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The relation between maternal attachment and patterns of mother-infant interaction at four months

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THE RELATION BETWEEN MATERNAL ATTACHMENT AND PATTERNS OF MOTHER-INFANT INTERACTION AT FOUR MONTHS

by

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A dissertation submitted to the Graduate Faculty in Psychology in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

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Abstract

THE RELATION BETWEEN MATERNAL ATTACHMENT AND PATTERNS OF MOTHER-INFANT INTERACTION AT FOUR MONTHS

by

Katherine Ellin Tobias

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The central aim of the proposed study was to examine the link between prebirth maternal attachment status and patterns of mother-infant interaction at four months. Attachment theory assumes that the way in which a mother internally represents her own early attachment relationships influences the way she responds to her child. Based on the notion that mothers in different attachment classifications organize and regulate their experience differently, it is reasonable to expect that they regulate their interaction with their infants in distinctly different ways.

Twenty-eight women in the last trimester of pregnanacy were given the Adult Attachment Interview (AAI). When the infants were four months old, the infant and mother were videotaped in face-to-face interaction for five minutes. The AAI was coded from a transcribed version of the audio tape. Each mother was assigned an attachment classification: Secure/Autonomous (F), Preoccupied (E), or Dismissing (D). The face-to-face

interaction was coded using Tronick and Weinberg's Infant and Caregiver Engagement Phases (1993).

To test the hypothesis that mothers of different attachment classifications and their infants display distinctly different patterns of engagement, infant behavior patterns and maternal behavior patterns were compared separately using t-tests and dyadic factors were compared using time series analysis. The analyses included secure and preoccupied mothers and their infants, because there were too few dismissing subjects. It was found that infants of preoccupied mothers spent significantly more time looking at their mothers than infants of secure mothers. In addition, infants of preoccupied mothers smiled significantly more often at their mothers and tended to smile at their mothers a larger percentage of time altogether than infants with secure mothers. In contrast, infants with secure mothers protested or cried with their mothers for significantly longer on average than infants with preoccupied mothers. In addition, infants with secure mothers tended to spend more time visually exploring the environment than infants with preoccupied mothers. In the analysis of dyadic factors, it was found that preoccupied mothers and their infants followed each other more closely than dyads in the secure maternal attachment group, with both mother and infant demonstrating a relatively higher degree of interpersonal responsivity.

In addition, in a qualitative examination of the data it was found that mothers in each attachment group responded to infant distress with strategies that are consistent with affect regulation styles of their attachment classification. That is, preoccupied mothers exaggerated their infants' distress, dismissing mothers minimized their infants' distress, and secure mothers acknowledged their infants' distress and then helped the infant regain emotional equilibrium.

The results of this study support the hypothesis that mothers in different attachment groups regulate their interaction with their infants in characteristic ways. These data are discussed in the context of attachment theory and research, psychoanalytic theories, and infant research.

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CHAPTER 1

INTRODUCTION

The importance of the mother-infant relationship to later individual development is widely recognized. The mysteries of this early relationship continue to fascinate researchers who study how and why mother-infant pairs develop their own unique ways of relating to one another. It is now believed that an infant develops a repertoire for life in the context of early nonverbal interaction with the mother (Ainsworth, Blehar, Waters & Wall, 1978; Beebe and Lachmann, 1988; Emde, 1983; Main, Kaplan and Cassidy, 1985; Stern, 1977, 1983, 1985; Tronick, 1989). The communication between a mother and her young infant consists of a complex system of exquisitely timed movements, facial expressions and gestures. The quality of this "dance" during the earliest months of an infant's life powerfully shapes and influences the child's later social and emotional development. But, what causes differences in the quality of the dance of each mother-infant pair? Why do some mother-infant dyads seem to "click" so easily while others appear to always "mis-step?"

Attachment research has explored questions of individual differences since Ainsworth's (1970) original finding that mothers who are judged to be more sensitive and contingent in their responses to their infants are

more likely to have securely attached infants and mothers who are less sensitive to the signals of their baby are more likely to have insecure infants. This seemingly common-sensical finding raised an important question about what allows mothers to sensitively respond to their infants. Though we presume that most mothers wish to be good caregivers for their infants, some are more able to be emotionally available to their infant. What accounts for these maternal differences that crucially affect an infant's development? To answer this question, researchers have looked at a number of factors. One especially interesting focus has been the search for specific factors within mothers that are linked to sensitive caregiving.

Using the Adult Attachment Interview, a structured clinical interview designed to assess an adult's state of mind with respect to attachment to her parents, Main (et. al., 1985) found that mothers who are secure with regard to attachment to their own parents are more likely to have securely attached children. That is, secure mothers tend to have secure children. This finding suggests that mothers who are judged to be secure in relation to their own parents are more able to sensitively respond to their own children.

Attachment theory provides a way to understand the link between adult attachment classification and sensitive caregiving by suggesting that the way in which

a mother internally represents her own early attachment relationships influences the way she responds to her child. Main and Goldwyn (1993) suggest that secure parents are sufficiently free from internal demands to notice, accurately interpret and respond to infant cues, whereas adults who are insecurely attached to their own parents tend to misinterpret infant cues on the basis of some more pressing need to "preserve a particular mental organization with respect to attachment" (p. 24). Recent research that examines the relationship between adult attachment classification and Rorschach responses shows that an adult's way of representing her early attachment experiences is inextricably tied to the ways in which she regulates affect and social interaction (Slade, Tuber, Dermer, Tobias and Tuttle, 1992). This work emphasizes that attachment classification captures not only thoughts and feelings about the adult's early experiences with her parents, but also reveals important features of her cognitive and emotional style. Thus, the finding that secure mothers have secure babies suggests that the way a mother organizes and regulates her own experience influences the way she comes to regulate her exchange with her infant.

Given the assumption that mothers of different attachment classifications organize and regulate their experience in distinctly different ways, it is reasonable to expect that mothers with different attachment

classifications will differ in their behavior with their infants in predictable ways. The goal of this project is to provide empirical support for the hypothesis that mothers of different attachment classifications differ in the quality of their interaction with their babies. By carefully observing mothers and their four month old infants in face-to-face interaction, this study aims to discover patterns of relatedness and affect regulation specific to each maternal attachment classification.

In what follows, I will provide the conceptual framework for this study. First, the research literature supporting the view that early mother-infant interaction influences later development is briefly summarized. Then, attachment theory -- especially as it relates to the Adult Attachment Interview -- is reviewed. I will then outline two basic theoretical assumptions of this study that are drawn from the infant research literature: (1) both mothers and infants regulate their interpersonal exchange, and (2) babies are active social partners who can perceive and organize the environment surprisingly well.

Importance of the Mother-Infant Relationship to Later Development

One of the basic assumptions of this study is that the mother-infant relationship is vital to an infant's development. This view states that what occurs in this

core relationship affects how the baby experiences himself and others in his world. Psychoanalysis has long asserted the importance of the early mother-infant relationship and the value of the "holding environment" for healthy psychological development. In the last two decades, attachment and infant researchers have amassed substantial empirical evidence supporting the conceptual understanding that the earliest non-verbal, kinesic and affective experiences form the basic framework for the individual's psychic structures (Beebe and Lachmann, 1988; Sander, 1977).

This large body of data demonstrates a strong connection between the nature of early mother-infant interaction and later cognitive, social and emotional development. Several studies (Ainsworth, 1970; Bates, Maslin and Frankel, 1985; Belsky, Rovine and Taylor, 1984; Grossman, Grossman, Spangler, Suess and Unzner, 1985) support the notion that the quality of caregiving during the first year of life predicts the security of attachment at one year. As described earlier, sensitively responsive mothers are more likely to have secure children and non-responsive or inconsistent mothers are more likely to have children who are insecurely attached. Subsequent studies examined the relationship between an infant's attachment classification and later cognitive, emotional and social functioning, building evidence that an infant's

attachment to his mother is related to his later ego resilience, social competence and emotional development (Arend, Gove and Sroufe, 1979; Easterbrooks and Lamb, 1979; Matas, Arend, and Sroufe, 1978; Pastor, 1980; Waters, Wippman and Sroufe, 1979).

This empirical research supports the belief that what occurs in an infant's life, especially in relation to his primary caregiver, is a highly influential ingredient in a child's development. This research further suggests that during the child's first year the basic foundation is laid for the development of a sense of self and other. Thus, it is in the context of the earliest relationship with the mother that an infant develops strategies for managing affect and ways of interacting with others. It appears from the research that the social repertoire constructed by the mother and her infant becomes the internal structure that the child carries forth through life. The notion of infant-mother interaction as a mutually regulated system that powerfully influences a child's development is central to this study.

Attachment Theory

The overarching theoretical framework for this study is provided by attachment theory. The conceptual and research developments in the attachment literature which

form the scaffolding on which the current study is based are reviewed in this section.

Bowlby. Attachment theory developed out of the theoretical work of John Bowlby (1958, 1969, 1973) who stressed the importance of the mother-infant connection. He believed that infants are biologically predisposed to form selective attachments to their primary caregivers. In Bowlby's view, infant behaviors including gazing, crying and reaching are "attachment behaviors" designed to elicit attention and care from the caregiver. Bowlby suggests that the goal of this "attachment behavioral system" is to maintain proximity to the caregiver. Thus, when the infant is close to the mother there is no need to signal. However, when the infant requires care or attention, the attachment system is activated and the infant signals in order to achieve the "set goal" of proximity, attention and care.

Bowlby believed that through interaction with their caregivers, infants develop "internal working models" of self and others. These models represent prototypes of past interactions which the infant then uses to anticipate future experience. Infants who experience sensitive and consistent care represent their caregivers as "available," but those infants who experience their caregivers as rejecting or unpredictable represent their caregivers as "unavailable." At the same time that the internal working model of the caregiver is developing, an

internal working model of the self is emerging in a parallel fashion. Thus, an infant who has a sensitive, responsive caregiver will develop an internal working model of self that is powerful enough and worthy enough to gain security, protection and care. But, an infant whose caregiver is rejecting or unpredictable will develop an internal working model of self as powerless and unworthy of care. These internal working models, which exist outside of conscious awareness, develop early in life and become increasingly resistant to change.

Ainsworth and the Strange Situation. Based on Bowlby's theoretical work, Ainsworth (1970) developed the experimental method that has fueled subsequent attachment research and conceptual developments: the "Strange Situation." Designed to determine the quality of attachment of infants to their parents, the strange situation involves episodes of separation and reunion of parent and child. The strange situation begins with the mother and infant entering a playroom set up with two chairs and some toys. The mother sits in the chair while the child plays or explores the room. After a minute or so, a stranger enters the room and sits in the other chair. Then, after a few minutes the mother leaves the child and the stranger together in the room. After a few minutes, the mother returns and the stranger discreetly leaves. The mother stays with the child for a few minutes and then leaves the child alone in the room.

After a few minutes, the stranger enters the room. Finally, the mother returns and, again, the stranger discreetly leaves. Separations and reunions usually last three minutes, although the separation can be ended sooner if the parent wishes to or if the child is in great distress. By observing the child's behavior during this procedure, especially behavior during the reunions, researchers can determine the child's internal representation or "internal working model" of the relationship with the mother.

In Ainsworth's original study of 23 mother-infant dyads, she discovered three distinct patterns or organizations of attachment behaviors during the strange situation: secure (B), anxious-avoidant (A), and anxious-resistant (C). Securely-attached (B) infants respond to the departure of the mother by crying or searching for her, and then when the mother returns, the secure infant greets the mother and receives comfort from her presence. Anxious-avoidant (A) infants may not seem to notice the mother's departure, and rather than eagerly greeting the mother when she returns, the avoidant infant will avoid contact with her by averting gaze and avoiding physical contact. The anxious-resistant (C) infants cry, scream and protest in an angry, uncontrolled manner when the mother leaves the room, and during the reunion, these infants combine proximity seeking behavior with

resistance to contact and cannot derive comfort from the mother.

In recent studies (Lyons-Ruth, Connell, Zoll and Stahl, 1987; Main and Solomon, 1990; and Radke-Yarrow, Cummings, Kuczynski and Chapman, 1985), a fourth attachment group has been defined: disorganized (D). Infants are judged to be disorganized (D) when they do not display organized strategies for managing distress during separations from their caregiver in the Strange Situation. These children usually have some history of physical or sexual abuse and/or severe neglect.

The strange situation has been used to assess attachment classification and socioemotional adaptation in one year olds in numerous studies over the last twenty years. In white, middle-class samples in the United States, approximately 60-65% of the infants are secure, 20-25% are avoidant and 10% are resistant.

Main and the Adult Attachment Interview. The next substantial development in attachment theory occurred when Mary Main shifted the emphasis from the behavior in the strange situation to the fact that these attachment behaviors reflect underlying representations of self, other and the relationship (Main, Kaplan & Cassidy, 1985). She began to study the parents of children who were studied in the strange situation five years earlier. Her research group developed the Adult Attachment Interview (George, Kaplan and Main, 1985), a semi-

structured interview that asks about early experiences including separations, losses and other experiences that might activate the attachment system. During the interview, the adult describes her childhood in both general ("semantic" memories) and specific terms ("episodic" memories), providing overall descriptive words as well as memories of incidents that demonstrate and support these general descriptions. In addition, the adult is asked to talk about why her parents behaved in the manner they did and how these childhood experiences have affected her own development.

Main believes that the Adult Attachment Interview (AAI) reveals the adult's representation of her relationship with her parents, much the way the infant's behavior in the strange situation reveals his expectations of his mother's response. In her view, the internal working model that was exhibited in behavior during infancy and childhood becomes representational in adulthood and can be revealed through language, cognition and memory, as well as nonverbal behavior. In both the AAI and the strange situation, the internal working models of the parent, the self and the relationship are being tapped and revealed.

The interviews are taped and transcribed verbatim and then coded from the transcribed version. It is scored as a whole for structural and content features. The most important feature of the scoring is overall

coherence in the narrative, which is defined as fluency of ideation and speech, the absence of contradictions within the narrative, and the ability to match semantic generalizations of the relationship with episodic memories which support such generalizations. Ratings for "probable childhood experience" are assigned for three scales: 1) love, 2) rejection, and 3) involvement. Then, the transcripts are analyzed for the subject's "current state of mind with respect to attachment." The major scales for the adult's representation of attachment are 1) memory, 2) idealization, 3) anger, 4) passivity, and 5) coherence.

One of Main's underlying premises is that the adult's level of security is not based solely on the nature of her early experiences, but primarily on the ways these memories and feelings are organized. When early experience is integrated in a coherent and balanced manner, the adult is judged to be secure, regardless of what specific early experiences are related. Insecure adults' interviews are often incoherent and/or full of idealization and contradiction.

Just as the strange situation yields three attachment classifications, the AAI yields three distinct patterns of attachment organization: secure/autonomous (F), dismissing (D) and preoccupied (E). These adult attachment classifications are analogous to the infant attachment classifications, that is infant-secure to

adult-secure/autonomous, infant-avoidant to adult-dismissing and infant-resistant to adult-preoccupied. There is also a fourth category that corresponds to the disorganized infant attachment classification: unresolved with respect to traumas. Within each attachment classification there are subclassifications that are more specific and thus able to capture the complexity of the quality of an individual's state of mind with respect to attachment.

The secure/autonomous adults tend to value attachment relationships, view these relationships as having affected their personality, can easily remember early relationships, do not idealize parents or past experience, can describe their relationships in general terms and then provide convincing memories that illustrate their semantic generalizations. Their interviews are coherent and balanced. They can acknowledge and talk about difficult or disturbing experiences in meaningful ways without being overwhelmed by the negative affect. There are five subcategories in the secure (F) group: F1) some setting aside of attachment, F2) somewhat dismissing or restricting of attachment, F3) secure/autonomous, F4) strong valuing of relationships, with some accompanying preoccupation with attachment figures, with separations or with past trauma, and F5) somewhat resentful/conflicted.

Adults rated as dismissing tend to minimize the value of attachment relationships, tend to idealize their parents, cannot provide episodic memories that match and support semantic generalizations about their early experiences, and often have difficulty remembering early experiences. Dismissing adults cannot acknowledge negative affect and their accounts of their lives are distorted by this denial of disturbing life experiences. Their descriptions of their parents often sound like caricatures since they cannot speak meaningfully about the actual texture of the relationships. For example, they might say that their relationship with a parent was "normal," or "fine," but they are unable to communicate a more complex, detailed, substantial picture of the relationship. In addition, when they are able to produce specific memories about their experiences with their parents, the memories often contradict the generalized memory. For example, a dismissing adult might say that her relationship with her father was "fine," but the specific memory she has is of a time when her father was critical and harsh. There are four subgroups in the dismissing (D) classification: D1) dismissing of attachment, D2) devaluing of attachment, D3) restricted in feeling, and D4) cut off from the source of fear of death of a family member.

The preoccupied adults are still preoccupied with and depend on their own parents. The interviews of

preoccupied adults are characterized by a flood of early memories that are not contained in or structured by semantic generalization. Especially when faced with negative affect, preoccupied adults become overwhelmed and flooded with memories and feelings that they cannot provide an organizing structure for. In the interview, a preoccupied adult will talk about the many details about her relationships and experiences and her emotional responses to all of the outpouring. Unlike the secure adult, the preoccupied adult cannot contain or organize negative affect by providing generalizations that structure the affective flow. There are three subgroups in the preoccupied (E) attachment group: E1) passive, E2) angry/conflicted, and E3) fearfully preoccupied by traumatic events.

Adults who fit the criterion for the "U", "unresolved" attachment classification have a relatively traumatic history that they have been unable to integrate into a coherent personal narrative. When a "U" is assigned, an alternative attachment classification is also provided.

Recent theoretical formulations in the attachment literature (Berlin, 1993; Cassidy, 1993, 1994; Cassidy & Berlin, in press; Kobak, 1987, 1993; Kobak & Sceery, 1988; and Malatesta-Magai, 1993) examine the connections between attachment theory and emotion regulation. Drawing on Thompson's (1994) view that emotions can be

adaptively regulated in order to achieve specific goals, Cassidy (1994) suggests that children regulate their own affect in an effort to achieve the attachment-related goal of maintaining proximity to the caregiver. Thus, attachment experience is seen as influencing the development of emotion regulation strategies and, reciprocally, affect regulation strategies are viewed as a central feature that differentiates attachment classification. It is thought (Cassidy, 1994) that secure adults have the capacity to regulate negative affect in a balanced manner, while insecure adults have difficulties regulating and modulating negative affect. Preoccupied adults tend to exaggerate or "maximize" negative affect and become overwhelmed and disorganized by it. In contrast, dismissing adults tend to minimize and deny negative affect which leads them to varying degrees of reality distortion. Both strategies, minimizing and maximizing, are failed attempts to integrate negative affect. In a discussion of this research, Slade (1993) asserts that "difficulties in the integration of negative affects are fundamental to insecure organizations."

In an extensive examination of the infant-ambivalent and adult-preoccupied patterns of attachment, Cassidy and Berlin (in press) review the related research, raise important questions for futher research and discuss theoretical considerations of the processes underlying

preoccupied attachment organization. In their discussion, Cassidy and Berlin note that the preoccupied attachment organization emphasizes connection to others at the expense of autonomy. That is, preoccupied adults require or value more intense personal involvement than secure adults whose lives reflect relatively greater balance between autonomy and interpersonal involvement. They also note that it is characteristic of ambivalent babies to attend more closely to their mothers and to explore their environment less than secure infants.

Main and Goldwyn (1993) found that the attachment classifications of the mothers were strongly related to the attachment classification of their children. This finding supports the notion that the mother's quality of attachment is transmitted to her child. How patterns of attachment are transmitted from one generation to the next is a crucial question for research. Attachment researchers believe that transmission of attachment patterns occurs through the moment-to-moment interaction of mothers with their babies. This study aims to evaluate this hypothesis by examining how mothers with different attachment classifications differ in the way they regulate their moment-to-moment interaction with their babies.

Maternal Sensitivity and Attachment. Beginning with Ainsworth's (et al, 1970) initial observations of mothers with their infants, researchers have studied the

relationship between maternal sensitivity and infant security. It has been found that maternal sensitivity is a central feature of early mother-infant interaction that leads to healthy psychological development. Studies examining the relationship between maternal sensitivity and infant attachment found that mothers who are sensitive to their infants have securely attached infants and mothers who are insensitive to their infants have insecurely attached infants (Ainsworth & Bell, 1970; Ainsworth, Bell & Stayton, 1974; Isabella & Belsky, 1991). This line of research is complicated because, although the concept of maternal sensitivity is an intuitively satisfying one, it is enormously difficult to operationally define. Different studies examine various aspects of maternal sensitivity using different levels of analysis. Both subjective rating scales and observational methods have been used. The unit of analysis ranges from less than one second to fifteen minute intervals. In addition, observations have been made in the home and in laboratory settings. Of particular interest to the present study is research that uses observational methods to analyze mother-infant interaction in order to examine the links between maternal sensitivity and infant attachment.

In an early study of the relationship between maternal sensitivity in face-to-face interaction and later infant attachment, Blehar, Lieberman and Ainsworth

(1977) found significant differences in maternal behavior between secure and insecure infant attachment groups. Mothers of infants who were later judged to be anxiously attached were more likely to initiate face-to-face interaction with a neutral expression and failed to respond to their infants' attempts to initiate interaction more often than mothers of secure infants. The study also found mothers of anxiously attached infants to be more abrupt and routine in their behavior. In addition, their face-to-face episodes were more likely to be brief. Blehar et al (1977) found that the behavior of mothers with securely attached infants was characterized by contingent pacing, encouragement of further interaction, and a playful and lively manner. This study was done in a naturalistic way in the home with observers making notes while watching the mother and infant as they went about their usual daily routines, thus the unit of analysis was relatively large.

More recent studies have drawn upon the techniques and concepts used in microanalytic studies of infant-mother interaction to examine maternal sensitivity (Belsky, Rovine & Taylor, 1984; Isabella, Belsky & von Eye, 1989; Isabella & Belsky, 1991). These studies used the concept of synchrony to operationalize maternal sensitivity. Again, the mothers and infants were observed in the home. The unit of analysis was 15 seconds. The degree of synchronous events over the

course of the mother-infant interaction was analyzed based on a priori classifications of specific combinations of maternal and infant behaviors. The researchers found that the behavior of mothers with infants later judged to be insecurely attached was at the extremes of maternal sensitivity, while the behavior of mothers with infants judged to be securely attached was characterized by moderation. Thus, either extreme of maternal behavior appears to produce insecurely attached infants. Mothers who were "overly" sensitive and responsive to their infants as well as mothers who were "under" sensitive and responsive to their infants had insecurely attached infants. Using the concept that synchrony in mother-infant interaction reflects maternal sensitivity, Isabella and Belsky (1991) demonstrate that intrusive maternal behavior produces avoidant infants and under-involved maternal behavior produces resistant infants.

The links between maternal sensitivity and infant attachment have been examined closely by researchers. However, little work has been done to understand what allows mothers to be optimally sensitive to their infants. The present study was designed to examine the links between the mother's inner world and her behavior in interaction with her infant. In this way, it can become possible to understand more about the aspects of a mother's internal experience that promote sensitive

caregiving. This study is among the first to evaluate the relationship between a mother's representational world, as captured by the AAI, and important behavioral features in early mother-infant interaction. In this study, the microanalytic techniques developed in infant research are used to analyze aspects of early mother-infant interaction in order to learn more about maternal sensitivity as it is revealed in the moment-to-moment behavioral exchanges.

Mutual Regulation Model

The infant research literature provides a rich conceptual understanding of early mother-infant interaction based on a continually growing mass of empirical data. The present study applies the methods and theories of current infant research to examine the relationship between maternal attachment and the quality of mother-infant interaction on a microanalytic level. An enormous body of empirical evidence in the area of infant research supports the perspective of the infant as an active partner in social interaction (Bakeman and Brown, 1977; Beebe, Jaffe, Feldstein, Mays and Alson, 1985; Brazelton, et al., 1974; Fogel, 1977; and Tronick, Ricks and Cohn, 1982). This perspective of infant-mother interaction argues that the mother and infant <u>together</u> regulate the infant's affective state. This "active" model assumes that infants are social beings who begin

life biologically predisposed to seek interpersonal contact (Ainsworth, 1974; Bowlby, 1969). It suggests that the infant plays an active role in initiating contact with others and maintaining the relationship. The goal of the social interaction has been called "affective attunement" (Stern, 1985), "reciprocity" (Brazelton, et al, 1974), "shared directional tendencies" (Tronick et al, 1982) and "matching" (Tronick, Als, Adamson, Wise and Brazelton, 1978). Basically, the infant seeks to be "in-synch" with the mother.

This means that the infant's behavior is directed towards his goal of maintaining interaction and is modified by the response he receives from his partner in the interaction. Bowlby (1969) names this "goal-corrected" behavior. When the interaction goes well and the baby feels himself to be in-synch with his mother, he is happy. The infant's affect is positive and well-modulated and he has an overall sense of well being. However, when there is a disruption, which occurs frequently in normal interaction, the baby is distressed and therefore tries to change the situation or adjust to the disruption. If his attempts succeed and he is able to get his partner back into a synchronous, coordinated interaction with him, the infant experiences himself as having some degree of control. But, if his efforts fail and he is unable to regain social contact with his

partner, he adjusts by doing his best to soothe himself on his own in order to reduce negative affect.

This mutual regulatory system or Mutual Regulation Model (MRM) of mother-infant interaction (Brazelton, 1982; Brazelton et al., 1974; Gianino and Tronick, 1988; Tronick, 1980, 1982) is a basic theoretical assumption of this study.

> The MRM proposes that mother and infant have an interactive goal and a set of capacities to help attain the goal. It suggests that their goal is to achieve a state of mutual regulation or reciprocity, and that to attain it they jointly regulate the interaction with interactive behaviors (Gianino and Tronick, 1988, p.2)

Within this model, the infant has two goals with his regulatory behavior. One is to repair the mismatch in the interaction and the second is to reduce his negative affect. An infant's capacity for self-regulation and his social interaction are thus inextricably intertwined. "The ability of the infant to attend to social stimuli may be related to the infant's capacity for internal self-regulation" (Lester, Hoffman and Brazelton, 1985, p. 15). This connection becomes painfully obvious in studies of low birth weight and premature infants. The immaturity of the premature or low birth weight infant's system does not provide him with the usual capacities for organizing and regulating internal and external stimuli. Thus his interaction with others is quite different from full-term neonates (Lester, et al, 1985).

It is important to note that many coping strategies force the infant to sacrifice social engagement by looking away or distancing himself from his partner. Therefore the infant must balance his need for affective regulation and his need for social engagement. When it becomes consistently too difficult for the infant to repair the break in the interaction, he may opt to reduce his own negative affect though it means sacrificing social contact. Gianino and Tronick (1988) discovered that infants who repeatedly fail to repair the interaction use more self-directed regulatory behavior to control negative affect. For example, Tronick (1980) reports that infants with depressed mothers often face a non-responsive partner and therefore the interaction is chronically out-of-synch. The regulation of affect becomes the main focus for many of these infants who give up their opportunity for involvement with people and objects by using self-directed regulatory behaviors including rocking, dull-looking eyes and loss of postural control.

The primary problem with an infant's emphasis on maintaining a regulated state in this manner is that it means that much of his time is spent managing his affect in ways which reduce contact with people and objects. Although initially adaptive, this solution may ultimately limit cognitive and social development (Brazelton, Koslowski & Main, 1974; Main, 1981; Tronick, 1989). In

addition, these responses may become rigid so that even when provided with a responsive partner, the infant automatically and indiscriminately withdraws. Gianino and Tronick (1985) suggest that this is the beginning of the development of defenses.

In- and out-of synch. In the course of healthy mother-infant interaction there are many "in-synch" moments in which infant and mother are coordinated in the interaction and there are many "out-of-synch" moments. The moments of perfect synchrony or matching have been described and studied by many researchers (Beebe, Stern, and Jaffe, 1979; Beebe and Kronen, 1989; Malatesta and Haviland, 1982; Papousek and Papousek, 1979; Pawlby, 1977; and Stern, 1977). A variety of terms have been used to describe the phenomenon in which mother and infant appear to be doing more or less the same thing at more or less the same time, including mirroring, echoing and imitation.

Although describing similar interactional exchanges, each of these terms refers to subtly different conceptualizations of infant-mother interaction. Many researchers (Field, 1977; Francis, Self and Noble, 1981; Pawlby, 1977; Papousek and Papousek, 1979) describe literal matching in which the mother mirrors the actual expression of the infant. Others (Malatesta and Haviland, 1982; Malatesta, et al, 1986) suggest that the mother's response does not literally match the infant's

expression, but responds to it in some manner. Malatesta and Haviland (1982) found that 35% of the maternal facial responses were imitations, whereas 65% were dissimilar responses. In these instances, the mother's mirroring behavior occurs somewhat after the infant's behavior and may or may not precisely mirror the expression. It may mirror the affective state or tone of the baby's expression or the mother's response may represent her effort to change the interaction. Stern (1985) describes interactions in which the mother responds to the infant using a different mode. For instance, the mother may respond to the infant's joyful vocalization with a touch by jiggling the infant in an excited manner. Another important distinction refers to who does the matching. Kaye and Charney (1981) report that the mother matches the infant and that it is a one-sided event. Others (Beebe and Kronen, 1989; and Stern, 1977) suggest that matching is mutually regulated, that is, both partners participate in the regulation of the interaction. Those who study matching in infant-mother interaction suggest that the ongoing regulations or expectable matching in the infant-mother interaction is what leads to a child's sense of coherence, predictability and the capacity for relatedness.

While matching in the interaction is important, the periods of <u>not</u> matching and the transitions between matches and mismatches are significant aspects of the

dyad's interaction as well. The "out-of-synch" moments have been described by Gianino and Tronick (1988). They label these disruptions "interaction error." These normal disruptions have also been referred to as "mismatches" (Stern, 1977; Tronick, Als and Brazelton, 1980). The infant signals with negative affect, gaze aversion, postural shifts or a combination of these behaviors when the interaction is not working. Generally, these moments end when the mother-infant pair shifts back to a coordinated rhythmic interaction by a process called "interactive repair" (Gianino and Tronick, 1988). An example of an out-of-synch moment followed by interactive repair is when the mother continues to "jazz up" the infant when the infant has had enough stimulation. At this moment, the infant might avert his gaze and change his posture to communicate that he has had enough. A sensitive partner will then reduce the level of stimulation, at which point the infant can reengage. It is this pattern of repetition of interactive error followed by interactive repair that provides the practice the infant needs to develop his repertoire for other-directed (Stern, 1977) and self-directed (Gianino and Tronick, 1988) regulatory functions. Through this interaction the infant begins to experience himself as able to exert control over his environment and interactive experience. This marks the

beginning of the infant's sense of efficacy in the world (Gianino and Tronick, 1988).

Embedded in the view of mother-infant interaction as a mutually regulated social exchange is the concept that face-to-face interaction between the mother and her infant presents the best opportunity for social communication. The face-to-face paradigm has been used by many infant researchers (Beebe, 1980, 1992; Brazelton, 1982; Stern, 1985; Tronick et al, 1978) because it allows for activation of the entire range of the attentional-affective system. The power of this paradigm stems from the freedom the infant has to use both affective displays and gazing activity in order to regulate the interpersonal exchange. For these reasons the current study uses the face-to-face paradigm to examine mother-infant interaction.

The different aspects of infant-mother interaction described here, including moments of the mother and infant being in-synch, out-of-synch and then getting back into a synchronous interaction again, are the important features that when taken together over time form the mother-infant relationship. By observing and analyzing the various patterns mother-infant pairs create together, researchers can understand more about the quality of the mother-infant relationship. In this study, these patterns of interaction that are jointly created and maintained by the mother and her infant are examined to

test the hypothesis that there are qualitative differences in mother-infant interaction based on the mother's attachment to her own parents.

Infant's Visual, Auditory and Representational Capacities

The Mutual Regulation Model presupposes that the infant is an active social partner from the beginning. This view of the infant as an active and competent partner in social interaction requires that the infant be able to perceive, analyze and respond to the environment. A large research literature supports this theoretical perspective. Several empirical studies demonstrate infants' capacity to perceive, process and respond to a wide variety of complex stimuli in the environment, especially to people. By four months of age, the age of subjects in this study, infants have the capacity to detect, organize and respond to visual and auditory stimuli in the environment. Using organized facial expression and body movement, infants are able to engage in social interaction, exerting remarkable influence on the interaction.

Visual development. The visual system, which is extremely important in human perception, is highly differentiated at birth. In the fetus some peripheral components of the visual system develop. For instance, the lateral geniculate and superior colliculus show

myelination (Bronson, 1974). At birth, the infant can focus on and track visual stimuli quite well at 8-15 inches (Bronson, 1974; Fantz, Fagan and Miranda, 1975), can differentiate patterns from plain colors and can differentiate among patterns (Fantz, 1963). In addition to the capacity to discriminate, studies show that infants as young as one day old have visual preferences. They prefer to look at patterns rather than plain colors and most of all, they prefer to look at the human face (Goren, Fantz, Herchenson, Munsinger and Kissen, 1965).

During the infant's first four months, maturation of the visual system continues at a fast pace, allowing for expansion of the infant's social capacity. By two months, the infant has smooth, continuous binocular convergence (Ling, 1942). By four months the infant's visual system achieves near adult status. Lens accommodation, which began in the second month, is now comparable to an adult's (Haynes, White and Held, 1965). The infant can control gaze and has visual-postural coordination (Scaife and Bruner, 1975; White, Castle and Held, 1964). Thus, by four months the infant has a highly functional visual system which is central to his interaction with the caretaker and others. For example, Beebe (1977) has demonstrated how an infant uses gaze aversion to actively participate in regulating social interaction.

Auditory ability. Auditory capacity is also well developed by four months. Infants are sensitive to rhythmicity, intonation, frequency variation and phonetic components of speech (DeCasper and Fifer, 1980). Studies have demonstrated that infants can differentiate among sounds and voices and have pronounced auditory preferences. They prefer high-pitched voices over low-pitched voices (Wolff, 1963). At birth, infants can differentiate between the voices of their mothers and female strangers and actively seek their mother's voice (DeCasper and Fifer, 1980) and will orient towards the mother's voice (Hammond, 1973).

Memory. Much of the research on visual and auditory capacity also suggests that the infant can remember in a rudimentary way. The infant's ability to differentiate between the mother's voice and a stranger's voice requires that he first know, or have a rudimentary representation of his mother's voice. Evidence supporting the existence of presymbolic representational capacity in infants continues to grow (DeCasper and Carstens, 1980; DeCasper and Fifer, 1980). DeCasper and Spence (1986) had pregnant women read The Cat in the Hat aloud and found that at birth their babies preferred this story to another Dr. Seuss story. Infant visual recognition memory research provides evidence for the infant's capacity to recognize and remember patterns over extended periods of time (Cohen and Gelber, 1975; Fagan,

1974; Fantz et al., 1975). Many studies show that newborn infants can imitate adult facial expressions (Field, Woodson, Greenberg and Cohen, 1982; Meltzoff and Moore, 1977; Trevarthan, 1977) suggesting kinesic memory. Further evidence for early kinesic memory exists in studies that demonstrate that infants will learn to kick to make a mobile move and that they will remember this several days later (Rovee-Collier et al, 1980; Rovee-Collier and Fagen, 1981; Rovee-Collier and Lipsitt, 1981). In addition, one study (Nachman, 1982, cited in Stern, 1985, p. 93) demonstrates that infants can remember affects associated with specific experiences. When an infant sees a toy that previously provided pleasure, the infant smiles as the affective experience is activated. By the time an infant is four months old, he has the capacity for visual, auditory, affective and kinesic memory. The significance of this ability of even very young infants to remember in a presymbolic manner cannot be overstated. The fact that infants have this presymbolic representational capacity further underlines the importance of early experiences with caregivers.

Summary

The purpose of this study is to closely examine the relationship between a mother's representational world and the behavioral dimension of the interaction she and her infant create. This study is founded on the well-

documented concept that early mother-infant interaction influences later development in crucial ways. That is, maternal behavior is enormously important to a child's later cognitive, emotional and social development. Attachment research has examined the connections between the quality of maternal behavior and the degree of psychological health in the infant. Ample empirical evidence from this research of individual differences demonstrates that maternal sensitivity is crucial for optimal infant development. It is repeatedly found that mothers who respond sensitively to their infants' needs have securely attached infants, whereas mothers who are too responsive or not responsive enough to their babies are more likely to have insecurely attached children.

More recently, the focus of attachment researchers and theorists has shifted to efforts to understand why mothers behave as they do in interaction with their infants. It is hypothesized that secure mothers are free from internal demands and thus are more able to notice, accurately interpret and appropriately respond to their infants communication, whereas insecure mothers have pressing internal demands and therefore tend to misinterpret their infants' cues which then leads them to respond inappropriately. To test this hypothesis requires an examination of the connections between the mother's attachment organization and her capacity to respond on a behavioral level to her infant.

Given that mothers with different attachment organizations regulate their experience in characteristic ways, it is reasonable to expect that they will regulate their interaction with their infants in similar, predictable ways. By using the microanalytic observational methods developed in infant research, this study examines the relationship between maternal attachment organization and the mother-infant interaction patterns. It is expected that there will be qualitative differences in the mother-infant interaction based on the mother's attachment classification.

CHAPTER 2

METHOD

Subjects

Twenty-eight middle class, married, primiparous women between the ages of 25 and 40 and their four month old infants participated in this study. They were part of a longitudinal study directed by Arietta Slade, Ph.D. at the City College of the City University of New York. The mothers began the study during the third trimester of pregnancy and continued until the children were 28 months old. The infants were four months old at the time of their participation in this aspect of the larger study. They were all healthy, full-term infants. Fifteen were male and thirteen were female. Initially, the four month visit was videotaped with one camera that recorded a sideview of both the mother and the infant. After the first year, the research project acquired a split screen generator. The first group of 28 tapes using the split screen system were selected for this research project.

Subjects were recruited from local childbirth classes, flyers placed in maternity stores, and advertisements in parenting newspapers and magazines. Mothers received $40 for three visits to the lab during pregnancy which included the Adult Attachment Interview, and $20 for the visit when the infant was four months old.

Procedure

Both visits took place at the laboratory at the City College of New York. Each mother was given the Adult Attachment Interview (George, Kaplan, Main, 1985) during her last trimester of pregnancy. Mothers were interviewed in a pleasant room furnished with tables, chairs and couches. Drinks and snacks were available to the mothers.

When the infant was four months old, the infant and mother visited the lab for a play session. The researcher greeted the pair, helped both to feel at ease and instructed the mother to play with her baby in the infant seat as she normally would, but not to use toys or pick up her infant. The infant and the mother were videotaped in face-to-face interaction for five minutes. The room for the infant-mother face-to-face interaction was set up with an infant seat on a table, a chair facing it for the mother and one camera in the room focused on the infant. Another camera in the equipment room behind a one way mirror was focused on the mother. The images were then merged onto a split-screen display so that the front of the baby and the front of the mother could be seen side by side on the monitor. There was a digital clock at the base of the display.

Measures

The Adult Attachment Interview (George, Kaplan and Main, 1985): This interview, its scoring criteria and the conceptual framework supporting it were described in detail in chapter 1. Developed by Mary Main and her colleagues, the interview is designed to reflect the mother's representation of her early attachment experiences. The transcripts of the interviews were coded by raters trained to reliability by Dr. Mary Main and the mothers were classified as Secure-Autonomous (F) (n=16), Dismissing (D) (n=2), or Preoccupied (E) (n=10).

Infant and Caregiver Engagement Phases (Tronick and Weinberg, 1993, See Appendix A): The mother-infant interaction data was coded using Tronick and Weinberg's Infant and Caregiver Engagement Phases (1993) by two trained coders who were blind to maternal attachment classifications. Derived from Tronick's Monadic Phases Scoring System (1980) and Tronick and Weinberg's Infant and Maternal Regulatory Scoring System (1991), the Infant and Caregiver Engagement Phases (ICEP) codes the level and quality of engagement of the infant and caregiver. There are six mutually exclusive phases of engagement for the infant and seven for the adult. Each engagement phase is a configuration of behavior and affect, which captures both the intensity of engagement and the affective quality of the moment.

Mother and infant behaviors were coded independently. The tape was viewed in real time and the duration of each phase was recorded. When necessary, the tapes were viewed in slow motion.

The mutually exclusive infant engagement phases include (A) Negative Engagement, (B) Protest, (C) Withdrawn, (D) Social Monitor, (E) Object/Environment Engagement, and (F) Social Positive Engagement. In Negative Engagement (A), the infant is negative, protesting or withdrawn. Negative engagement can be divided into two specific phases: Protest (B) and Withdrawn (C). In Protest (B) Engagement the infant is protesting in an active manner. In the Withdrawn (C) Engagement Phase the infant is withdrawn and minimally engaged with the caregiver. In Social Monitor (D) the infant is looking at the adult's face with a flat, neutral, or interested facial expression. In the Object/Environment (E) Engagement Phase the infant is looking at objects in the environment. In the Social Positive (F) Engagement Phase, the infant is looking towards the adult and is smiling.

The mutually exclusive adult engagement phases include (A) Non-Infant Focused Engagement, (B) Negative Engagement, (C) Hostile, (D) Withdrawn, (E) Social Monitor, (F) Social Positive Engagement, and (G) Exaggerated Social Engagement. In Non-Infant Focused Engagement (A) the adult is involved in a non-infant

focused activity such as talking to the experimenter or looking at an object the infant is not looking at. In Negative (B) Engagement the adult is negative, hostile or withdrawn. Negative Engagement can be divided into two specific phases: Hostile (C) and Withdrawn (D). The Hostile (C) Engagement phase is characterized by anger or hostility. In the Withdrawn (D) Engagement Phase the adult is minimally engaged and withdrawn. In the Social Monitor/Neutral (E) Engagement Phase the adult looks at the baby with a neutral or interested facial expression. In Social Positive (F) Engagement the adult is smiling and looking at the infant. In Exaggerated Positive (G) Engagement the adult displays an exaggerated facial expression and is looking at the infant.

Reliability. Ten infants and twelve mothers were coded by a second coder to calculate interobserver reliability. Agreement was defined as the first coder observing the same engagement phase within one second of the second coder. Interobserver reliability was then calculated by dividing the number of agreements by the sum of the agreements and disagreements. This produced a percentage of agreement for each individual engagement phase and a percentage of agreement for overall coding of the mothers' engagement phases and overall coding of the infants' engagement phases. Overall interobserver reliability ranged from 81% to 98% for the mothers' engagement phases, and from 84% to 99% for the infants'

engagement phases (Kappas = .70 and .73, respectively). Appendix B presents the interobserver reliability for each code.

Ratings of Maternal Response to Infant Distress. In addition to coding the videotapes of face-to-face interaction using the ICEP, notes were made in narrative form on moments in which the infant expressed negative affect. The Negative Moments Narrative describes what occurred before, during and after the infant's negative affective display and focuses specifically on the way in which the mother responds to her infant's distress.

To further explore maternal response to infant distress, three observers who were blind to the study's hypotheses and to maternal attachment classifications, viewed the videotaped portions of the mother-infant interaction where the baby showed distress. On an index card labelled with the subject's identification number, observers scored the mother's response to the infant's negative affective display. They were instructed to choose one of the following responses to best describe the mother's response to her infant's distress:

1) Maximizes or exaggerates negative affect
2) Minimizes or ignores negative affect
3) Acknowledges negative affect and goes on
4) None of the above, No category fits

Hypotheses

Hypothesis 1: Maternal attachment, as measured by the Adult Attachment Interview administered in the last trimester of pregnancy, will be related to patterns of engagement in mother-infant face-to-face interaction when the infant is four months old.

1a: Infants with mothers in different attachment groups will differ in their gaze behavior, with infants with preoccupied mothers looking at their mothers the most, infants with secure mothers looking at their mothers a moderate amount and infants with dismissing mothers looking at their mothers the least amount of time.

1b: Infants with mothers in different attachment classifications will differ in their emotional expression, with infants with preoccupied mothers displaying the most positive affect and least negative affect, infants with secure mothers showing moderate amounts of positive and negative affect, and infants with dismissing mothers displaying the least positive affect and the most negative affect.

1c: Mothers with different attachment classifications will differ in their affective and attentional behavior with their infants, with preoccupied mothers being the most exaggerated in their display of affect and most attentive to their infants, dismissing mothers being least demonstrative in their affective

display and least attentive to their infants and secure mothers showing moderate amounts of affect and attention to their infants.

1d: Mother-infant pairs in different maternal attachment groups will differ in their degree of mutual influence, with preoccupied mothers and their infants demonstrating the highest degree of mutual influence, secure mothers and their infants showing a moderate amount of mutual influence and dismissing mothers and their infants having the lowest amount of mutual influence.

Hypothesis 2: Maternal attachment, as measured by the Adult Attachment Interview administered during the last trimester of pregnancy, will be related to maternal response to infant distress in mother-infant face-to-face interaction when the infant is four months old. It is expected that preoccupied mothers will exaggerate the infant's negative affect, secure mothers will acknowledge the infant's negative affect and then help the infant regain emotional equilibrium, and dismissing mothers will minimize or devalue the infant's negative affect.

CHAPTER 3

RESULTS

To test the central hypothesis that there are qualitative differences in mother-infant interaction based on the mother's attachment classification, three approaches are presented. First, descriptive comparisons of infant and mother engagement phases are presented including comparisons of the percentage of time spent in each engagement phase, the number of bouts of each phase and the average length of the bouts for each phase. The second section evaluates the time-series of mother-infant pairs in different attachment groups to compare relationship factors. The final section explores the question of how mothers of different attachment classifications respond to the negative affect of their infants.

Comparisons of Infant Engagement Phases

The first set of hypotheses, which predicted a relationship between maternal attachment and patterns of engagement in mother-infant interaction, was tested in two ways. Hypothesis 1a and 1b, in which infant engagement phases are the outcome variable, were tested using t-tests to evaluate differences in infant behavior based on maternal attachment classification. The first set of analyses presented compares infants of mothers who

were judged to be secure (n=16) and infants of mothers who were judged to be preoccupied (n=10). Infant-mother dyads in the dismissing group were not included in the analyses because there were only two subjects judged to be dismissing. Each table lists each infant engagement phase as well as a post-hoc category labeled "social" which combines the social monitor and social positive engagement phases to produce a new category that reflects the infant looking at the mother.

The percentage of time spent in each infant engagement phase and the results of t-tests comparing infants with preoccupied mothers to infants with secure mothers is presented in Table 1. Percentage was calculated by dividing the total duration of each engagement phase by the total length of the session.

Infants in the two maternal attachment groups differed in the percentage of time they spent looking at their mothers. The infants with preoccupied mothers looked significantly more at their mothers than did infants with secure mothers, $t(24)=2.07$, $p<.05$. The two groups of infants tended to differ in the percentage of time they spent in the social positive engagement phase, with infants with preoccupied mothers tending to spend more time in this phase than infants with secure mothers, $t(24)=1.85$, $p<.10$. In addition, infants in the two maternal attachment groups differed in the percentage of time they spent looking at objects and their environment.

Infants with secure mothers tended to spend more time attending to their surroundings than infants with preoccupied mothers, $t(24)=1.70, p=.10$. No other differences were found.

In Table 2, frequency of infant engagement phases is examined. To calculate frequency, the number of bouts of each engagement phase is counted. A bout begins when the infant starts an engagement phase and ends when the infant shifts to another phase. Thus, a bout can last anywhere from 1 to 300 seconds.

In this examination of the data, differences were again found between the infants in the preoccupied and secure maternal attachment groups. Infants with preoccupied mothers had significantly more bouts of social positive, that is, looking and smiling at their mothers, compared to the infants with secure mothers, $t(24)=2.20$, $p<.05$.

In Table 3, the average length of the bouts of each infant engagement phase is presented. To calculate the average length of the bouts of each infant engagement phase, the duration of each engagement phase was divided by the number of times it occurred in each maternal attachment group as a whole.

Again, differences between the two groups of infants emerged. The infants with preoccupied mothers looked at their mothers for significantly longer periods of time than did the infants with secure mothers, $t(442)=2.76$,

$p<.01$. In addition, the infants with secure mothers protested or cried for significantly longer on average than did infants with preoccupied mothers, $t(48)=-2.23$, $p<.05$.

These tables report three interlocking sets of findings. The data in each table is related to, but subtly different from the data in the other tables. An integration of the findings shows that infants with preoccupied mothers spent a significantly greater percentage of their time looking at their mothers than the infants with secure mothers, while the infants with secure mothers tended to spend a greater percentage of time looking at objects in their environment than the infants with preoccupied mothers. In addition, the infants with preoccupied mothers tended to smile more at their mothers. In contrast, the infants with secure mothers protested for significantly longer on average than did the infants with preoccupied mothers, although they did not necessarily protest for more time overall or protest more often. In sum, the infants with preoccupied mothers attended more to their mothers and were somewhat less inclined to explore the environment. They were relatively more likely to express positive affect to their mothers and somewhat less likely to express negative affect than the infants with secure mothers.

TABLE 1

PERCENTAGE OF TIME SPENT IN EACH INFANT ENGAGEMENT PHASE

	PREOCCUPIED (n=10)		SECURE (n=16)		
ENGAGEMENT	MEAN	SD	MEANS	SD	t(df)
Negative	0	0	.02	.08	
Protest	1.2	2.3	3.5	6.1	-1.13(24)
Withdrawal	0	0	0	0	
Social monitor	27.1	17.6	19.0	13.0	1.34(24)
Object engage	55.2	22.4	68.5	17.4	-1.70(24)+
Social positive	16.6	08.7	9.0	10.9	1.85(24)+
Social (post-hoc category)	43.6	21.8	28.0	16.6	2.07(24)*

Negative - general negative affect
Protest - protesting and expression of anger
Withdrawal - withdrawn and minimally engaged with caregiver
Social Monitor - attention directed to the caregiver
Object Engagement - attention directed to objects
Social Positive - general positive affect while looking at caregiver
Social - combination of Social Monitor & Social Positive

\+ $p \leq .10$
* $p \leq .05$
** $p \leq .01$

TABLE 2

FREQUENCY (NUMBER OF BOUTS) OF

EACH INFANT ENGAGEMENT PHASE

	PREOCCUPIED (n=10)		SECURE (n=16)		
ENGAGEMENT PHASE	MEAN	SD	MEANS	SD	t(df)
Negative	0	0	0	0	
Protest	1.8	3.6	2.0	2.4	-.1720(24)
Withdrawn	0	0	0	0	
Social Monitor	19.9	5.9	16.6	6.9	1.2397(24)
Object Engage	16.9	7.6	18.2	6.8	-.4488(24)
Social Positive	10.7	4.8	6.3	5.2	2.1949(24)*
Social	16.7	7.1	17.3	7.3	-.2107(24)

Negative - general negative affect
Protest - protesting and expression of anger
Withdrawal - withdrawn and minimally engaged with caregiver
Social Monitor - attention directed to the caregiver
Object Engagement - attention directed to objects
Social Positive - general positive affect while looking at caregiver
Social - combination of Social Monitor & Social Positive

\+ $p \leq .10$
* $p \leq .05$
** $p \leq .01$

TABLE 3

AVERAGE LENGTH OF BOUT OF EACH INFANT ENGAGEMENT PHASE

	PREOCCUPIED (n=10)		SECURE (n=16)		
ENGAGEMENT PHASE	MEAN	SD	MEANS	SD	t(df)
Negative	0	0	0	0	
Protest	1.93	0.88	5.13	6.04	-2.2251(48)*
Withdrawn	0	0	0	0	
Social Mon	3.99	5.53	3.34	3.88	1.4814(463)
Object Eng	9.64	14.87	11.12	14.68	-1.0352(458)
Social Pos	4.56	4.59	4.27	4.95	.4450(205)
Social	7.67	15.73	4.77	5.89	2.7629(442)**

Negative - general negative affect
Protest - protesting and expression of anger
Withdrawal - withdrawn and minimally engaged with caregiver
Social Monitor - attention directed to the caregiver
Object Engagement - attention directed to objects
Social Positive - general positive affect while looking at caregiver
Social - combination of Social Monitor & Social Positive

\+ $p \leq .10$
* $p \leq .05$
** $p \leq .01$

Comparisons of Maternal Engagement Phases

Hypothesis 1c, in which the outcome variable is maternal patterns of engagement, is tested using t-tests to evaluate differences in maternal behavior between maternal attachment groups. This set of analyses compares the engagement phases of preoccupied mothers with the engagement phases of secure mothers. The dismissing mothers were omitted because there were only two dismissing subjects.

Most mothers spent about 75% of their time in the social positive engagement phase. When the two maternal attachment groups were compared for percentage of time spent in each engagement phase, frequency of engagement phases and average length of bout of each engagement phase, no significant differences emerged in the mothers' behavior.

Comparisons of relationship factors

In hypothesis 1d predictions for relational factors were set forth. It was expected that mother-infant pairs would differ in their degree of mutual influence, with preoccupied mothers and their infants demonstrating the highest degree of mutual influence, secure mothers and their infants showing a moderate degree of mutual influence and dismissing mothers and their infants having the lowest amount of mutual influence. This hypothesis is tested using t-tests on z-scores derived from time

series analysis that analyzes the quality of the face-to-face interaction at a dyadic level.

Time series analysis is a procedure that examines the relationship between two time series, while controlling for the regularity within each individual time series (Bakeman & Gottman, 1986). Thus, time series analysis calculates the cross-correlation between the time series of the infant and time series of the mother, while controlling for autocorrelation within each series. The ICEP coding system provided a second-by-second record of each partner's attentional-affective engagement during the interaction. This bivariate time series of the mother's engagement phases and the infant's engagement phases of approximately 300 observations each was analyzed. The cross-correlation between the infant's and the mother's time series was calculated at different lags or time intervals. This means that correlations were calculated for second 1 of the infant's time series and seconds 1, 2, 3, 4, 5, and 6 of the mother's time series, and vice versa for each second of each time series. Therefore, it was possible to analyze the relationship between what occurred at the same second for each partner, as well as the relationship between one partner's behavior and the other partner's behavior in the following seconds. For the various analyses, different weights were assigned to each time lag, based on assumptions about the rate of maternal and infant

responsivity as discussed in the research literature (Beebe and Jaffe, 1992). A Fisher-z transformation of the cross-correlation-coefficients at each lag was performed. The Fisher-z transformation is useful because the distribution of z can be well approximated by a normal distribution. Therefore, the z-score describes the correlation between the mother's time-series and the infant's time-series at different lags.

Analyses were run to test differences between the preoccupied and secure maternal attachment groups, omitting the dismissing subjects because there were only two. In preliminary analyses, a series of 2-way ANOVAs (Maternal Attachment x Infant Gender) was performed to test for differences in the relationship between the infant and mother time-series. There were no main effects for gender and no interactions with gender. Therefore, 1-way analyses for maternal attachment are reported to increase the power to detect differences between maternal attachment groups. Two aspects of the mother-infant interaction were examined. First, mutual influence, which describes how much the mother and infant respond to one another's behavior, was evaluated. Then to tease out which partner accounts for the amount of mutual responsivity, each partner's responsivity to the other was evaluated. In what follows, results for the analyses of mutual influence, maternal responsivity and infant responsivity are presented.

Mutual influence. Mutual influence describes how much the mother and infant influence each other or how responsive they are to one another. Mutual influence was defined as the correlation of the mother's level of engagement and the infant's level of engagement. Thus, a high correlation would mean that the mother's and infant's behavior was highly correlated showing a high degree of mutual influence between the partners. Mutual influence was measured as a weighted mean of z-scores to lag 5 with higher weights assigned to lags close to lag 0 (simultaneous occurrence). A t-test on mutual influence showed that the mother-infant pairs in the preoccupied maternal attachment group had a higher degree of mutual influence than the mother-infant pairs in the secure maternal attachment group, $t(24)=2.66$, $p=.01$. Means, standard deviations and significant t-tests are presented in Table 4.

With a mutual influence score, there is no way of knowing which partner accounts for how much of the dyadic responsiveness. To further understand the nature of the dyadic interaction, separate analyses were applied to the data. The first analysis compared contingent responsivity of mothers to their infants across maternal attachment groups. The second comparison analyzed the responsivity of infants to maternal behavior across maternal attachment groups.

Maternal responsivity. Two analyses using different weights for each time lag were used to examine maternal responsivity. It was found that the preoccupied mothers were more contingently responsive to their babies than the secure mothers in both analyses, (1) For weights 1,2,2,2,1, $t(24)=2.93$, $p<.01$; (2) For weights 2,2,1,1,1, $t(24)=2.99$, $p<.01$. Means, standard deviations and significant t-tests are presented in Table 4. Thus, preoccupied mothers were significantly more likely to follow their babies than the secure mothers.

Infant responsivity. Two analyses using different weights for each time lag were also used to examine infant responsivity. Infants with preoccupied mothers were more responsive to their mothers' behavior than the infants with secure mothers in both analyses, (1) For weights 1,2,2,2,1, $t(24)=2.02$, $p=.05$; (2) For weights 2,2,1,1,1, $t(24)= 2.12$, $p<.05$. Means, standard deviations, and significant t-tests are presented in Table 4. Thus, infants of preoccupied mothers were significantly more likely to follow their mothers than the infants of secure mothers.

These data demonstrate that preoccupied mothers and their infants are more responsive to one another than are the secure mothers and their infants. The preoccupied mothers followed their babies' shifts in affective and attentional intensity very closely and their babies followed them very closely as well. This close tracking

of one another in the preoccupied maternal attachment group is further supported by the evidence showing that infants with preoccupied mothers spent more time looking at their mothers than infants with secure mothers.

TABLE 4

COMPARISON OF DYADIC FACTORS

	PREOCCUPIED MEAN	SECURE MEAN	SD	t(df)
MUTUAL INFLUENCE				
w: 1,2,3,3,3,3,2,1	.0295	.0155	.0131	2.655(24)**
MATERNAL RESPONSIVITY				
w: 1,2,2,2,1	.0265	.0110	.0131	2.928(24)**
w: 2,2,1,1,1	.0276	.0118	.0131	2.986(24)**
INFANT RESPONSIVITY				
w: 1,2,2,2,1	.0269	.0162	.0131	2.018(24)*
w: 2,2,1,1,1	.0281	.0167	.0134	2.119(24)*

\+ $p \leq .10$
* $p \leq .05$
** $p \leq .01$

Comparison of Maternal Response to Negative Affect

The second hypothesis was tested using more qualitative methods. As described in chapter 2, observers were asked to rate the mothers' responses to their infants' distress by choosing one of the following descriptions: 1=Maximizes or exaggerates negative

affect, 2=Minimizes or ignores negative affect, 3=Acknowledges negative affect and goes on, 4=None of the above, does not fit a category. Of the 28 dyads, only 8 infants showed distress during the face-to-face interaction. Three observers blind with respect to hypotheses and maternal attachment classifications rated all eight mothers. It was expected that preoccupied mothers would exaggerate the infant's negative affect, dismissing mothers would minimize or devalue the infant's negative affect, and secure mothers would acknowledge the infant's negative affect and then help the infant regain emotional equilibrium. Table 5 presents a view of how each of the three observers categorized the mothers' responses to their infants' negative affect. Every mother is described based on her attachment subclassification.

As can be seen from Table 5, secure mothers tended to be rated as acknowledging of the baby's negative affect and able to move on to a positive interaction, while insecure mothers tended to be rated as using either minimizing or maximizing strategies to regulate the infant's negative affect. The two preoccupied mothers tended to be categorized as maximizing of negative affect and the dismissing mother was rated as minimizing of negative affect by all three coders. Given the qualitative nature of this analysis and the small number

of subjects, this aspect of the study is seen as suggestive and requires more systematic study.

TABLE 5

RATINGS OF MOTHERS' RESPONSES

TO NEGATIVE AFFECT IN THE INFANT

MATERNAL ATTACHMENT CLASSIFICATION	*RATINGS BY CODER		
SECURE(n=5)			
1. Secure	3	3	3
2. Secure	3	3	3
3. Secure, but somewhat dismissing	3	3	2
4. Secure, with some setting aside of attachment	3	2	2
5. Unresolved with Respect to Trauma, with sub-classification of Secure	3	3	4
INSECURE (n=3)			
6. Preoccupied	1	1	3
7. Unresolved with Respect to Trauma, with sub-classification of Preoccupied	1	1	1
8. Dismissing	2	2	2

*1=Maximizes or exaggerates negative affect,
2=Minimizes or ignores negative affect
3=Acknowledges negative affect and goes on
4=None of the above, does not fit a category

CHAPTER 4

DISCUSSION

The aim of this study was to provide empirical support for the hypothesis that maternal attachment is related to patterns of mother-infant interaction. Mothers were assigned attachment classifications based on an Adult Attachment Interview (AAI) administered during the last trimester of pregnancy. Mother-infant face-to-face interaction was videotaped and coded resulting in detailed second-by-second descriptions of the affective-attentional behavior of each partner. Analyses of several aspects of these sequential accounts of each mother-infant pair's interaction demonstrate that there is a relationship between maternal attachment classification and the structure of the mother-infant face-to-face interaction. Differences between the secure and preoccupied maternal attachment groups emerged when examining infant behavior and dyadic factors of the mother-infant interaction. Dismissing mothers and their infants could not be included in these analyses because only two mothers in the sample were judged to be dismissing. The differences that emerged between the preoccupied and secure maternal attachment groups included differences in the (1) patterns of infant engagement and (2) level of mutual influence in the dyad.

The patterns of infants' attentional behavior and affective displays that emerged in the data reflects the distinct styles of relatedness and affect regulation associated with different maternal attachment organizations. It was found that infants with preoccupied mothers looked at their mothers a significantly greater percentage of time for significantly longer uninterrupted blocks of time than infants with secure mothers. In contrast, infants with secure mothers tended to visually explore the environment a greater percentage of their time than infants with preoccupied mothers. Thus, infants with preoccupied mothers attend to their mothers more than infants with secure mothers who attend to their surroundings more than infants with preoccupied mothers.

In terms of affect regulation, it was found that infants with preoccupied mothers tended to smile at their mothers a greater percentage of time and significantly more often than infants with secure mothers. Infants with secure mothers protested or cried with their mothers for significantly longer periods on average than infants with preoccupied mothers.

This investigation found that mother-infant pairs in the preoccupied maternal attachment group had higher levels of mutual influence than those in the secure maternal attachment group. Both mothers and infants accounted for this difference. That is, preoccupied

mothers and their infants followed each other significantly more closely than secure mothers and their infants.

In addition to the quantitative analysis of the data, a qualitative examination of maternal response to infant distress was completed. It was found that preoccupied mothers exaggerated their infants' distress, dismissing mothers minimized their infants' distress and secure mothers acknowledged their infants' distress and then helped them to regain emotional equilibrium.

Thus, preoccupied and secure mothers and their infants construct relationships that differ in subtle, but important ways by the time the infant is four months old. The interaction of preoccupied mothers and their infants is characterized by a relatively higher degree of interpersonal influence, more looking at the mother by the infant, more positive affective expression by the infant and less negative affective expression by the infant. In contrast, the interaction of secure mothers and their infants is characterized by a relatively lower degree of interpersonal influence, greater visual exploration of the environment by the infant, as well as greater expression of negative affect by the infant.

Interpretation of the Data

There are a number of ways to interpret this data. On a purely descriptive level, the data supports the

hypothesis that mothers regulate their interaction with their infants in ways that are consistent with their own attachment strategies. In order to understand more about this finding that mother-infant interaction reflects the mother's representation of her own attachment experience, it is important to consider various theoretical perspectives.

Different conceptual viewpoints understand how and why this intergenerational transmission of affect regulation and interactional patterns occurs in different ways and each perspective provides valuable insight into the meaning of this data. From the perspective of attachment theory, the transmission of patterns of relatedness and affect regulation strategies are thought to be interactionally mediated. Alternative views emphasize the importance of biologically determined factors, including temperamental factors and field independence or dependence. These biological views suggest that attachment organization, as well as interactive behaviors including affect regulation and patterns of relatedness, reflect temperamental, biologically determined, characteristics. Therefore, from this perspective, the relationship between maternal attachment classification and mother-infant interaction patterns is understood as a matter of biological inheritance. Thus, for example, mothers who are temperamentally more relaxed are more likely to have

infants who are more relaxed and their interaction will reflect this temperamental tendency. Similarly, from the perspective of field theory which suggests that individuals have a tendency towards field dependence or independence, a tendency towards one or the other of these ways of being in the world is likely to be the same for mother and infant and therefore their interaction would reflect this mutual tendency. While these perspectives are relevant to a full understanding of this data, further discussion of the data will focus primarily on the perspectives of attachment theory and research, psychoanalytic theories and infant research in which the interactionally mediated dimension is emphasized. In this view, the infant's biological contributions are considered important factors in the infant's adaptation to the world, as well as highly influential in shaping the mother-infant interaction. However, it is the interaction itself that is thought to create the psychic structures within the infant.

Recent efforts to integrate the work of attachment researchers and theorists with that of infant researchers and psychoanalytic writers have yielded a rich tapestry of theory supported by a large body of empirical evidence. Taken together, attachment theory and research, infant research and psychoanalytic theories provide a fuller understanding and appreciation of the findings of this study. The two main aspects of the

mother-infant interaction that are addressed in what follows are (1) the quality of engagement and (2) strategies for affect regulation. In addition, an effort is made to conceptually understand the preoccupied state of mind and to explore the possible mechanisms for intergenerational transmission of modes of relatedness and patterns of affect regulation.

Quality of engagement. This study found that preoccupied mothers and their infants were more sensitive to one another than secure mothers and their infants. That is, the preoccupied mothers and their infants followed or "tracked" (Beebe, 1992) one another's behavior more closely than the secure mothers and their infants. In addition to showing a higher degree of responsivity, the infants of preoccupied mothers looked at their mothers more than infants with secure mothers. It is important to emphasize that each partner demonstrated higher responsivity or tracking vis a vis the other. This suggests that by the time the infant is four months old, patterns of interaction with the mother have been mutually established. Whether or not the interaction patterns are already internally set within the infant is an open question and an important area for future research. But, this investigation lends further support to the hypothesis that by four months the infant and mother have co-constructed interaction patterns in

which the partners' behavior is consistent with one another.

At this point in the discussion, it is important to emphasize that the word "responsive" is used in a concrete manner to specifically describe how closely the two partners' time series follow one another. When the two time series follow one another closely they are described as "highly responsive." When they appear not to affect one another, that is to say they are not related to one another, they are described as "not responsive" to one another. In this case, the word "responsive" does not describe how much empathy a mother displays or how "responsive" or "sensitive" she is to her infant's needs.

In order to understand this data further, it is necessary to examine it in relation to the various models suggested by previous researchers. In the early attachment literature, Ainsworth (1973, 1979) suggests that greater maternal responsivity produces secure infants. In this linear model, the more sensitive the mother is to her infant the better. In studies of adult interaction, Chapple (1970, 1982) supports this model with evidence that higher degrees of interpersonal responsivity indicate a positive relationship. Meanwhile, other researchers (Beebe and Jaffe, 1992; Gottman, 1981) report findings that suggest that higher levels of interpersonal influence indicate disturbed

interaction. More recently, researchers (Beebe, 1992; Isabella, Belsky & von Eye, 1989; Isabella & Belsky, 1991) offer an alternative model that reconciles these two views by demonstrating a curvilinear relationship between the level of interpersonal influence and infant outcome. According to this curvilinear model, either extreme of interpersonal sensitivity reflects problematic interaction and leads to infant insecurity, whereas a moderate degree of responsivity reflects a healthy interaction and produces a secure infant.

Although the current study was unable to test the curvilinear model due to the low number of dismissing subject, it is conceivable that the data conforms to one side of the proposed curve. This interpretation of the data suggests that the high level of interpersonal responsivity demonstrated by preoccupied mothers and their infants represents a disturbed pattern of interaction and the relatively lower level of interpersonal responsivity of the secure mothers and their infants reflects a more adaptive pattern of interaction. The crucial missing segment required to confirm this interpretation is the dismissing maternal attachment group at the low level of interpersonal responsivity.

The difference in the degree of interpersonal responsivity between maternal attachment groups provides empirical support for the theoretical writing of Cassidy

(1994) who discusses the unique patterns of relatedness that are characteristic of preoccupied adults. Cassidy notes that it is characteristic of ambivalent babies to show greater attention to their mothers and inhibited exploration of the environment. The findings of the current study appear to indicate that preoccupied mothers and their infants display these very same behaviors when the interaction is analyzed on a microanalytic level. Both preoccupied mothers and their infants show greater attention to one another, as demonstrated by the higher degree of mutual responsivity, as well as by the infants' hyper-vigilant looking at their mothers. The findings of the current study are also consistent with evidence from a study that found increased social referencing during the third episode of the strange situation (Dickstein, Thompson, Estes, Malkin & Lamb, 1984). These researchers found that during the separations and reunions of the strange situation, infants judged to be ambivalent looked more at their mothers than secure infants. This suggests that the heightened attention to the mother found in face-to-face interaction when the infant is four months old may be the precursor to increased social referencing at one year and greater attention to attachment figures throughout life. In addition, the current study found that infants with preoccupied mothers tended to visually explore the environment less than infants with secure mothers. Again, this parallels the findings of

investigations that examine the relationship of attachment classification and the quality of exploration in toddlers. It is consistently reported that toddlers who are judged to be ambivalently attached show inhibited exploration of the environment (Hazen & Durrett, 1982; Cassidy, 1986; Jacobson & Wille, 1986; Lewis & Feiring, 1989). Again, it seems that the relatively lower visual exploration of the environment displayed by four month old infants with preoccupied mothers may be a precursor to later impaired exploration of the environment.

Affect regulation. The regulation of affect, particularly of negative affect, is one of the key elements of the interaction that the mother and infant construct together. Attachment theorists (Cassidy, 1994; Cassidy & Berlin, in press; Kobak, 1987, 1993; Slade and Cohen, 1994) currently believe that the quality of attachment is intrinsically related to the capacity to regulate negative affect. The exploratory analysis of maternal patterns of regulating negative affect in the infant in the current study was consistent with the current theoretical position (Cassidy, 1994) that secure women can acknowledge negative affect without being overwhelmed by it, preoccupied women maximize or exaggerate negative affect and dismissing women ignore or minimize negative affect. These strategies for managing negative affect were apparent in the mothers' manner of regulating their infant's negative affect.

Even more striking was the finding that patterns in the four month old infants' expression of affect reflected their mothers' attachment classification. Infants with preoccupied mothers displayed more positive affect toward their mothers than infants with secure mothers, while infants with secure mothers displayed negative affect for longer episodes on average than infants with preoccupied mothers. It is possible to speculate that preoccupied mothers who become easily overwhelmed by negative affect and have few strategies for structuring negative affective experience, might work hard to prevent negative affect from occuring. If negative affect does occur, preoccupied mothers might tend to "over" respond because they feel somewhat overwhelmed by the negative affect. This increased attentiveness to the infant and effort focused on preventing infant distress is one way to account for the finding that infants of preoccupied mothers show less distress in the face-to-face research paradigm. In addition, when taking into account the developmental needs and tasks of a four month old infant, it makes sense that an infant with a preoccupied mother who attends extremely closely and carefully to her infant would feel comfortable and not experience distress. Only when the developmental tasks require greater exploration of the environment and less emphasis on attending to the attachment figure would the established patterns of

interaction create a conflict for the infant who might then show greater distress.

Another way to understand the finding that infants with preoccupied mothers protest less than infants with secure mothers takes into account Winnicott's (1965) description of the development of the "false self." In Winnicott's view, a mother's capacity to meet the infant's spontaneous gesture or communication is crucial to the development of a "true self." If the mother is unable to receive her infant's spontaneous and genuine communication, the infant "gets seduced into a compliance" (p. 146) and develops a "false self." In light of Winnicott's description of the development of the "false self," another possible way to understand the relatively lower negative affective expression of infants with preoccupied mothers is as a subtle sign of the beginnings of compliance and the development of a false self in the infant in response to the preoccupied mother's difficulty responding to her infant's negative affect.

Interestingly, previous research examining infant response to unusual maternal behavior, found evidence that might also be interpreted as support for this perspective. In a study using the still-face paradigm in which the infant is faced with a non-interactive partner in the face-to-face position, Bates et al (1985) found that secure infants tended to be calmer than insecure

infants when faced with the still-faced mother, but then showed more negative affect in the reunion segment. The researchers suggest that the greater distress may have been caused by a violation of the infant's expectation for closer contact on reunion than the experimental situation allowed. However, in light of the findings of the current study that secure mothers are more able to accept their infants' negative affective displays and are more competent in helping the infant regain emotional equilibrium, and that infants with secure mothers are less restricted in their display of negative affect, a somewhat different interpretation presents itself. Perhaps the secure infants displayed greater negative affect on reunion because they felt freer to express their anger and sadness to the mother with the expectation that their communication would be acknowledged and that they would then feel better again.

Mothers of different attachment classifications regulated their infants' negative affect in predictable ways as previously described. Secure mothers tended to acknowledge negative affect without being overwhelmed by it. For instance, Jane and her daughter Patty were playing and "talking" together in the face-to-face interaction paradigm. Patty started to fuss, but her mother continued to smile, saying "Wha(t)? Wha(t)?" in a caring tone, as if asking "What's the matter?" Jane continued to smile pleasantly and said, "Here, here,

let's clap hands." Patty stopped fussing and showed mild interest, but then began to fuss again. Her mother continued the clapping game while smiling, ignoring the fussing this time. Patty responded by becoming involved in the clapping game.

In this interaction, Jane demonstrates her capacity to acknowledge and understand the baby's upset. She responds by trying in a rudimentary way to "discuss" her baby's feelings by asking "What?" Then, she makes the decision to try to interest her baby in an activity that might cheer her up. Throughout, Jane remains cheerful. She does not become saddened by Patty's cries the way a preoccupied mother might, nor does she ignore the negative feeling in the manner characteristic of a dismissing mother. Rather, she acknowledges her baby's distress while providing a positive affective holding environment (Winnicott, 1960) or positive frame (Cohn and Tronick, 1988) for the baby. She acknowledges, interprets and responds to her baby's distress without the distortions that occur when a parent's inner pressures are too great to allow them the freedom to respond sensitively to her child's negative affect in a balanced way.

Another mother, Nancy, also judged to be secure, was singing to her baby who began to fuss. Nancy responded, "Ohhhhh, what are those sounds? What are those sounds?"

She continued to smile and repeat, "Ohhhh... Ohhhhh..." in a soothing, rhythmic manner.

A third mother who was judged to be secure, Liz, responded to her baby's cries by adjusting him in the seat. He continued to cry. Liz mirrored his expression with her own face, and said, "Yeah, I know. Get me out of this. I want to play on the floor. I know you don't like the seat. Just five minutes." And, then she smiled. Her baby looked at her while she said all of this and when she smiled, he even smiled back. Liz started to sing the "Eensy Weensy Spider" and her baby was happy again.

In this instance, Liz provided a narrative for her baby. She put words to his feelings, with an explanation as well. She let him know with her facial mirroring, tone of voice and her words that she could accept and understand his feelings. Then she reassured him with, "Just five minutes," her smile, and a song. He relaxed and was able to enjoy the singing. His feelings were heard and accepted and he felt comforted and was able to go on playing with his mother. All of these secure mothers demonstrated flexibility in their approach to their infant's distress. In psychoanalytic terms, they used higher level defenses when faced with negative affect.

One of the hallmarks of those who are dismissing with regard to attachment is the tendency to ignore,

minimize or have contempt for negative affect. In interaction with their babies, these mothers showed this tendency to dismiss and devalue feelings. One dismissing mother laughed whenever her baby cried or fussed. The laughing served to separate her from the baby's distress and helped her maintain her own affective equilibrium, but the laughing left the baby very much alone to deal with his distress. An observer feels that the mother is ridiculing the baby's upset and, of course, the baby continues to be upset. From a psychoanalytic perspective, this mother resorts to more rigid, primitive defenses to deal with her infant's negative affect.

Preoccupied mothers tend to feel flooded by their own negative affect and the evidence suggests that they feel overwhelmed by their infant's negative affect as well. Preoccupied mothers appear to take on the infant's distress as their own, becoming unable to provide the "positive frame" (Cohn and Tronick, 1988) that the secure mothers maintain for their infants. As Cassidy and Berlin (in press) describe, the preoccupied mothers communicate a sense of "oh my God! You're upset! How terrible! I'll never be able to get you to feel better again! You'll be upset! I can't deal with it!" For example, one mother judged to be preoccupied responded quickly to her infant's fussing, but displayed few strategies for helping him to feel better again. When he fussed, Sally looked concerned and said, "Whaaat?" and

called the infant's name. Two minutes later he fussed again and she quickly said, "Ok, ok" and played a foot game with great enthusiasm. Her baby calmed down, but a few seconds later he fussed and arched his back. Sally's face looked hurt and she kept saying, "Aww, oh, oh" with genuine distress and pain on her face. She then pleaded with her baby, "Be good for just a few more minutes." Then she started to sing a song and her baby recovered easily and smiled. This example is particularly interesting because it is obvious that the infant recovers easily from his upsets once his mother provides a positive structure for him. He is not a particularly difficult child and when Sally sings or maintains a positive feeling, he recovers quickly. However, Sally becomes so upset by his distress that she cannot maintain her own affective equilibrium. She becomes anxious and lacks confidence in her capacity to help her baby feel better and, indeed, she has difficulty providing the soothing he needs. What appears to an observer to be normal, low level fussiness in an infant, feels to Sally like intense pain that hurts her deeply and she then has difficulty recovering enough to help her baby feel better. She eventually does find a way with a song, but the pain she shows in her face when her baby fusses is dramatic. In psychoanalytic terms, the preoccupied mother's defenses fail her and she is overwhelmed by negative affect.

These descriptions of how mothers of different attachment classifications regulate their babies' negative affect in characteristic ways support the hypothesis of this study that maternal attachment patterns will be reflected in mother-infant interaction. That these mothers respond to their infants' negative affect just as they respond to their own is not surprising. After all, this is what they "know" about how to experience and shape negative affect. And, it seems to become what their infants "know" about affect as well. The finding of this study that mothers of different attachment classifications use predictable strategies for regulating their infants' negative affect and that infants develop patterns of affect regulation that reflect the attachment classification of their mother, lends support to the idea that the capacity to experience, tolerate and integrate a range of affects is transmitted from mother to child.

Understanding the preoccupied state of mind. An examination of the theoretical discussions in attachment and psychoanalytic literature may deepen our understanding of the nature of the internal structures and underlying processes that contribute to preoccupied attachment organization. Preoccupied attachment organization reflects a state of mind in which connection to attachment figures is emphasized at the expense of autonomy. In a discussion of the processes underlying

the preoccupied state of mind, Cassidy and Berlin (in press) examine the theoretical literature to understand why an adult would emphasize attachment issues and de-emphasize autonomous exploration. They describe three possible reasons for this emphasis on attachment. The first model suggests that parents who grew up in families where attachment was emphasized will also focus on attachment. In this view, the adult continues to believe and act in a manner that is consistent with what she experienced and learned as a child. A second model suggests that parents who emphasize attachment with their children do so in an effort to meet their own needs. This view stems from the fact that many preoccupied adults report a childhood with an incompetent parent. As parents themselves, they try to repair their own emotional pain by getting nurturance from their child. A third view described by Cassidy and Berlin (in press) is an evolutionary perspective set forth by Main (1990) and Belsky, Steinberg, & Draper (in press, cited in Cassidy and Berlin, in press). This view suggests that parents emphasize attachment to promote dependent behavior which allows the parent to exert greater influence on the child.

A look at the psychoanalytic literature sheds light on the deeper internal processes that may contribute to a preoccupied attachment organization. In her seminal work, Mahler (1975) describes the separation-

individuation process in which an infant develops greater autonomy and is able to move away from the merged state of symbiosis. It seems that for preoccupied mothers the anxiety of separation is too overwhelming and the longing for merger is too great to allow their infant this natural growth towards independence. In addition, the preoccupied mother cannot allow herself a sense of autonomy either. She herself is in a merged state with her infant and is unable to maintain a separate ego.

This may account for what observers interpret as "under-involvement" on the part of preoccupied mothers. They do not appear to be doing much with their infant. They initiate less and teach less than secure mothers or mothers of secure infants. However, on the microanalytic level of analysis, preoccupied mothers appear to be over-involved with their infants. They mirror and echo their infants behavior more than secure mothers. One possible inference from this observation is that they are so merged with their infants that their ego functioning is compromised and thus, they are unable to exercise typical parenting functions. This interpretation of the evidence is further supported by reports in the literature that preoccupied mothers or mothers of ambivalently attached infants are found to be over-involved with their six year old children (Solomon, George, & Ivins, 1987). Attachment researchers point out that maternal under-involvement during infancy and maternal over-involvement

at age six are strategies to promote the child's dependence on the parent. From the point of view of an observer, this shift from under- to over- involvement is indeed what appears to be happening. However, closer inspection suggests that, in fact, the underlying structure of the mother and of the mother-child relationship remains consistent throughout the child's life. During infancy, the preoccupied mother is too merged to function independently and when her child is six the same configuration of a pull towards a symbiotic state exists, albeit transformed in behavior due to the developmental changes of the child.

In a discussion of the internal conflict faced by new mothers, Deutsch (1945) describes this tension between the wish for symbiosis and the pull towards autonomy. A new mother is faced with a dilemma: how does she soften her boundaries enough to mother her new infant, while maintaining her own clear sense of self so as not to become engulfed by and overwhelmed by the infant's needs. Deutsch (1945) writes:

> After the unity (of pregnancy) has been split, two tendencies are present in the mother -- one progressive, aiming at helping her ego regain its rights, the other regressive, aiming at reunion with the child and preservation of the psychic umbilical cord... the fate of motherliness depends upon the result of the conflict of these opposite forces. An excess of fear of ego impoverishment produces flight from the child, ... and inability to experience motherliness. On the other hand, excessive fear of losing the child will result in excessive devotion to him, too drastic a turning away from other

> interests, and a disposition to neurotic fears about the child" (p. 267-8)

This passage describes not only the internal struggle that all new mothers must go through, but also the two strategies adopted by insecure mothers in relation to their infants. Attachment theorists maintain that how a mother regulates affect and organizes her relationships with others, which is evident in her representation of her early experiences with her parents, influences how she resolves this dilemma. In their view, secure mothers strike a balance between uniting with their infant and maintaining their own ego integrity, while insecure mothers either separate themselves too much from the baby's needs and emotions or they become overwhelmed by the baby's needs and emotions. Dismissing mothers may maintain an extremely distant position from their infants with low responsivity. Preoccupied mothers, on the other hand, are thought to have excessive fear of losing their child and therefore sacrifice their own ego integrity and autonomy to maintain an intense attachment. This merged state is demonstrated by high levels of interpersonal responsivity in face-to-face interaction of preoccupied mothers and their infants. In this symbiotically-tinged relationship, preoccupied mothers are unable to maintain autonomous affect regulation and tend to become overwhelmed by their baby's affective state. In contrast, secure mothers find the balance and are able to

maintain their own psychological integrity while recognizing and responding to their baby.

Transmission of patterns of relatedness and affect regulation. This study lends support to the hypothesis that a mother's representation of her early attachment relationships is revealed and re-played in the moment-to-moment interaction with her infant. The findings suggest that the patterns of relatedness and affect regulation strategies that the mother developed in the context of earlier relationships are recreated in her interaction with her infant. This tantalizing glimpse at intergenerational transmission of patterns of regulating social interaction and affect prompts an exploration of the possible mechanisms by which this process occurs. In an effort to understand how modes of relatedness and patterns of affect regulation are transmitted from one generation to the next, the attachment and infant research literature are considered.

In an examination of the concept of repetition across generations, Slade and Cohen (1994) suggest that what accounts for intergenerational repetition is "a quality of consciousness that is transmitted from mother to child via the mother's recognition and regulation of the child's affect states" (p. 8). This process through which a mother transmits her "quality of consciousness" to her infant is becoming better understood as microanalytic studies of mother-infant interaction inform

psychoanalytic thinking about the development of psychic structures.

Infant researchers suggest that the mother and infant develop a set of rules through their interaction together which are then used to predict future interaction (Beebe and Lachmann, 1988; Tronick, 1982). In order to establish these interaction rules, infants must first develop rudimentary representations which lead to the formation of expectations for the interactions. Stern (1985) calls these rudimentary representations "Representations of Interactions that are Generalized" (RIGs). In Stern's view, a RIG is like an averaged memory, rather than a memory of an actual occurrence. The "internal working model" construct of attachment theory is a related concept since both refer to representations that the infant uses to form expectations of future experience. However, the term "internal working model" generally describes the representation of attachment related phenomena and is thought of as a larger unit, perhaps as many RIGs together. In order to capture the "in-process" and interactive nature of these early presymbolic representations, Beebe and Lachmann (1988) use the term "actions-of-self-in-relation-to-actions-of-objects" (p.327).

Tronick explains that in well-coordinated mother-infant pairs the partners are relatively consistent and interaction rules are easy to establish and follow.

Therefore, the interaction proceeds with ease. However, for mother-infant pairs in which the mother or the infant is inconsistent in the interaction, the RIGs or inner representations of interaction events are more varied and complicated, making it difficult for the infant to form expectancies for future interaction. Thus, these interactions are more problematic and require greater effort by both the mother and the infant. In this way the particularities of each pair's interaction develop as the partners jointly construct the interaction governed by rules that are mutually regulated. Thus, a mother's unique manner of regulating social interaction and affect shape the interactive environment for her infant so that it becomes what her infant "knows" about being with himself and others.

Case examples

The results of this study describe subtle, but important distinctions between secure and preoccupied mothers in the patterns and rhythms of the interaction they and their infants develop together. Although mothers of all attachment classifications smile and play with their babies, there are important differences in the more nuanced dimensions of their behavior. To more vividly bring to life the process examined by this study, one mother from each attachment group is described and

the connections between the Adult Attachment Interview and the mother-infant interaction are explored.

Secure Mother. Susan was judged to be secure. Her baby was secure at one year. Susan was one of five children born to professional parents who both worked full time from the time of her birth. A live-in babysitter/housekeeper cared for the children. Susan convincingly described the positive and negative aspects of her relationships with her parents and her experiences as a young child. Susan was extremely thoughtful and approached the telling of her story with ease and humor. Susan's interview was very coherent. She had a good memory for events in her life and described them with feeling, but she was not flooded by her memories. When describing negative experiences with her parents, she was not angry, but forgiving and understanding of her parents.

When asked to describe her relationship with her mother, Susan described a relationship that was loving, but filled with longing. She gave weight to both the positive and negative aspects of her relationship with her mother. When she described the loving aspect of the relationship she told of a time her mother had been very angry at her and as a child she was worried that her mother didn't love her anymore. Susan remembered, "I remember being outside with her, and she spent a lot of time explaining the difference between being angry and

loving somebody, especially a child. And she said that, basically, that even though every now and then, she would become angry, that that never affected how much she loved us. So, I remember that. Really, I have always remembered that and it's really stuck in my mind, because after she spent a lot of time describing the difference, it jelled, I guess, in my mind... I felt loved by it." Then, after this description she went on to describe the sadness and longing in the relationship: "It was really sad for me to be apart from her so much... Whenever I was with her I got the sense that it wasn't going to be for very long... I remember feeling almost desperate, you know, to be with her, and then also sort of almost painfully aware that she was going to be gone in a little while."

When asked what she'd learned from her childhood experiences, Susan said, "It's really important to be there for your kids. It doesn't mean dropping everything and waiting on them hand and foot, but it's kind of an emotional sense that you care about what they're going through... And that's what I would hope to do."

And she does. In her interaction with her baby, Susan shows a lot of stamina for playing. She is positive, plays rhythmic games with her infant including feet games, peek-a-boo, tickle-gonna getcha games and feet kissing games. Her repertoire for being with her child is large and varied. When her baby fusses, Susan

responds with an empathic "Ohhhh," and then plays with her baby. Susan is there for her baby. She provides a positive frame and together this dyad appears to be enjoying each other's company.

Preoccupied Mother. Janice was judged to be preoccupied. Her baby was insecurely attached at one year. Janice was the older of two girls. Her interview was difficult to follow since she interrupted herself repeatedly with parenthetical statements that she would then follow rather than returning to her original thought. Her language was confused and she often became entangled in her efforts to describe her relationships with her parents. For example, when describing her relationship with her mother she started with, "My mom and I didn't get along very well, but, I'm always puzzled, I still am trying to figure this out because when we, I was really little I don't really remember things about it and all the pictures I look very happy and content, but I know, like I know things she said, and that I was upset with her because she didn't really like children. Or, that was my feeling, and that she said that, I mean, and she hated little boys, so it's lucky that you were a little girl."

Janice makes an effort to provide both the positive and negative dimensions of her relationship with her parents in her narrative, but rather than creating a balanced, integrated picture, she oscillates between

positive and negative sides that seem to obliterate one another. For instance, she may follow a negative statement with a disclaimer. When describing her relationship with her mother, she mentions a number of negative feelings and follows with, "Sounds so negative, we get along very well now so it's really funny, cause she's aware that I ever thought all these things." She then continues to describe her early relationship with her mother, "I just felt like I couldn't please her, like it didn't matter what I did. I don't know. But, I mean... not that it was a conflict but I just wasn't doing things right, for whatever her expectations should be. Then I remember little things, like I remember her squeezing my arm with her fingernails all the time to get me to do things and I would think like in my imagination that she was a witch and when she did that she was being transformed into a witch and her nails were getting longer. And I would just like, you know, hallucinate these ideas of whatever, and that it really wasn't my Mom, it had to be a witch because she was just totally crazy. I couldn't accept that that was my Mom." What she describes in this passage about imagining that her mother was a witch because it was too painful to accept that her mother could treat her so badly, is a continuous struggle for her still. Throughout the interview, she describes her mother's negative behavior and makes a disclaimer. Janice's inability to integrative the

positive and negative aspects of her mother reflects one of the key difficulties of preoccupied adults.

In discussing how her relationship with her mother has changed over time, Janice describes a moving moment in which the two of them discussed their relationship. "And I was saying, 'It wasn't that you did anything wrong, it's just that we never had the feeling that you cared about what we thought or what we felt about it.' and she said she never knew that mattered." Janice plans to try not to do that to her own child. She wants her own child to feel that her feelings, thoughts and desires are heard, valued and understood.

In her interaction with her infant, she is highly responsive to the baby's communications and responds very quickly to the baby's vocalizations. Sometimes her responses are so quick that it seems to interrupt the infant's efforts to vocalize and sounds like an echo. Janice's primary mode of interaction is imitating her baby's sounds. She follows the baby closely, echoing her coos and squeals and even following the infant's movements extremely closely. Janice brings little of her own agenda to the interaction. She does not introduce songs or games; rather, she asks, "What are you doing? Do you want to see the picture?" and so on. It seems that in her effort to not intrude her own needs into the relationship, she is putting the responsibility completely on her baby to initiate the communication.

She follows her infant so closely that the watching and following feels intrusive. One senses that the baby has little room to explore his world, except with his mother as a shadow. Janice does not verbalize any negative feelings, but her face takes on a sad expression when she empathizes with her distressed infant. Rather than provide a way to contain and manage the negative affect for her baby she enters her infant's affective state and shares it with him.

One way to understand what has happened here is that in Janice's efforts to not repeat her parents' apparent disengagement from her feelings, she is determined to be involved with her own baby's feeling state. So, she matches her own affect almost completely to her baby's. Interestingly, her baby at one year is judged to be avoidant in the Strange Situation. Janice's efforts to be involved with her baby create an exaggerated involvement in which she intrudes on the baby's emotional world, which the baby, apparently copes with by developing avoidant strategies. Janice, too, probably feels herself to be lost in her efforts to be a good, caring parent and overwhelmed by her baby's needs.

Dismissing Mother. Samantha was judged to be dismissing. She was the eighth of ten children. Her interview lacked coherence and consistency. For example, when describing her relationship with her father she said, "It was just a positive relationship. I can't, you

know, try to think of...He drank, um, and I didn't notice that until I was 10." Later in the interview, Samantha describes her father as "sort of loving." She explained with this example: "It would drive my mother nuts and I remember incidences when he would come home drunk at night and get us up on a school night to sing Irish songs on the piano and we all would love it. We'd think it was great. Who cares if we have school tomorrow. So... and that would drive my mother nuts. She would stand at the top of the stairs and say, 'The kids have school tomorrow.' 'Oh so what, we're singing Irish songs'...Then he got into a car accident when he was drunk and no one was hurt and he had been golfing and out drinking with his buddies and then after that he went to Alcoholics Anonymous and never drank again, but there were times when he was drinking all through my childhood, but those were the only times I recall it when I was a little older..." This long quote gives the reader the opportunity to experience the lack of organization of the narrative. Samantha begins by describing what she thinks of as loving aspects of her relationship with her father, but without any clear transition she slips into telling about what might have been a tragic event and was certainly an important catalyst for her father changing his life. She tells of her father having a car accident while driving drunk. In her description of this event there is no indication that she felt frightened or

worried, or that even now as an adult looking back on this aspect of her life that she recognizes this as an important event in her life. She expresses no feelings at all -- not fear, not admiration for her father's efforts and ability to make this change in his life, nor compassion for her mother who carried the burden of caring for the children and maintaining an orderly life for ten children, with an alcoholic husband. This distancing from the emotional experience of the events is typical of dismissing individuals. In addition to the contradictions in her narrative (describing her father as loving and citing examples that include drunk driving) Samantha oscillates in her view of her experience. For example, she described an incident when her father came home "smashed in the middle of the night, probably 2:00. I don't know what time it was, and came in and kicked out all the spindles in the staircase going up the stairs. Yeah, and it scared us. We woke up and I went out there and had said to him "what do you think you're doing. What's going on around her?" And he said, "Get back into your room." Shut the door and the next day we were all downstairs watching cartoons and he kicked out spindles to the staircase. My mother was probably on her first vacation in 15 years, I don't know. She never really went anywhere. She was with her girlfriend. She was away. She wasn't there and we looked out in the driveway and he had a brand new car and there was a huge dent in

it and that's what he was mad about, but he came downstairs about 10:00 and said, "I want to know who kicked out the spindles in the staircase." And we all looked at him and went, "Very cute Dad, you did it. Don't you remember?" And he was like, "Oh my God." So that was I guess leading up to the point where he quit drinking. It was just out of hand and he went outside and realized that he had dented his car and that's why he had come in and..." When the interviewer asked Samantha more about times her father did things that were scary, Samantha said there weren't other times. She said, "They were always let's play the piano They were the jolly old times... We thought it was great, you know." Samantha's conscious memory for negative experiences is poor, yet when she begins to speak about her early childhood the negative events break through her efforts to deny them.

Another significant feature of Samantha's narrative is her laughter during descriptions of times when she was hurt as a child. She described falling into a pool, "cracking" her head open and nearly drowning when she was 2 years old, an incident she remembers very little of. Then she noted she'd had asthma attacks as a child and then she described a time when she drank bleach at age 2 or 3. As she described her mother's efforts to take care of her after this accident, Samantha laughed a lot. She stated that she didn't remember what happened afterwards, but "I was probably fine afterwards (after drinking

bleach). When I fell into the pool and cracked my head open, and when I came home from the hospital days later, I just went right back in the pool again."

Samantha's lack of integration of the disturbing events of her life into a coherent narrative is echoed in her interaction with her baby. When her baby fusses, Samantha misinterprets the infant's cries and responds as if the baby was being positive, until the 4th cry. Then she laughs and seems at a loss for what to do. She primarily relies on distracting strategies and makes efforts to force her baby to play. The laughing at her baby's distress is reminiscent of her laughing at the times she herself was hurt as a young child.

Each of these three mother's representation of her early relationships with her parents was related to her behavior in her interaction with her infant. Susan's representation was coherent and thoughtful. She expressed both negative and positive emotions in a meaningful and integrated manner. With her baby, she was able to respond fully to both the positive and negative affective displays of her baby. She gave the impression of being centered in herself and being with her baby. Janice, the preoccupied mother, was overwhelmed by the emotional experience of telling about her early relationships. She became lost in her narrative and was unable to integrate the negative experiences with the positive in a balanced manner. With her child, she also

seems lost. She appears to be consumed by the relationship. Her affect and timing is so close to her infant's that there is little separation between the two in terms of psychological space. When her baby is unhappy, so is she. There is no sense that she exists as a cohesive person who is separate from her infant. Contrastingly, Samantha, who was judged to be dismissing, allows herself little emotion. Negative feelings are clearly not allowed and she distances herself from all negative emotion by devaluing or ridiculing the feeling. Just as she laughs at her own pain, she ridicules her infant's distress.

Seeing these mothers' representations of their own early attachment relationships reflected in their interaction with their infants is dramatic. Even more significant, is the fact that the empirical evidence supports these links between a mother's attachment organization and the relationship she and her infant create together. Indeed, the evidence demonstrates that together mothers and infants develop patterns of relatedness and affect regulation strategies that are consistent with the mother's own unique way of organizing her experience.

Limitations of the study

In this study, differences were found in the analyses of infant behavior and relationship factors.

Differences were not found in maternal behavior, which raises many questions. One obvious possibility is that the mothers do not behave in distinctly different ways and that differences in infant behavior and dyadic factors are accounted for by individual differences within the infants, especially temperamental differences. The primary challenge to this view is the empirical evidence demonstrating differences in maternal responsivity. This seems to suggest that differences do indeed exist, however, they were not captured by the maternal measure used in this investigation. It seems that the subtle nuances of the mother's behavior escaped this coding system. The Infant and Caregiver Engagement Phases (Tronick and Weinberg, 1993) is a microanalytic coding system that codes each second of behavior. Although this is consistent with the method used in much current infant research, it is likely that a more detailed and sensitive coding system would capture greater distinctions between maternal attachment groups and provide more information about how mothers in different attachment classifications actually differ in their interaction with their infants.

Another significant limitation of this study was the low number of dismissing subjects, which precluded them from the analysis. While interesting differences emerged between preoccupied and secure mothers in the patterns and rhythms of their infant-mother interaction, further

research is necessary to uncover the qualities of dismissing mothers' interaction with their infants.

Recommendations for further study

An interesting question that this study raises is how entrenched or flexible are the infant's interaction patterns and at what age do they become more established. This might be analyzed by examining the infant's interaction with a different social partner at different ages to see whether or not the infant maintains the interaction patterns that he has established with his mother in interaction with the new partner.

Another direction for future research suggested by this study is to extend the inquiry of the current study to examine the links between maternal attachment, quality of the mother-infant interaction and infant attachment. Attachment theorists hypothesize that attachment classification is transmitted from generation to generation. However, a puzzling complication emerges when evaluating the current study in the context of research (Beebe, 1992) that examined links between mutual influence in the mother-infant interaction and infant attachment at one year and found that infants who were high trackers at four months were judged to be avoidant (A) in the Strange Situation at one year and infants who were low trackers at four months were judged to be resistant (C) at one year. The current study found that

high trackers had preoccupied mothers and Beebe's study found that high trackers were avoidant at one year. This suggests that the preoccupied mothers had infants who were high trackers who then become avoidant. One speculation (Tronick, personal communication, May 26, 1994) about this surprising twist is that perhaps the preoccupied mother's infant is hypervigilant because her mother is unpredictable and the baby is "studying" in an effort to learn the rules. By one year, however, the baby has "given up" trying to figure out her mother's patterns and now relies on her own resources while avoiding the mother. Another possibility that suggests itself is that the research design of these two studies was sufficiently different to produce results that cannot be interpreted together. For this reason, further exploration of the links between maternal attachment, mother-infant interaction and infant attachment would provide a clearer way to understand these complex phenomena.

Concluding Remarks

This study demonstrates that a mother's representation of her attachment to her own parents is reflected in the structure of her interaction with her four month old infant. It was found that the interaction of preoccupied mothers and their infants differed in important ways from the interaction of secure mothers and

their infants. They showed heightened attention to one another and decreased visual exploration of the environment on the part of the infant. In addition, the infants with preoccupied mothers displayed greater amounts of positive affect and less prolonged bouts of negative affect than infants with secure mothers.

The process through which mothers pass on their unique ways of organizing experience to their children is fascinating. It is a process that has enormous implications for clinical work with both children and adults, especially as it relates to the issue of therapeutic change. An understanding of the mechanisms through which parents transmit "ways of being" to their children could potentially contribute to a fuller understanding of what occurs in psychotherapy to promote change.

Appendix A

INFANT AND CAREGIVER ENGAGEMENT PHASES

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The Infant and Caregiver Engagement Phases are based on Tronick's Monadic Phases Scoring System and Tronick and Weinberg's Infant and Maternal Regulatory Scoring Systems (IRSS & MRSS). The codes within both the Infant and Caregiver Engagement Phases are mutually exclusive.

Infant Engagement Phases

A. NEGATIVE ENGAGEMENT: The infant is negative, protesting, or withdrawn. The infant must display negative facial expressions (e.g., anger, sadness, disgust, distress, cry or grimace faces), and/or whimpering, complaining, fussy, or crying vocalizations. There is no gaze criterion and a variety of gestural and postural behaviors may occur (e.g., pushing the caregiver away, twisting and turning in chair).

Negative Engagement can be divided into two specific phases: Protest and Withdrawn. Always try to code whether the infant is in the Protest or Withdrawn phase. If it is not possible to make this differentiation, code the undifferentiated category of Negative Engagement.

B. PROTEST: The infant is protesting. The infant often displays facial expressions of anger, grimaces, and/or is crying. The infant tends to be active during this phase: the infant may arch his/her back, try to escape/get away, gesture, want to be picked up, bat at the caregiver, and push and pull away from the caregiver. There is no gaze criterion.

C. WITHDRAWN: The infant is withdrawn and minimally engaged with the caregiver. This phase often includes sad facial expressions, whimpering/fussy vocalizations, slumped posture, and gaze aversion. The infant typically engages in few activities and gives the impression of being disengaged from the caregiver. Although the infant often gaze averts, there is no specific gaze criterion defining this phase.

D. SOCIAL MONITOR: The infant's attention is directed towards the caregiver. The infant looks at the adult's face with a flat, neutral, or interested facial expression. The infant's body, head, and eyes must be oriented towards the adult and he/she may vocalize in a neutral/positive manner. Ignore instances when the infant very briefly glances away from the adult's face. In cases where it is difficult to differentiate between Negative Engagement (particualarly Withdrawn) and Social Monitor, score Social Monitor. Similarly, if it is difficult to differentiate between Social Monitor and Social Positive Engagement, score Social Monitor.

E. OBJECT/ENVIRONMENT ENGAGEMENT: The infant is looking at objects that are either proximal (e.g., infant seat) or distal (e.g., camera). The infant may manipulate proximal objects. The infant's orientation of body, head and eyes must be directed towards an object. The infant's facial expressions are typically interested or neutralbut may on occassion be positive. The infant may or may not vocalize. Objects include the infant's hands, feet, belly, or clothing; the partner's body (e.g., trunk, hands, jewelry), and objects that are part of the laboratory setting (e.g., chair strap, side of chair, cameras, or curtains). The partner's face does not constitute an object. Ignore instances, however, when the infant very briefly glances at the adult's face during object/environment engagement. If the infant displays negative affect or vocalizations while looking at an object, code Negative Engagement, Protest, or Withdrawn. If the infant laughs or smiles while looking at an object, code Object/Environment Engagement.

F. SOCIAL POSITIVE ENGAGEMENT: The infant must display facial expressions of joy including smiles, coo, and play faces. the infant's body and head must be oriented towardsthe partner and the infant must look towards the caregiver's face. The infant may be vocalising in a positive manner or laughing. The infant may be engaged with the adult in rhythmic social play -- games, e.g., pat-a-cake, peek-a-boo. During these games it may not be possible for the infant to be looking at the adult's face because of the caregiver's position (e.g., adult's face buried in infant's lap) or the nature of the game (e.g., face covered in peek-a-boo). Score these instances asSocial Positive Engagement as long as the infant's facial and vocal expressions are positive. Ignore instances when the infant briefly glances away from the partner. If the infant looks at objects or the environment (as described in E) while smiling or laughing, code Object/Environment Engagment.

XX. UNCODABLE: If the baby is obscured because of poor camera angles, technical problems or because the adult is blocking the baby's camera, score Uncodable. If you can make a reasonable evaluation as to what the baby is doing score phase A-F and do not use Uncodable.

In a second run of the tape, code the infant's self-comforting, distancing behaviors and autonomic stress indicators. These behaviors can occur during any of the six infant phases.

G. INFANT SELF COMFORTING: The infant uses his/her body to provide self-stimulation. Self-comforting activities include: 1) instances when the infant sucks on his/her body, e.g., his/her thumb or wrist. There must be skin contact with the mouth and the behavior must be initiated by the infant; 2) instances when the infant sucks on or brings to his/her mouth something other than his/her body such asthe stap of the chair or his/her clothing. This behavior must also be initiated by the infant; and 3) instances when the infant sucks on or brings to his/her mouth the mother's hand or finger. Ther must be skin contact but this self-comforting behavior is scored regardless of who initiated the contact.

H. INFANT GET AWAY/ARCH: The infant attempts to increase his/her physical distance from the caregiver without engaging an object. Distancing include: 1) instances when the infant tries to get away by turning and twisting away from the caregiver. The infant's shoulders and trunk are always rotated sideways (The shoulders and trunk need not be completely rotated but some rotation must be evident.) The infant's head is averted sideways, or up and sideways, with gaze directed sideways, or up and sideways, away from the adult. The arms are usually, but not always raised above or at the level of his/her head. The back is typically, but not always arched. Do not score infants who have this constellation of behaviors but are trying to get a better look at an object; and, 2) instances when the infant's shoulders are pushed back against the chair and the torso is thrust forward and up. There is no shoulder or trunk rotation. The infant's arms are usually down by the infant's sides but are occasionally raised. The infant typically looks at tghe adult but head and gaze are sometimes averted.

I. INFANT AUTONOMIC STRESS INDICATORS: The infant exhibits behaviors which may indicate stress or autonomic arousal such as spitting up, hiccupping, or yawning. Drooling should not be coded as spitting up. The infant's spit up should have consistency and be white or milky.

Caregiver Engagement Phases

The Caregiver Engagement Phases are mutually exclusive. For each phase, consider the adult's facial expressions, vocalizations, and gestures/touches.

A. NON-INFANT FOCUSED ENGAGEMENT: The adult is not attending to the baby and is involved in a non-infant focused activity (e.g., filing her nails, reading a book, fixing her clothing, talking to the experimenter, looking at an object the infant is not looking at, and so on.).

B. NEGATIVE ENGAGEMENT: The adult is negative, hostile, or withdrawn, Her facial expressions are angry, hostile stern, sad, sober, or expressionless. There are no smiles or hints of smiles. The adult's vocalizations are sharp, angry, loud, adultlike, or expressionless. The adult may be silent or speak in a monotone. There is no burst-pause, sing-song, or exaggerated language characteristic of Motherese. The adult's touches and gestures are sharp, abrupt, and not tender (e.g., pokes and jabs). The adult may be leaning back in her chair and appear at a loss for what to do. There is no gaze criterion.

Negative Engagement can be divided into two specific phases: Hostile and Withdrawn. Always try to code whether the adult is in the Hostile or Withdrawn phase. If it is not possible to make this differentiation, code the undifferentiated category of Negative Engagement.

C. HOSTILE: The adult's engagement with the baby is characterized by anger, hostility, or aggression. The adult's facial expressions are angry or hostile. There are no smiles or hints of smiles. The adult's vocalizations may be sharp, angry, loud, or adultlike and her touches sharp, abrupt, and not tender (e.g., pokes and jabs). There is no burst-pause, sing-song, or exaggerated language characteristic of Motherese. There is no gaze criterion.

D. WITHDRAWN: The adult is minimally engaged and withdrawn with the baby. The adult's facial expressions are sad, tense, flat, or expressionless. There are no smiles or hints of smiles. The adult may be silent or speak or whisper in a flat or expressionless monotone. THe adult may be leaning back in her chair, not touch the baby, and appear hesitant or at a loss for what to do. There is no burst-pause, sing-song, or exaggerated vocalizations (i.e. motherese). There is no gaze criterion.

E. SOCIAL MONITOR/NEUTRAL: The adult watches or focuses her attention on the baby or the baby's activities. Her facial expressions range from neutral to interest. The adult may vocalize to the baby in a neutral tone. her vocalizations are infant-focused. The caregiver's tone is not flat or expressionles nor is she using Motherese. If the caregiver's face is neutral but she is speaking in Motherese, score F Social Positive Engagement. The adult may also touch the baby.

Ignore instances when the caregiver briefly glances away from the infant. In cases where it is difficult to differentiate between Withdrawn and Social Monitor, score Social Monitor. Similarly, it if is difficult to differentiate between Social Monitor and Social Positive, score Social Monitor.

F. SOCIAL POSITIVE ENGAGEMENT: The caregiver expresses positive affect. The face is bright and includes hints of smiles, simple/slight smiles, and full open smiles but no exaggerated smile faces. Laughter, even when the face is relatively neutral, is included. Very exaggerated laughter is coded G. Mock negative faces unless they are exaggerated, and attempts to soothe the baby are also included in this category. The adult may vocalize to the baby using Motherese or singing but there is nothing exaggerated in her speaking or singing. The caregiver may play games with the infant but these games do not have an exaggerated quality. If it is difficult to differentiate F and G, code F.

G. EXAGGERATED POSITIVE ENGAGEMENT: This phase includes exaggerated social displays of face, voice, and action. The adult's facil expressions include exaggerated smiles and laughter, as well as exaggerated play, surprise, mock, and coo faces. Orientation is fully towards the infant. The adult's vocalizations are exaggerated and may include singing, Motherese, Baby Talk, animated narraties, or vocalizations associated with particular games (i.e. pat-a-cake). The adult may play exaggerated rhythmic or non-rhythmic games with the infant.

XX. UNCODABLE: If the adult is obscured because of poor camera angles or technical problems, score Uncodable. If you can make a reasonably good guess as to what the adult is doing, score phase A-G and do not use Uncodable.

Appendix B

Table 6

Overall Reliability for Infant Engagement Phases

Engagement Phase	% agreement
Negative	100%
Protest	59%
Withdrawn	100%
Social Monitor	60%
Object/environment	90%
Social Positive	76%
Overall relability	93% (2780/3000) Kappa= .73

Table 7

Overall Reliability for Caregiver Engagement Phases

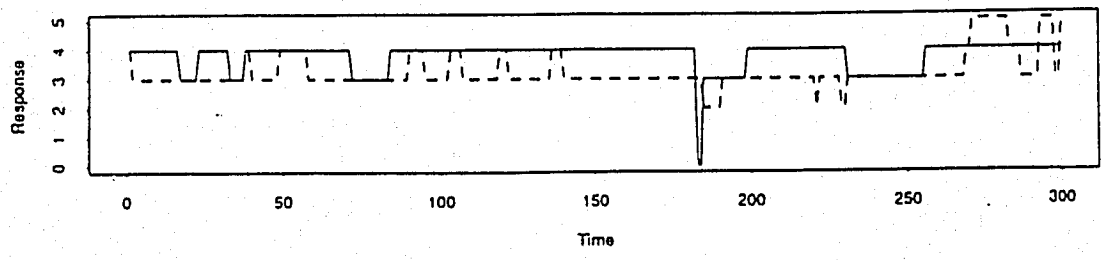
Engagement Phase	% agreement
Non-infant focus	50%
Negative	0% (0/1)
Hostile	54%
Withdrawn	0% (0/6)
Social Monitor	50%
Social Positive	89%
Exaggerated Positive	43%
Overall reliability	92% (3579/3900) Kappa= .70

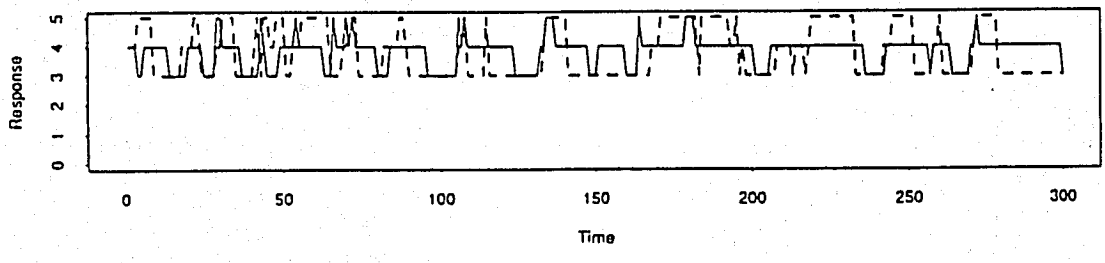
Appendix C

Figures of Time-Series of Mother-Infant Interaction

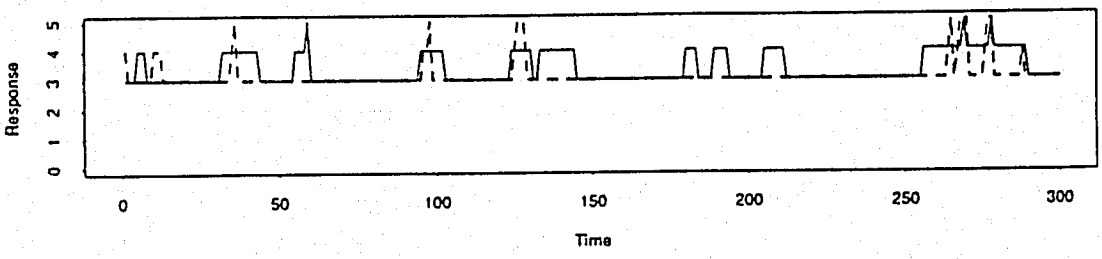
(solid line - mother; dashed line - infant)

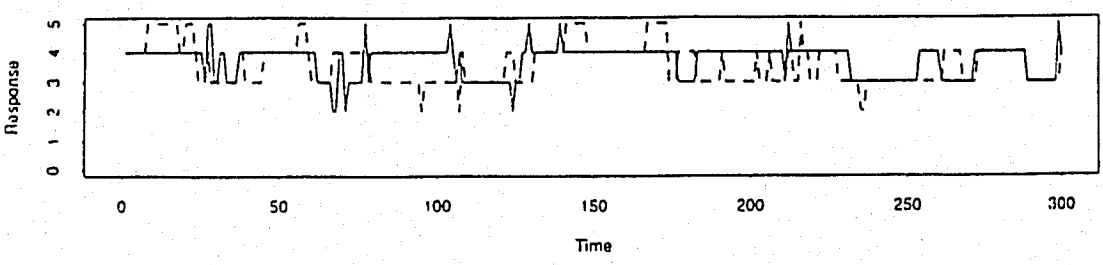
SECURE MOTHER AND INFANT



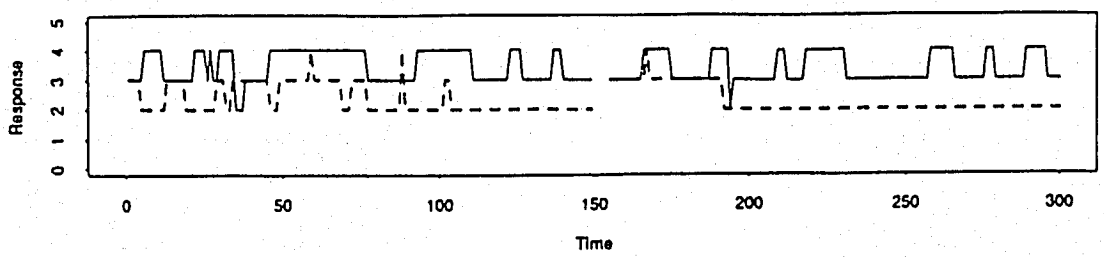


PREOCCUPIED MOTHER AND INFANT





DISMISSING MOTHER AND INFANT



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