base a judgement. This instrument was also normed on "higher risk" samples and may not be applicable to other populations (Crittenden, 1981).

**Six Month Assessment Period**

**Six Month Social History**

The Six Month Social History (Blackwood & Lodge, 1987) is comprised of 11 open ended questions concerning the mother’s: family of origin, involvement of the baby’s father, perception of the infant, and life circumstances.
Reliability and Validity

Since this instrument was created specifically for this research project, no reliability or validity data was available.

Parent-Infant Perception Profile

This instrument was readministered to assess the changes in the maternal-infant relationship.

Bavolek Adult-Adolescent Parenting Inventory

This instrument was again administered to determine if changes had taken place from earlier assessment periods.

Bayley Scales of Infant Development

The Bayley Scales of Infant Development were again utilized to measure growth and developmental progress of the infant.

CARE-Index

Videotaped segments of maternal-infant interaction were again evaluated to assess the development and changes within this relationship.
Sixteen Month Assessment Period

Sixteen Month Social History

The Sixteen Month Social History (Blackwood & Lodge, 1987) is comprised of questions which assess the mother's: living arrangements, perceptions of herself and her baby, relationship with the baby's father. There were also questions concerning the mother's and baby's health over the past sixteen months.

Reliability and Validity

Since this instrument was created specifically for this research project, no reliability or validity data was available.

Attachment Apperception Test (AAT)

The Attachment Apperception Test (Blackwood, Lodge, & Roundtree, 1987) is a projective test designed to allow people to fantasize in response to an ambiguous, unstructured stimulus. The client is shown a picture and asked to create a story incorporating the presented stimuli. Although this instrument is similar to the Thematic Apperception Test (Murray, 1939), the 12 pictures which comprise the Attachment Apperception Test were designed specifically to draw upon factors
associated with bonding behaviors such as separation anxiety, punishment, and feelings about pregnancy.

Reliability and Validity

The AAT is a new instrument which is still under revision. Therefore there was no published reliability or validity data.

Recent Life Changes Questionnaire

Holmes and Rahe (1967) asked subjects to rate a number of events according to the amount and duration of change that occurred in their accustomed lifestyle. The Social Readjustment Rating Scale provides a list of mean readjustment values for 43 different life events that are potentially stressful. The events are placed into a time frame of occurring during the last: zero to six months, seven to twelve months, or one to two years.

Reliability and Validity

Overall, the use of biographical or life history data in exploring the antecedents for attachment is supported in the psychological literature e.g. Belsky and Isabella (1988). However, there are problems inherent in this method of data collection that should be considered.
First, items on this instrument could be subject to falsification. Some of the areas assessed are sensitive, such as the question asking about serving a jail term. The "correct," or socially desirable answer can be readily ascertained by the client. If rapport and trust are not established between the researcher and client, there is a greater chance that answers on this instrument may be falsified.

Another potential problem involves the client's perception of stressful events. Since people experience stress in different manners a standard score, e.g. 100 stress points for death of a spouse, may not be applicable to everyone (Layon & Goodstein, 1982).

Bayley Scales of Infant Development

The Bayley Scales of Infant Development were again utilized to measure growth and developmental progress of the infant.

CARE-Index

Videotaped sessions were again rated by the CARE-index to track the development of maternal-infant interactions.
The Strange Situation

The Strange Situation (Ainsworth et al., 1978) was first developed as a validating instrument for the extended observations of 23 mother-infant dyads throughout the first year of life. These observations were based on Bowlby's (1969; 1973) theory of attachment.

The Strange Situation was created to measure how an infant utilizes an adult as a "secure base" from which to explore the environment. The infant's reactions to a stranger, to separation from and reunion with the mother are also assessed. The infant's ability to utilize the mother as a secure base was emphasized because it was felt to be one of the most important criteria of a healthy attachment (Ainsworth & Wittig, 1969).

The Strange Situation is usually videotaped so that trained observers can review and rate the session on the six rating scales: proximity or contact seeking, contact maintenance, resistance, avoidance, search and distance interaction. The judges then classify the infant into one of five groups Secure, Anxious-Avoidant, or Anxious-Resistant, Avoidant-Ambivalent or Disorganized-Disoriented.
Reliability and Validity

Although the Strange Situation has been widely utilized in attachment research, this instrument has limitations. The use of the Strange Situation in research is based upon a longitudinal study performed by Ainsworth et al., (1978). This study has been found to have major flaws in both the reliability and validity of the Strange Situation as it was described.

Review of this research revealed that Ainsworth et al. (1978) tended to overinterpret and overgeneralize small differences between tiny groups. The original data analysis was based on a sample of 27 mother-infant dyads which were subsequently evaluated and entered into the different classification groups. Later evaluations of the classifications of the Strange Situation suggest that although there are different infant behaviors observed between the Secure, Anxious-Avoidant, and Anxious-Resistant categories these groups may represent not distinct types of infants, but an underlying continuum (or several continua) which have been artificially trichotomized (Lamb et al., 1984).

Gardner and Thompson (1983), using cluster analysis, found that the boundaries between Secure, Anxious-Avoidant, and Anxious-Resistant classifications of infants were not entirely distinct. Researchers have
also failed to identify distinct and replicable antecedents of the Anxious-Avoidant and Anxious-Resistant patterns of insecure behavior (Lamb et al., 1984).

Despite striking differences in infant behavior, the mother of babies classified as Anxious-Avoidant and Anxious-Resistant differed less from each other than they did from the mothers of babies in the Secure group. Whatever the reason for the similarities between Anxious-Avoidant and Anxious-Resistant group means, the absence a clear difference between these insecure attachment groups precludes a conclusion that behavior in the Strange Situation is necessarily determined by differences in the prior patterns of mother-infant interaction (Lamb et al., 1984).

The finding that the categories of the Strange Situation may be artificially created was further supported by the research of several authors who were trying to evaluate infant behaviors within the traditional classifications. These researchers Crittenden (1985); Lamb, et al. (1984); Main and Weston (1981); and Spieker and Booth (1988) found that the boundaries between the Strange Situation classifications were not concise and that it was at times difficult to assign all infants into one of the three categories.
This problem has been addressed by both Crittenden (1985) and Main and Solomon (1987) who proposed the creation of a two more categories. The first, Avoidant-Ambivalent was created by Crittenden in 1985. A second category, Disorganized-Disoriented was described by Main and Solomon in 1987. Based on figures reported in three recent studies (Crittenden, 1985; Main et al., 1985) in which these two new categories were not used, as many as 68% to 83% of insecure infants may have been forced into a Secure classification. It has been hypothesized that infants who exhibited the Avoidant-Ambivalent or Disorganized-Disoriented behavior patterns were previously classified as being "Secure" since there was no other category that adequately described their actions (Spiéker & Booth, 1988).

Another limitation of the Strange Situation involves the high level of intercorrelation among the six maternal rating scales. The ratings on all of these scales was above 0.80 and over half of them over 0.90. In response to these high intercorrelations Ainsworth et al., (1978) acknowledged that there was really only one primary construct that underlined all the measures used in the Strange Situation, the degree of harmony during mother-infant interaction (Lamb et al., 1984).
Another potential weakness of Ainsworth et al. (1978) longitudinal study was that inter-rater reliability was never assessed when these infants were evaluated in the home and inadequately measured during the laboratory procedure. Beyond this, some of the same raters evaluated the baby both in the home and the laboratory. This meant that the observers were not naive to the infant's prior behavior at home. This could potentially have biased their subsequent rating of the Strange Situation in the laboratory setting (Lamb et al., 1984).

Other studies involving maternal-infant bonding as measured by the Strange Situation rarely include any indication of inter-rater reliability. One of the few studies which included these values was Spieker and Booth (1988) who reported inter-rater reliabilities between 78% and 79%. Although these ratings are reasonably high these authors went on to say that doubts still remained that the classification of some infants represented an accurate characterization of the quality of attachment security. In point of fact these authors did not include 30% of their original sample in their final data analysis because they were not confident of their attachment classification.
The Strange Situation has almost become synonymous with "the attachment situation" (Waters & Deane, 1982). Almost all assessments of attachment involve either the Strange Situation or a procedure based on this principle. Although the Strange Situation assessments are based on maternal-infant interactions in a laboratory, it is assumed that behaviors observed in this setting are an accurate representation of what occurs at home or in other contexts. This assumption is rarely confirmed by concurrent observations.

Even if the infant's actions are reflective of behavior which occurs in other contexts, three minute assessment segments do not allow enough observation to evaluate this phenomenon reliably. In a sample of 30 infants seen at twelve and eighteen months of age, the median reliabilities of looking, vocalizing, smiling, gesturing, approaching, and touching the mother during 3-minute observation periods prior to and after separation were .30, .45, .39 and .43, respectively. Utilizing the Spearman-Brown formula for estimating the duration of observation needed to achieve reliabilities for these areas, it was estimated that between 20 to over 1,000 minutes of observation would be necessary to achieve a reliability of .90 (Waters, 1978). The Strange Situation has become so much of the hallmark of an
attachment measure that other constructs such as infant state, cognitive level, temperament or maternal behavior are usually not controlled or measured concurrently (Waters & Deane, 1982).

The temporal stability of the mother-infant classifications made by the Strange Situation has been explored by many researchers. The overall classification stabilities over a six month period (when the infants were twelve and eighteen months) yielded ranges from 96% (Waters, 1978) to 48% (Egeland & Sroufe, 1981). The highest estimate was obtained in a highly stable middle class sample, whereas the lowest estimate was for a sample where the infants were identified as having experienced serious abuse or neglect. Changes in quality of attachment were found not only between securely attached infants becoming insecurely attached infants but also in the reverse (Kreppner, 1987; Waters, 1983).

A final limitation of the Strange Situation attachment classification system is that it is so sensitive to changing family circumstances. It was hypothesized that this assessment may reflect the current, but not necessarily the enduring, status of the degree of harmony between the mother and infant. When the life circumstances of the infant change just prior
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to the Strange Situation assessment, earlier antecedents of attachment may have no predictive value at all (Lamb et al., 1984).

Research Limitations

Researchers have found that it is very difficult to determine the antecedents of maternal-infant attachment since there are several problems inherent to this endeavor (Lamb et al., 1984; Spieker & Booth, 1988).

The first limitation involves the selection of a target population. Researchers use samples that have diverse demographics such as age, socioeconomic and marriage status so that the results cannot be generalized from one study to the next. Even when similar samples are utilized, different antecedents of attachment are assessed.

A second concern is that most studies utilize multiple assessment instruments, many of these evaluations employ nonindependent-measures. Although many variables involved in maternal-infant bonding are being examined, one particular construct, such as degree of harmony between mother and infant, may actually be the only one being assessed.
A final problem inherent to this type of research is that often only a small portion of many assessments reveal significant differences. Even within a given study the same measures are not related in a similar fashion to separate subsamples (e.g., boys and girls). This problem is further complicated when significant findings are not replicated within the multiple assessments of maternal characteristics, or to consecutive assessments in the Strange Situation (Egeland & Farber, 1984). When differences in attachment groups have been discovered, the clearest evidence is found in comparisons between abused and nonabused infants rather than from studies exploring variations within the normal range (Lamb et al., 1984).

Although many of the limitations involved in exploring the antecedents of maternal-infant attachment just reviewed are applicable to this dissertation, there have been several safeguards that were employed to enhance the validity of the findings.

First, measures of maternal-infant interaction which are felt to be imperative to bonding (Waters, 1983), were assessed by the CARE-Index (Crittenden, 1981) at three, six and sixteen months to measure changes that may have occurred as the maternal-infant relationship developed and matured. Since the CARE-
Index was used to evaluate maternal-infant interaction in a semi-structured play situation during each of these assessment periods, changes detected in the patterns of interaction using this instrument can be related to the classification of maternal-infant bonding yielded by the Strange Situation.

During each data assessment period (prenatal, postpartum, three months, six months, and sixteen months) measures of maternal stress were evaluated. These measures assessed maternal stressors and major life changes which could influence her relationship with her baby and impact upon the results of the Strange Situation.

Although some of the limitations of examining the construct of the antecedents of maternal-infant attachment have been controlled, other potentially confounding factors still exist.

The first limitation of this study was that a small number of mother-infant dyads (36.7% of the original sample of 155) completed the sixteen month postpartum assessment which included the Strange Situation. Although a N of 60 fulfills most statistical assumptions, the number of subjects within any of the five classifications of the Strange Situation were considerably smaller. Since the size of the
classification groups prohibited meaningful interpretation of the data, the infant security ratings were collapsed into two groups, secure and insecure attachment.

A second limitation of this dissertation involves the temporal spacing of the data collection periods. The first four data periods (prenatal, postpartum, three and six months) are close together in time so that the potential of confounding variables is diminished. The last data collection period was at sixteen months. This ten month gap in time was detrimental for two reasons. First, when the infant is six months of age social reciprocity with the mother begins to emerge. At this point measures such as maternal-infant interaction became more significantly related to the classification of attachment measured during the Strange Situation. A data assessment period between the six and sixteen month measures would have helped to monitor and document these changes. A second advantage to another data collection period would have been that a second Strange Situation could have been included so that the temporal stability of this measure could be assessed.

A final limitation of this dissertation is that a few areas of maternal-infant attachment, such as Maternal Perception of Early Childhood Experiences, were
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not explored in depth. Within the scope of this study it would have been difficult to explore all of the potential antecedents of attachment in great detail. Participant time and patience plus research costs prohibited the exploration of all possible antecedents of attachment in great depth.

Statistical Hypotheses

1. Mothers over 19 years of age are more likely to have infants who are Securely Attached to them.

2. Infants who were rated during the Postpartum Period as having more mature motor and neurological responses on the Brazelton Neonatal Assessment Scales will have a greater likelihood of being Securely Attached to their mothers at sixteen months.

3. Mothers who express positive perceptions of their infants during the Prenatal, Postpartum, Three Month, Six Month and Sixteen Month data collection periods will have infants who are rated as being Securely Attached to them during the Strange Situation.

4. Female infants will be more likely to have a Secure bond with their mothers than male infants.

5. Mothers who interacted in a Sensitive fashion during the CARE-Index evaluation are more likely to have infants who are Securely Attached to them.
6. There will be a relationship between maternal perception of infant temperament at Three Months and security of attachment at Sixteen Months. Mothers who view their infants as having an "easy" temperament will be more likely to have infants who are Securely Attached to them.

7. Mothers who are more knowledgeable about normal infant growth and development will have infants who are securely attached to them during the Strange Situation.

8. There will be a relationship between maternal stress measured at the Three, Six and Sixteen Month assessment periods and security of attachment.

9. Mothers who feel that they have an adequate support system will have infants who can utilize the mother as a secure support base during the Strange Situation.

10. Increased maternal psychological integration as assessed by projective testing will be related to infant security in the Strange Situation.

11. Maternal emotional status as assessed during the Prenatal, Postpartum, Three and sixteen Month data periods will be related to classification of security by the Strange Situation at Sixteen Months.
12. Mothers who have a realistic and generally positive perception of their early childhood experiences will have toddlers who demonstrate healthy bonding patterns during the Strange Situation.

**Research Design**

This study was descriptive in nature. Many potential confounding variables were held constant, such as including only primiparous mothers in the sample, but other factors, e.g., maternal personality variables, were not be manipulated by the researcher. Factors which could not be controlled were measured to see if significant statistical differences existed between the two classifications of maternal-infant bonding (secure or insecure) as measured by the Strange Situation (Galfo, 1983).

**Statistical Analysis**

Path analysis was the statistical method utilized for analysis of the longitudinal data for this dissertation to study the variability among the many antecedents of attachment. Since these variables could not be manipulated, path analysis becomes an observational rather than an experimental technique.
(Borg & Gall, 1983). The principle purpose of path analysis was to separate the correlations among the antecedents of attachment into causal and noncausal components. The causal components were those maternal or infant variables which influenced security of attachment as rated by the Strange Situation.

At its simplest level, path analysis uses multiple regression analysis, but in a very structured, explicit manner (Keith, 1988). As a result, path analysis does not require independent variables to be unrelated, nor does it require categorical independent variables (Keith, 1988). But, unlike many forms of multiple regression, path analysis requires an explicit assumption of independent (presumed cause) and dependent (presumed effect) variables, and also often requires that these assumptions be justified (Borg & Gall, 1983). The path chosen by the researcher must be based upon a supportable theory that includes all important potential causes of the dependent measure (Keith, 1988).

Although the correlational data used in this dissertation cannot itself imply causality, with the use of path analysis evidence of causation can be presumed (Keith, 1988). This is accomplished by combining nonexperimental or correlational data with an explicit
theory of cause and effect of maternal-infant bonding. In fact, cause and effect are inferred from the theory, and the correlations simply provide fuel to test the theory (Keith, 1988).

Path analysis is a useful statistical technique that allows the inference of causality when using correlational data if several requirements are fulfilled (Borg & Gall, 1983). The first requirement is that a prior time precedence must be established. This means that the presumed cause must occur before the presumed effect (Keith, 1988). Since this dissertation was longitudinal, the attachment variables were measured before the final endpoint of the Strange Situation evaluation. A second requirement is that there must be a relationship between the variables (Keith, 1988). All of the instruments employed in this study either involved maternal perceptions of herself and/or her infant or the objective assessments of these constructs. All of these related measures were designed to determine the goodness of fit and degree of harmony between the mother and her baby. A final and most important requirement of path analysis is that all of the presumed variables that influence maternal-infant attachment must be included within the statistical design (Keith, 1988). Extensive review of the
literature and consultation with mental health professionals with clinical expertise in the area of maternal-infant bonding gave support to the inclusion of all these important variables within the path analysis.

The relationships of the antecedents of attachment assessed within this dissertation were included in a path analysis with the Strange Situation being the culminating measure. This path presumed that the maternal perception of her infant had a direct impact on the classification of attachment. The other factors which were included were all presumed to influence the mother's perception of her infant.
CHAPTER FOUR: ANALYSIS OF RESULTS

Results of Data Analysis

The relationships of the antecedents of attachment assessed within this dissertation are illustrated in a path analysis with the Strange Situation being the culminating measure. This path presumed that the maternal perception of her infant had a direct impact on the classification of attachment as assessed by the Strange Situation when the toddler was sixteen months of age. The other maternal-infant constructs which are included were all hypothesized to influence the mother's perception of her infant.

Path analysis by its very design generates many regression equations (see Figure 1). To facilitate data interpretation within this dissertation a relationship of less than .05 was presumed to be insignificant (Loether & McTavish, 1974). Relationships ranging from .05 to .20 were considered to make a significant but weak contribution to the explanation of variance in the dependent variable (Loether & McTavish, 1974). Finally, relationships over .20 strongly contributed to the
DATA ANALYSIS FOR MATERNAL-INFANT BONDING

DATA COLLECTION PERIODS

<table>
<thead>
<tr>
<th>Prenatal</th>
<th>Postpartum</th>
<th>3 Months</th>
<th>6 Months</th>
<th>16 Months</th>
<th>End Measure</th>
</tr>
</thead>
</table>

KEY TO PATH ANALYSIS ABBREVIATIONS

SMS = Sources of Maternal Social Support
MES = Maternal Emotional Status
MPF = Maternal Perception of the Infant
KNO = Knowledge of Infant Growth, Development
MPI = Maternal Personality Integration
MA = Maternal Age
MPE = Maternal Perception of Childhood Experience

DIN = Differences in Neonatal Responsiveness
SEX = Gender of the Infant
MPT = Maternal Perception of Infant Temperament
MMS = Measure of Maternal Stress
MII = Maternal-Infant Interaction
IDS = Infant Development Status
STS = Strange Situation
amount of variance in the dependent variable that was explained by the independent variable (Loether & McTavish, 1974). To further facilitate data interpretation, a second path analysis was designed using solid lines for significant predictors and broken lines for insignificant findings (See Figure 2). The statistical interpretations for each part of the path analysis are also listed in tables.

A review of the Prenatal path analysis results is presented in Table 4.

During the second to third trimester of pregnancy, the prenatal period, there was evidence that several factors influenced how a woman perceived her developing fetus. The first factor was the amount of social support she received from others linked with her own emotional status. A second contributing factor was the woman's age when she became pregnant. Finally, emotional status (or mood) also provided a significant contribution to the perception of the fetus. Other factors, such as maternal knowledge of infant growth and development, made a small but insignificant impact on how a mother perceived her fetus.

Table 5 gives the data interpretation of the Prenatal-Postpartum Transition period.
DATA COLLECTION PERIODS

PRENATAL

16 MONTHS

6 MONTHS

3 MONTHS

POSTPARTUM

DATA ANALYSIS FOR MATERNAL-INFANT BONDING

KEY TO PATH ANALYSIS ABBREVIATIONS:

SIS = Strange Situation
IDS = Infant Development Status
MII = Maternal-Infant Interaction
MPS = Measure of Maternal Stress
SEX = Gender of the Infant
DIN = Differences in Maternal Responsiveness
MPE = Maternal Perception of Childrearing
MA = Maternal Age
MPF = Maternal Personality Interaction
KNO = Knowledge of Infant Growth, Development
MPS = Maternal Perception of the Infant
MPS = Measure of Maternal Status
SMS = Sources of Maternal Support

DATE ANALYSIS FOR MATERNAL-INFANT BONDING

Figure 2
Antecedents of Attachment

Table 4
Path Analysis Interpretations for the Prenatal Period

<table>
<thead>
<tr>
<th>Prenatal Dependent Variable</th>
<th>Prenatal Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Sources of Social Support</td>
<td>.10 *</td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Maternal Emotional Status</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Maternal Personality</td>
<td>.00</td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Integration</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Maternal Age</td>
<td>.12 *</td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Maternal Perception of Childhood Experiences</td>
<td>.00</td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Maternal Knowledge of Infant Growth and Development</td>
<td>.01</td>
</tr>
<tr>
<td>Maternal Perception of the Fetus</td>
<td>Maternal Emotional Status</td>
<td>.09 *</td>
</tr>
</tbody>
</table>

* Significant Finding
Table 5
Prenatal-Postpartum Transition

<table>
<thead>
<tr>
<th>Postpartum Dependent Variable</th>
<th>Prenatal Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postpartum Maternal Perception of the Infant</td>
<td>Prenatal Maternal Perception of the Fetus</td>
<td>.03</td>
</tr>
</tbody>
</table>
Since this dissertation involved longitudinal data there were variables which linked the data collection periods together. It was hypothesized that prenatal perception of the fetus would have a significant impact on how the mother related to her infant during the postpartum period. In this case the null hypothesis was supported and a significant difference was not found.

Table 6 lists the results of the path analysis for the Postpartum period.

During the Postpartum Data Period Infant Gender along with Differences in Neonatal Responsiveness contributed to Maternal Perception of the Infant. Measures of Maternal Stress were found to be insignificant at this data assessment point.

The path analysis results of the Postpartum-Three Month transition are shown in Table 7.

In the Postpartum-Three Month transition two factors were found to be significant. First, the Postpartum Maternal Perception of the Infant was associated with the Maternal Perception of Infant Temperament at three months. The second significant factor that influenced the three month Maternal Perception of the Infant was the Postpartum Maternal Perception of the Infant linked with an evaluation of the Maternal-Infant Interaction at three months.
### Table 6

**Postpartum Path Analysis Interpretation**

<table>
<thead>
<tr>
<th>Postpartum Dependent Variable</th>
<th>Postpartum Independent Variable</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress</td>
<td>.03</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Infant Gender</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Differences in Neonatal Responsiveness</td>
<td>.05*</td>
</tr>
</tbody>
</table>

* Significant Finding
### Table 7

**Postpartum-Three Month Transition**

<table>
<thead>
<tr>
<th>Three Month Dependent Variable</th>
<th>Postpartum-Three Month Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Perception of Infant Temperament</td>
<td>Postpartum Maternal Perception of the Infant</td>
<td>.05 *</td>
</tr>
<tr>
<td>Infant Developmental Status at Three Months</td>
<td>Postpartum Maternal Perception of the Infant</td>
<td>.03</td>
</tr>
<tr>
<td>Maternal Perception of the Infant at Three Months</td>
<td>Postpartum Maternal Perception of the Infant</td>
<td>.15 *</td>
</tr>
<tr>
<td>Maternal-Infant Interaction at Three Months</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Significant Finding
Postpartum Maternal Perception of the Infant did not have a significant impact on the Infant's Developmental Status at three months.

Table 8 contains the three month path analysis interpretations.

At three months several factors significantly influenced the maternal perception of her infant. Maternal Perception of Infant Temperament was related to the mother's more generalized perception of her baby. Measures of Maternal Stress were also found to impact on her perception of the infant. When Measure of Maternal Stress was linked with Maternal Emotional Status the association became stronger. The strongest impact upon Maternal Perception of the Infant was found when Measure of Maternal Stress was associated with Sources of Social Support. Maternal Perception of the Infant was not measurably influenced by either Maternal-Infant Interaction and Infant Gender or the Infant's Developmental Status.

Table 9 includes the Three to Six Month Transition results for the path analysis equations.

There was only one significant factor in the transition from Three to Six Months. The three month Maternal Perception of the Infant linked with the six month Maternal-Infant Interaction had a weak but causal
### Table 8

Three Month Path Analysis Interpretations

<table>
<thead>
<tr>
<th>Three Month Dependent Variable</th>
<th>Three Month Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Maternal Perception of Infant Temperament</td>
<td>.12 *</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Infant Developmental Status</td>
<td>.00</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress</td>
<td>.16 *</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress</td>
<td>.16 *</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Maternal Emotional Status</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress</td>
<td>.30 **</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Sources of Social Support</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Maternal-Infant Interaction</td>
<td>.00</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Infant Gender</td>
<td></td>
</tr>
</tbody>
</table>

* Significant Finding

** Strongly Significant Finding
### Antecedents of Attachment

#### Table 9

Three to Six Month Transition Path Analysis

**Interpretations**

<table>
<thead>
<tr>
<th>Six Month Dependent Variable</th>
<th>Three Month-Six Month Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge of Infant Growth and Dev.</td>
<td>3 Mo. Maternal Perception of the infant</td>
<td>.00</td>
</tr>
<tr>
<td>6 Mo. Maternal Perception of the Infant</td>
<td>3 Mo. Maternal Perception of the infant</td>
<td>.05 *</td>
</tr>
<tr>
<td>6 Mo. Infant Dev. Status</td>
<td>3 Mo. Maternal Perception of the infant</td>
<td>.00</td>
</tr>
</tbody>
</table>

* Significant Finding
Antecedents of Attachment

link with the Maternal Perception of the Infant at six months. The three month Maternal Perception of the Infant alone did not have any measurable influence on six month Knowledge of Infant Growth and Development or Infant Development Status.

Table 10 gives the Six Month path analysis interpretations.

During the Six Month Data Assessment Period three factors were found to have a significant impact upon the Maternal Perception of her infant. The first measured construct was Knowledge of Infant Growth and Development. A second factor was the association between Sources of Social Support and Measures of Maternal Stress. Finally, Maternal-Infant Interaction and Infant Gender became significant at the six month data analysis period. Variables which had insignificant influences on Maternal Perception of her Infant included Infant Developmental Status and Measures of Maternal Stress.

Table 11 lists the results of the Six to Sixteen Month Transition Periods.

There were no significant links in the Six to Sixteen Month Transition. The six month Maternal Perception of the Infant and sixteen month Maternal-Infant Interaction did not reach a level of significance.
<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Knowledge of Infant Growth and Development</td>
<td>.11 *</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Infant Developmental Status</td>
<td>.04</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress</td>
<td>.03</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress</td>
<td>.19 *</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Sources of Social Support</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Maternal-Infant Interaction</td>
<td>.05 *</td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Infant Gender</td>
<td></td>
</tr>
</tbody>
</table>

* Significant Finding
Table 11
Six-Sixteen Month Transition Path Analysis
Interpretations

<table>
<thead>
<tr>
<th>Sixteen Month Dependent Variable</th>
<th>Six-Sixteen Month Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Mo. Maternal Perception of the infant</td>
<td>6 Mo. Maternal Perception of the infant</td>
<td>.04</td>
</tr>
<tr>
<td>16 Mo. Infant Developmental Status</td>
<td>6 Mo. Maternal Perception of the infant</td>
<td>.04</td>
</tr>
</tbody>
</table>
with the sixteen month Maternal Perception of the Infant. The six month Maternal-Perception of the Infant was not significantly related to the sixteen month Infant Developmental Status.

A description of the Sixteen Month path analysis results is made in Table 12.

At the final sixteen month data assessment period several factors had a significant impact upon Maternal Perception of the Infant. First, Maternal Measure of Stress associated with Maternal Emotional Status had a strong influence on Maternal Perception of the Infant. Maternal Measure of Stress linked with Sources of Social Support was also found to be significant. Maternal Personality had an impact on Maternal Perception of the Infant. Finally, Maternal-INFANT Interaction and Infant Gender strongly influenced the Maternal Perception of the Infant. Two other factors, Measure of Maternal Stress and Infant Development, had a weak and insignificant effect on Maternal Perception of the Infant.

Table 13 lists the Strange Situation classifications of the sample 60 toddlers evaluated within this dissertation. This table represents the number of toddlers who were securely and insecurely attached to their mothers.
### Antecedents of Attachment

Table 12

**Sixteen Month Path Analysis Interpretations**

<table>
<thead>
<tr>
<th>Sixteen Month Dependent Variable</th>
<th>Sixteen Month Independent Variable(s)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress .03</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress .25 **</td>
<td></td>
</tr>
<tr>
<td>of the Infant</td>
<td>Maternal Emotional Status</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Measure of Maternal Stress .18 *</td>
<td></td>
</tr>
<tr>
<td>of the Infant</td>
<td>Sources of Social Support</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Maternal Personality .08 *</td>
<td></td>
</tr>
<tr>
<td>of the Infant</td>
<td>Integration</td>
<td></td>
</tr>
<tr>
<td>Maternal Perception of the Infant</td>
<td>Infant Developmental Status .03</td>
<td></td>
</tr>
<tr>
<td>Maternal-Infant Interaction .21 **</td>
<td>Infant Gender</td>
<td></td>
</tr>
</tbody>
</table>

* Significant Finding

** Strongly Significant Finding
### Antecedents of Attachment

#### Table 13

Results of the Strange Situation Classifications

<table>
<thead>
<tr>
<th>Attachment Classification</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Secure</td>
<td>26</td>
<td>43.4</td>
</tr>
<tr>
<td>Insecure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anxious-Avoidant</td>
<td>14</td>
<td>23.3</td>
</tr>
<tr>
<td>Anxious-Resistant</td>
<td>3</td>
<td>5.0</td>
</tr>
<tr>
<td>Disorganized-Disoriented</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>Avoidant-Ambivalent</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>60</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 13 illustrates that only 43.4% of the toddlers in this sample utilized the mother as a secure base for attachment in the Strange Situation. The remaining 56.6% of the toddlers within this study expressed behavior patterns which were associated with one of the insecure classifications of attachment.

It was hypothesized that each maternal and infant variable included within this dissertation would influence the security of attachment as evaluated during the Strange Situation. The results of the statistical relationships examining the associations between the specific antecedents of attachment to the Strange Situation are listed below.

**Relationship of Specific Antecedents of Attachment to the Strange Situation**

1. Mothers over 19 years of age will be more likely to have infants who are securely attached to them.
   
a. The relationship between maternal age and security of attachment was .02 and was not significant.

2. Infants who were rated during the Postpartum period as having more mature motor and neurological responses on the Brazelton Neonatal Assessment Scales will have a greater likelihood of being Securely attached to their mothers at sixteen months.
a. There was no relationship (.00) between
Postpartum measures of developmental status and the
Strange Situation at sixteen months.

3. Mothers who express positive perceptions of their
infants during the Prenatal, Postpartum, Three Month,
Six Month and Sixteen Month data collection periods will
have infants who are rated as being Securely attached to
them during the Strange Situation.

   a. There was no relationship (.00) during the
Prenatal through Three Month data collection periods.
Small but insignificant relationships of .03 at six
months and .01 at sixteen months were found.

4. Female infants will be more likely to have a Secure
bond with their mothers than male infants.

   a. There was no difference (.00) in security of
attachment as measured by the Strange Situation between
male and female infants.

5. Mothers who interacted in a Sensitive fashion
during the CARE-Index evaluation are more likely to have
infants who are Securely attached to them.

   a. There was no difference detected between
Sensitive versus Controlling or Unresponsive mothers at
Three Months and insignificant differences of .03 and
.01 at Six Months and Sixteen Months, respectively.
6. There will be a relationship between maternal perception of infant temperament at Three Months and security of attachment at Sixteen Months. Mothers who view their infants as having an "easy" temperament will be more likely to have infants who are securely attached to them.

   a. Maternal perception of infant temperament was a significant predictor (.10) of the Strange Situation classifications at Sixteen Months.

7. Mothers who are more knowledgeable about normal infant growth and development will have infants who are securely attached to them during the Strange Situation.

   a. There was no relationship (.00) between maternal knowledge and security of attachment at either the Prenatal or Six Month assessment periods.

8. There will be a relationship between maternal stress measured at the Three, Six and Sixteen Month assessment periods and security of attachment.

   a. There was not a significant relationship between maternal reports of stress (Three Months = .04; Six Months = .00; Sixteen Months = .01).

9. Mothers who feel that they have an adequate support system will have infants who can utilize the mother as a secure support base during the Strange Situation.
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a. Prenatal social support was significantly (.06) predictive of the security of attachment at Sixteen Months. Later measures of maternal social support were not significant (Three Months = .00; Six Months = .01; Sixteen Months .02).

10. Increased maternal psychological integration as assessed by projective testing will be related to infant security in the Strange Situation.

a. Neither the Thematic Apperception Test (.00) administered during the prenatal period or the Attachment Apperception Test (.03) given during the Sixteen Month assessment were significant predictors of infant attachment ratings.

11. Maternal emotional status as assessed during the Prenatal, Postpartum, Three and Sixteen Month data periods will be related to classification of security by the Strange Situation at Sixteen Months.

a. This factor had no relationship to maternal-infant attachment at any of these data periods: Prenatal, Postpartum, Three or Sixteen Months.

12. Mothers who have a realistic and generally positive perception of their early childhood experiences will have toddlers who demonstrate healthy bonding patterns during the Strange Situation.
a. There was a significant relationship (.07) between maternal recall of early childhood experiences and security of maternal-infant attachment when the babies were sixteen months old.
CHAPTER 5: DISCUSSION AND CONCLUSIONS

Maternal-infant attachment is a difficult construct to assess since there are maternal variables, infant variables, and their unique combination. This dissertation attempted not only to examine these constructs but also to predict how these variables would influence security of attachment as measured by the Strange Situation during a sixteen month assessment.

Maternal Age

Even though 38.3% of the mothers in this study were under 20 years old when they delivered their infants, Maternal Age was not a significant predictor of maternal-infant attachment at sixteen months. Although other studies (Field et al., 1980; Jones et al., 1980; Ragozin et al., 1982) have reported Maternal Age as being a crucial factor in the Maternal Perception of the Infant these studies were not longitudinal in nature and were conducted during the early postpartum period. The cited studies also focused on differences in how mothers
interacted with their babies during feeding time and other infant care activities and not the Strange Situation.

Maternal age did have a significant impact on Maternal Perception of the Fetus as measured during the prenatal period. Although it was not predicted in the path analysis, this difference in Maternal Perception of the infant based on Maternal Age may have remained significant during early infancy.

**Maternal Personality Integration**

Maternal Personality Integration was assessed by projective personality test during data periods for this dissertation. The first test, the Thematic Apperception Test, was administered to mothers during the prenatal period. The results of this test were not significantly related to either Maternal Perception of the Fetus or the Strange Situation. The second projective test, the Attachment Apperception Test, is an instrument recently devised to assess areas that are specifically related to maternal-infant bonding. The Attachment Apperception Test was administered during the sixteen month assessment period and was significantly related to the Maternal Perception of the Infant. This test was not a
significant predictor of the Strange Situation classification (secure versus insecure).

Other researchers, such as Belsky and Isabella (1988), have found that maternal personality factors are significantly associated with security of attachment as measured by the Strange Situation. There are two basic differences between their findings and the results of this dissertation. First, both of the personality measures utilized within this dissertation were projective. The Belsky and Isabella (1988) study employed self-report measures which are more objective in their scoring (Ryan, 1985). The second projective test administered, the Attachment Apperception Test, has just been developed and there are no reports of pilot studies or standardization data available on this instrument. A second difference between the findings were that Belsky and Isabella found different combinations of the subscales entered into the path analysis equation explained different amounts of the variance in attachment security. The Attachment Apperception test did not yield the same subscales as were utilized in the Belsky and Isabella (1988) study.
Maternal Emotional Status

Although Maternal Emotional Status was significantly related to Maternal Perception of the infant at four of the five data periods it was not related to the Strange Situation. Other researchers, such as Fleming et al., (1988), found that a mother's emotional status influenced the patterns of the interactions with her baby at one and three months. Feldman and Nash (1984) found that the mother's emotional status during the prenatal period continued to influence interaction with the infant up through the six month period. Within this study Maternal Emotional Status was related to Maternal Perception of the Infant as predicted except during the prenatal period. The breakdown in predicted results occurred when Maternal Perception of the Infant was not significantly related to the Strange Situation.

Maternal Perception of the Infant

Within the Path Analysis it was predicted that Maternal Perception of the Infant would be the link between the five data collection periods and ultimately the Strange Situation. This hypothesis was not supported by the results of path analysis.
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There are several factors that could have contributed to this lack of support for the path analysis. First, the data which was included in Maternal Perception of the Infant was weak and often incomplete. It sometimes involved several instruments, such as the Emde 1-Feel Picture Deck, which were not specifically designed to measure a mother's perception of her baby. At other data assessment periods the information concerning Maternal Perception of the Infant simply involved a few simple questions which did not assess this variable in enough depth to allow generalizations to be made from one data period to another. Although the measure of the mother's perception of her baby was incomplete, other variables such as measures of maternal emotional status were significantly related to this construct.

Another potential factor could be that the Strange Situation was not a sensitive predictor of maternal-infant attachment. Several researchers including Gardner and Thompson, (1983) and Lamb et al., (1984) have found that the classifications of attachment were not concise. Other researchers, such as Main and Solomon (1987), found that all toddlers could not be accurately classified. These researchers did not include 30% of their original study in their final data
analysis because they were not confident of their attachment classification. A third factor which may have influenced the relationship between the Maternal Perception of the Infant and the Strange Situation were incidents that occurred during the Strange Situation evaluation that may have confounded the results. A few examples of factors that may have influenced the Strange Situation evaluations include: 1) "Mother said baby had a fever and didn't sleep well last night, baby fell asleep immediately after reunion;" 2) "Baby has had a virus -possibly colitis- for past three weeks which now seems resolved, the baby was also separated from mother for eight days three weeks ago;" 3) "Mother reported that baby went to the doctors this same day and has a virus;" 4) "Baby has epilepsy and is on Phenobarbital." All of these infants received insecure ratings of maternal-infant attachment. Other variations from the Strange Situation routine such as "stranger did not introduce self to baby" or "mother picked child up and comforted when she was supposed to leave the room" were also noted. The potentially confounding factors found associated with the Strange Situation were so numerous that if they were all deleted from the study it would be difficult to meet the basic assumptions of statistical analysis.
Maternal Perception of Early Childhood Experiences

It was hypothesized that a mother's perceptions of her early childhood experiences would impact upon her relationship with her own infant (Belsky & Isabella, 1988; Sroufe, 1985; Tronick et al., 1986). This influence was not evident during the prenatal period since this construct had no measurable effect on the Maternal Perception of the Fetus. By sixteen months a mother's perceptions of her own childhood began to impact upon her relationship with her toddler. Maternal Perception of Early Childhood Experiences had a weak but significant influence on the Strange Situation ratings of secure or insecure attachment to the mother.

Measure of Maternal Stress

Measure of Maternal Stress was a significant predictor of how a mother perceived her baby (Feiring et al., 1987; Grossman et al., 1980). This construct became very strong when linked with either of the variables Maternal Emotional Status or Sources of Social Support. It is evident that although stress in itself can often influence the mother's perception of her child, it becomes a stronger predictor when the variables of her emotional status (mood) and available
social support to help her handle the stressors are known. Measures of Maternal Stress were not significantly related to the Strange Situation evaluation of security of attachment during any of the data periods.

**Sources of Maternal Social Support**

Beginning during the prenatal period and all through the infants first sixteen months, sources of maternal social support were important to how the mother perceived her infant (Levitt et al., 1986; Mitchell & Trickett, 1980). The predictive value of this variable was strengthened when it was associated with Measures of Maternal Stress. During several of the data periods, e.g., three, six and sixteen months, information relating directly to Maternal Sources of Social Support were incomplete, often consisting of one or two questions. During the prenatal period a comprehensive evaluation of maternal social support was assessed. Information obtained on social support during the prenatal period was significant in predicting security of maternal-infant attachment at sixteen months. If other measures of this construct were as complete as the prenatal period, Sources of Maternal Social Support may
have accounted for even more of the variance in security of maternal-infant attachment.

**Knowledge of Normal Infant Growth and Development**

It was hypothesized that mothers who were more knowledgeable about infant growth and development would have a more realistic perception of their infants (Svejda et al., 1982). Although this hypothesis was not supported during the prenatal period by six months postpartum it was a significant factor in the maternal perception of her infant.

**Infant Gender**

Mothers of female infants were predicted to respond to their infants in a more sensitive manner than to their sons (Crockenberg & Smith, 1982; Moss, 1967). Infant gender became one of the strongest influences on maternal-infant attachment although its effect did not become significant until the infant was six months of age. By sixteen months of age, infant gender explained 21% of the variance in maternal-infant interaction. The direction of this difference is that mothers interact more sensitively with their daughters than with their sons. Although infant gender was related to maternal-infant interaction, it did not significantly influence
security of attachment as measured by the Strange Situation.

**Differences in Neonatal Responsiveness**

Although other researchers (Belsky & Rovine, 1987; Waters et al., 1980) have discovered an association between the Brazelton Neonatal Assessment Scale and security of attachment in the Strange Situation these results were not replicated within this dissertation. The other studies cited utilized larger populations which allowed them to differentiate infants into all categories of secure/insecure attachment (Secure, Anxious-Avoidant, and Anxious-Resistant).

Other researchers (Belsky & Isabella, 1988; Grossman et al., 1980) failed to differentiate between differences on the Brazelton Neonatal Assessment Scale and security of maternal infant attachment. This was found to be true especially when the characteristics of the neonate fell within the normal range of functioning as was the case with the sample of this study.

**Maternal Perception of Infant Temperament**

Infant temperament as measured by the Carey Infant Temperament Questionnaire (Carey, 1970; Carey & McDevitt, 1978) was a significant predictor of both
Maternal Perception of the Infant and security of attachment during the Strange Situation. Since the Infant Temperament Questionnaire was an excellent assessment of maternal perception of her infant (Goldsmith & Alansky, 1987; Lerner & Lerner, 1983) it was not surprising that it predicted 12% of the variance in the three month Maternal Perception of the Infant. Although there was a thirteen month time period between the three and sixteen month data assessments, 10% of the variance in the security of maternal-infant attachment measured by the Strange Situation evaluation was explained by the Infant Temperament Questionnaire.

Maternal-infant Interaction

Maternal-infant interaction by itself did not account for a significant amount of variance in either the Maternal Perception of the Infant or Strange Situation. Only when infant gender was included in the Maternal-infant interaction assessment did it become a significant construct within the path analysis.

There are three possible explanations for this. First, even though 60 mother-infant dyads were included in the Strange Situation, not all of these were included in the CARE-Index evaluations. For example, only 40 mother-infant dyads completed this assessment during the
sixteen month visit. With a sample that small it would take a larger difference in the Maternal-Infant Interaction ratings to approach a significant level.

Another potential factor which could have influenced these results is that maternal-infant interactions were only viewed for three minutes. This short time period may not have allowed sufficient time for conclusive results to be drawn on such a global construct as maternal-infant interaction (Waters & Deane, 1982).

Finally, factors such as infant illness, recent separations from the mother, and/or side effects from prescribed medications could all have influenced how an infant interacted with his or her mother. Also, when dealing with infants one has to consider feeding and nap times which may contribute to the infant's state and hence to interactional capabilities (Demos, 1982).

**Infant Developmental Status**

Differences in Infant Developmental Status did not reach significance either with the Maternal Perception of the Infant or the Strange Situation. Although the Bayley Scales of Infant Development are a good measure of infant development other researchers (Egeland & Farber, 1984; Matas et al., 1978; Pastor, 1981; Waters,
et al., 1979) also failed to find that differences in infant development were related to maternal-infant attachment classification assessed by the Strange Situation. It is evident that differences in developmental status were not important criterion for either Maternal Perception of the Infant or the Strange Situation within this dissertation.

**Strange Situation**

The percentage of toddlers who were securely attached to their mothers was lower than other studies with similar populations (Egeland & Farber, 1984; Lyons-Ruth et al., 1984; Speiker & Booth, 1985). There are two possible explanations for this discrepancy. First, there may have been factors inherent to this sample that hindered the formation of a secure maternal-infant bond. A second possibility is that since the expanded classification system, including Avoidant-Ambivalent and Disorganized-Disoriented ratings, was utilized in this study, toddlers who were earlier classified as being Secure could have been correctly classified within these two categories, thus changing the overall distribution. The second hypothesis has been supported by the research of Crittenden (1985) and Main and Solomon (1987). These researchers found that as many as 83% of the toddlers
who would be placed within these classifications would have otherwise been labeled as Securely attached to their mothers. Since there were population or procedural differences between studies utilizing the five Strange Situation categories and this dissertation direct comparisons of results was not possible.

Revised Path Analysis for Maternal-Infant Attachment

In light of knowledge gained from completing this dissertation the original path would be redesigned (Figure 3). First, there would be two basic tracks which potentially influence the Maternal Perception of the Infant. The first track is the evaluation of maternal characteristics, such as race, age, social support, measures of stress and emotional status. The second track would involve infant characteristics such as gender and temperament.

It could be hypothesized that maternal variables would have a greater impact on the Maternal Perception of the Infant until the baby is about six months old. When the infant reaches six months, reciprocity in the relationship between the mother and baby begins to emerge. As this reciprocity develops, it could be predicted that the baby's characteristics will begin to exert a greater impact on Maternal Perception of the
KEY TO PATH ANALYSIS ABBREVIATIONS

STI = Strange Situation
MII = Maternal-Infant Interaction
MPS = Measures of Maternal Stress
Temperament
MPI = Maternal Personality Perception of Infant
MPE = Maternal Perception of Infant
SEX = Gender of Infant
Childhood Experience
MPF = Maternal Perception of Early Life
SMPS = Sources of Maternal Support

REVISED PATH ANALYSIS FOR MATERNAL-INFANT ATTACHMENT

FIGURE 3
DATA COLLECTION PERIODS
PRENATAL 3 MONTHS 6 MONTHS 16 MONTHS POSTPARTUM END MEASURE
Infant. This influence could also be reflected in the security of maternal-infant attachment as assessed in the Strange Situation.

Several other changes would also be made in the proposed path analysis to enhance the amount of variance in security of attachment that could be accounted for by the measured maternal and infant variables.

The first change in the path analysis would involve the category of Maternal Personality Integration. Self report personality measures would be utilized instead of projective testing for two reasons. First, self report personality tests have stronger reliability and validity ratings than projective tests. The higher validity and reliability ratings allow the test results to be compared with other studies. The second reason is that self report personality tests also include specific scales evaluating nurturance, affection, ego strength, and self-esteem which have been found to be significant in other studies examining maternal-infant bonding (e.g. Belsky & Isabella, 1988).

Including Maternal Age as a factor influencing Maternal Perception of the Infant to the other four data collection periods would be another change in the proposed path analysis. Since Maternal Age was a significant predictor of Maternal Perception of the
Fetus, the effect may carry over to other data periods in this longitudinal study.

Another change in the path analysis would be to include the race of the maternal-infant dyad. Race may contribute to differences in both maternal-infant interaction and security of attachment in the Strange Situation.

Maternal Perception of the infant would remain the linking factor between the different data collection periods. More comprehensive measures of this variable would be utilized at each of the data collection periods. It could be hypothesized that if a stronger assessment of Maternal Perception of the Infant were employed that both maternal and infant variables would have a stronger association with this construct. With a more comprehensive evaluation of Maternal Perception of the Infant the link between the data collection periods would probably reach a level of significance.

The relationship between some of the variables within the path analysis would also be changed. The interaction between maternal social support, stress and emotional status would be reassessed. Maternal Emotional Status, instead of Measures of Stress, would be the variable directly linked with the mother's Perception of the Infant. Although it would be
important to determine the amount of stress and the strength of the support system, the most important measure influencing perception of the baby may be how the mother feels about herself as assessed by Maternal Emotional Status.

Two variables would be deleted from the revised path analysis. Although the Brazelton Neonatal Assessment Scale and Bayley Scales of Infant Development are both good measures of infant development, they did not have significant associations with either the Maternal Perception of the Infant or the Strange Situation. Since this construct did not relate to either of the criterion measures they would be omitted from the revised path.

A final change that would be made in redesigning the path analysis involves moving Maternal Perception of Infant Temperament from the three to six month data assessment period. This move would be executed for two reasons. First, the Carey Infant Temperament Questionnaire was normed on infants four to eight months of age (Carey, 1978). Secondly, the Infant Temperament Questionnaire would be a valuable measure when the infant is six months old since this is the period when reciprocity in the relationship between a mother and baby begins to emerge. This new dimension of
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reciprocity may have a profound impact on how the mother perceives her infant's temperament.

Although the basic integrity of the path analysis could be maintained, it is hypothesized that these changes would strengthen the relationship of maternal and infant variables to the constructs of Maternal Perception of the Infant and security of attachment as evaluated by the Strange Situation. If the relationship between the measured maternal and infant variables and these two constructs were strengthened, the predictability of this statistical model would be enhanced.

Considerations for Future Studies

In designing a study examining the antecedents of maternal-infant attachment several factors should be considered.

First, although 60 mother-infant dyads satisfies most statistical criteria, a larger sample would be recommended. As noted in this dissertation, many potentially confounding factors can influence maternal-infant interaction especially when it is being evaluated for the Strange Situation. A larger sample would allow the researcher some flexibility in determining which factors may have confounded the results of the Strange
Situation and to omit these dyads from the final data analysis. If a larger sample were utilized it would also allow the researcher to utilize the five categories of the Strange Situation instead of being limited to Secure versus Insecure Attachment classifications.

Since the Strange Situation has almost become synonymous with "the attachment situation" (Waters & Deane, 1982), the reliability and validity of this instrument should be strengthened. One way to strengthen the reliability of the Strange Situation would be to utilize this assessment during different assessment periods. Since the Strange Situation is most often utilized from the time the toddler is twelve to twenty four months, two assessments could take place within this time period. This would measure the temporal stability of the Strange Situation. In "high-risk" populations such as the one described in this dissertation the temporal stability of the Strange Situation was found to be 48-62% over a six month time period (Egeland & Farber, 1984; Vaughn et al., 1979). The validity of the Strange Situation could be strengthened by carefully controlling or monitoring extraneous factors which could potentially influence the toddlers expression of security of attachment to his or her mother.
A final suggestion for future research is that the scope of infant bonding be broadened to include the father of the baby or significant others in the infant's life. If, within the scope of the study, these variables cannot be measured then they should be controlled. The researchers should ask the mother what other people the child interacts with on a regular basis and the nature of the relationship. The infant's ability to bond is not related exclusively to the relationship with the mother. Other people in the infant's life undoubtedly play a role in this most important construct.

Conclusion

The development of a secure attachment with the mother is crucial for the physical and psychological development of a child. Although all of the antecedents of secure bonding have not been identified by this dissertation several variables have been found to be important. Two factors, sources of social support and perception of early childhood experiences, had a significant influence on the security of attachment at sixteen months. The variable Maternal Perception of Infant Temperament assessed at three months postpartum
predicted 10% of the variance in security of infant attachment when the infant was sixteen months.

Although the other factors in the path were not significantly associated with the Strange Situation, they did give some insight into the development of the maternal-infant relationship.

Maternal age, sources of social support, and measures of stress all influenced how a mother perceived her unborn child during the prenatal period.

The baby's gender and developmental status had a weak, but significant influence on the mother's perception of her newborn.

By three months postpartum more variables began to influence the mother's perception of her infant. First, social support, measures of stress, and emotional status had a strong impact on how the mother perceived her baby. Characteristics that involved the infant such as temperament and measures of interaction also began to shape the mother's perception of the baby.

During the six month data assessment period the maternal factors of social support, stress, and knowledge of infant development all influenced her perception of her baby. Infant variables such as mother's perception at three months, gender, and
measures of interaction also impacted upon the mother's perception of her baby at six months.

Finally, during the sixteen months assessment period maternal factors continued to influence her perception of her baby. Measures of social support, emotional status, stress, and personality integration all influenced the perception of her toddler. The baby's gender became a strongly significant factor in explaining differences in interactive patterns between mother and child by sixteen months. The toddlers gender explained 21% of the variance in maternal-infant interaction during this data period.

The Strange Situation has become synonymous with the attachment in mothers and infants. Even though this measure has reliability and validity problems with the different classifications of security, it does give valuable insight into the history of the maternal-infant relationship. When a child cannot utilize his or her mother as a secure base to obtain comfort during a stressful situation, it is a sign of maladaptive bonding. Different classifications of attachment, such as Ambivalent-Avoidant and Disorganized-Disoriented, have been related to child abuse (Crittenden, 1985; Speiker & Booth, 1987).
The purpose of this dissertation was to discern some of the antecedents of attachment which were correlated with maladaptive maternal-infant bonding. Through the use of path analysis the relationship of a large number of maternal and infant variables to maternal perception of the infant and the Strange Situation have been measured. Since infants less than 12 months of age are very responsive to changes in their mother's behavior patterns this is a crucial period for support and clinical interventions to occur. As the toddler continues to grow and develop this valuable window of opportunity for change begins to narrow as the representative model of a caregiver begins to solidify within the child's mind (Sameroff & Chandler, 1975). Early and specific support and clinical interventions are needed when maladaptive bonding is suspected, especially when it is associated with infant neglect or abuse putting the child's physical and psychological health at risk.
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