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The Infant-Mother Relationship: An Examination of the Antecedents of Attachment

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THE INFANT-MOTHER RELATIONSHIP:
AN EXAMINATION OF THE ANTECEDENTS OF ATTACHMENT

by
Janice M. Kowalski

A Dissertation Submitted to the Faculty of the Graduate School
of Loyola University of Chicago in Partial Fulfillment
of the Requirements for the Degree of

Doctor of Philosophy

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1985

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VITA

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CHAPTER I

INTRODUCTION

The examination of the relationship between early childhood experience and later developmental outcomes has long dominated both the theory and research in the study of human development (Kagan, 1979; Rutter, 1982). Because of the extended biological and psychological dependence of the human infant upon his/her primary caretaker, who is typically the biological mother, it has been suggested that the quality of the earliest interactions between the infant and his/her mother plays an important role in organizing the child's perceptions of the world and mediating his/her experience with the gradually expanding environment (Brazelton, Koslowski, & Main, 1974).

Attachment theory, originally proposed by Bowlby (1958, 1969, 1982) and extended by Ainsworth (1973, 1979, 1984; Ainsworth, Blehar, Waters, & Wall, 1978), has provided the single most comprehensive framework for the study of early human social development (Campos, Barrett, Lamb, Goldsmith, 1983; Joffe & Vaughn, 1982). According to this view, attachment is defined as an enduring affectional tie between the child and the mother, which originates in the early infant-mother interactions, and facilitates the child's subsequent development in the cognitive, social, and emotional domains (Ainsworth, 1984; Ainsworth et al., 1978; Joffe & Vaughn, 1983). In particular,

contemporary research in the area has argued persuasively for the position that the quality of the infant-mother attachment relationship is strongly associated with the quality of the child's subsequent developmental functioning (Ainsworth et al., 1978; Bretherton, 1985; Joffe & Vaughn, 1982). Given the nature of this proposed relationship between quality of attachment and later cognitive and social-emotional functioning, it becomes imperative to delineate the antecedents of a secure affectional bond between child and mother. However, research attempting to specify the antecedents of the infant-mother attachment relationship has lagged significantly behind efforts to empirically demonstrate the relationship between quality of attachment and a variety of important developmental outcomes (Antonucci & Leavitt, 1984). Part of this striking discrepancy is due to the complex matter under investigation. Early patterns of interaction between the infant and his/her mother are characterized by continual change and mutual adaptation. Accurate assessments of the dynamic nature of the interactive processes which have occurred between the child and the mother were difficult to obtain. However, recent advancements in both developmental theory and research methodology have rendered this complex phenomenon more amenable to study. As a result, contemporary interest in the antecedents of the infant-mother attachment has increased, although the research at this time is still neither comprehensive nor systematic.

It is the purpose of the current study to contribute additional knowledge to our contemporary understanding of the antecedents of the infant-mother attachment relationship. In particular, the goal

of this study is to delineate those constellations of infant and maternal behaviors and characteristics that are most predictive of the quality of this affectional bond between child and mother. The identification of the antecedents of secure and adaptive patterns of attachment would contribute greatly to our theoretical understanding of human social development through the first year of life as well as help organize clinical interventions with "at-risk" populations. In particular, the early identification of troubled infant-mother dyads would facilitate early intervention and possible remediation of maladaptive patterns of interaction. In turn, appropriate intervention at nodal points of development would serve to maximize optimal developmental outcomes.



CHAPTER II

REVIEW OF THE RELATED LITERATURE

Attachment is defined as the enduring affective tie between the infant and his/her mother (Ainsworth et al., 1978; Bowlby, 1969, 1982). Bowlby (1969, 1982) proposed that the human infant was genetically predisposed to form such an attachment with his/her primary caretaker, who is typically the biological mother, to ensure the perpetuation of the species. However, although he hypothesized this genetic predisposition, Bowlby did not believe that attachment exists at birth, nor that it is predetermined to whom the child would form an affective bond (Joffe & Vaughn, 1983). Rather, Bowlby suggested that attachment occurs through a developmental process of interaction between the infant and his/her mother involving the interplay of both infant and maternal behavioral systems.

The concept of a behavioral system, borrowed from ethological theory, is fundamental to understanding attachment theory. The term behavioral system refers to those species-specific behaviors organized in a behavioral sequence, often times unlearned, which evolved in order to ensure the survival of the species. It refers to both the external and observable behaviors which characterize the system, as well as the intraorganismic organization that integrates the component behaviors into a goal-directed behavioral sequence (Ainsworth et al., 1978).

In Bowlby's formulation, attachment was operationalized as that behavioral system in the human species that promoted the maintenance of proximity between the infant and his/her primary caretaker. The biological function of this system was viewed as rather obvious; namely, to promote the protection and care of the young until self-care and reproductive maturity were attained. Bowlby's discussion of the structure of attachment behavior was more complex. He suggested that the attachment behavioral system was mediated by three different behavioral components: (1) orientation behaviors, such as visual and auditory tracking, which serve to sustain the child's awareness of the mother; (2) signaling behaviors, such as crying, smiling, calling, and reaching, which serve to bring the mother to the child; and (3) approach behaviors, such as seeking, clinging, and sucking, which serve to bring the child closer to the mother. Bowlby postulated that these different behavioral sequences became organized over time and comprised the developmental course of human attachment. Although Bowlby suggested that the course of attachment was open-ended and unfolded throughout childhood and even into adulthood, three of the four major phases he proposed were assumed to occur during the child's first year of life and to provide the foundation for subsequent attachment relationships with significant others in the environment (Ainsworth, 1984).

In Bowlby's model, the first phase of the attachment process between the infant and his/her mother occurs from birth to approximately three months of age. Bowlby (1982) referred to this as the phase of "orientation and signals without discrimination of figure."

During this period, attachment as an affective bond between the infant and his/her mother cannot be observed. Rather, attachment at this time is rather diffuse in nature and consists primarily of the infant's orientation and signaling to people in the immediate environment, but with little discrimination among different individuals in the environment. Bowlby argued that this phase of attachment is present from birth because the human infant is biologically equipped with a repertoire of signaling behaviors that are used to elicit approach and contact behaviors from caretakers in the environment. The utilization of these behaviors is believed to facilitate proximity between the infant and the primary caretaker which, in turn, insures protection for the offspring and the satisfaction of his/her basic biological needs. The first phase of the attachment process concludes when the infant begins to discriminate among individuals, particularly his/her mother, in the environment and respond to them in a differential manner.

The second phase of the developmental process of attachment generally lasts from three to six months of age. Bowlby (1982) referred to this as the phase of "orientation and signals directed towards one (or more) discriminated figure(s)." During this period, the infant demonstrates a clear ability to discriminate the primary caretaker from others in the environment and directs orientation and signaling behaviors primarily towards her. In addition, the infant displays an expanded repertoire of attachment behaviors, such as smiling, reaching, and clinging, which serve to promote even greater proximity with the primary caregiver.

The third phase of the attachment process, which begins around the sixth or seventh month and continues throughout the child's second year of life, is described by Bowlby (1982) as the phase of "maintenance proximity to a discriminated figure by means of locomotion as well as signals." At this time, the infant becomes more active in his/her attempts to establish and maintain proximity with the mother, incorporating locomotion into his/her repertoire of attachment behaviors. The infant now begins to employ the mother as a secure base for venturing out into the environment. In addition, the child's initial fear of strangers (stranger anxiety), which occurs around the onset of this phase, gradually subsides and disappears. The child also begins to exhibit simple goal-directed behaviors designed to facilitate proximity and contact with his/her mother. Such behaviors typically involve the child's adaptation to the mother's behaviors in order to initiate and/or sustain interaction with her. Bowlby suggested that it is this "goal-directed" quality of the dyadic relationship, which begins to develop during the third phase of the attachment process, that signals the formation of the affective bond between the child and his/her mother. Similarly, Ainsworth (1984) emphasized that it is during this developmental phase of the attachment process that the child begins to create a representational model of the primary caretaker that serves to provide comfort during periods of physical separation from the mother.

The final phase of the attachment process begins during the third year of life and continues throughout childhood, and in some degree, throughout the entire life-span. Bowlby (1982) referred to

this as the phase of "goal-directed partnership." It is during this time that the child firmly establishes a goal-directed relationship with his/her primary caretaker which involves increasingly more complex ways through which the child attempts to maintain physical and/or psychological proximity with his/her mother. The child now gradually separates from his/her mother and recognizes her capacity to function in an independent and autonomous manner. Mutuality, based upon the recognition of the child and the mother as separate individuals, begins to characterize the dyadic relationship. In addition, the child continues to express similar goal-directed attachment towards significant others in his/her environment. Bowlby suggested that subsequent attachment relationships which occurred throughout life are patterned after the original infant-mother relationship.

Bowlby (1969, 1982) also postulated the existence of a maternal behavioral system that was complementary to the infant's attachment system. The goal of the maternal behavioral system was to maintain proximity with the child, thus insuring that the biological function of the caretaking system--survival of the offspring--was attained. In terms of system goals and biological functions, the infant attachment system and the maternal caretaking system were believed to be closely interrelated. Ainsworth (1984) suggested that the responsibility of the caretaker to the infant's signals is the single most important determinant of how the attachment process will unfold. She contended that developmental anomalies may occur in the progression of the attachment relationship when the caretaker acts in ways that interfere with the orderly expression of the infant's behavioral

system. Egeland and Sroufe (1981), on the basis of their research with physically abused children, have supported Ainsworth's claim. They reported that abused children do form attachments, often times quite intense ones, with their punitive parents. However, the organization of the affective bond between child and parent is typically distorted and characterized by high levels of aggression, hostility, and dependence.

Bowlby's original model of attachment (1958, 1969), rooted in ethological theory, emphasized the evolutionary significance of the infant-mother relationship in terms of its contribution to the perpetuation of the species. Subsequent theory and research in the area of this dyadic relationship (Ainsworth, 1973; Ainsworth et al., 1978; Bretherton, 1985; Sroufe, 1979, 1985; Sroufe & Waters, 1977) has expanded the theoretical significance of the infant-mother relationship beyond its evolutionary purpose of facilitating survival of the species. Contemporary study of the infant-mother relationship now emphasizes the relationship between the quality of the dyadic relationship and the quality of the child's subsequent developmental functioning in the cognitive, social, and emotional domains. This shift in emphasis has resulted in several important modifications in Bowlby's original view of attachment, and has revitalized empirical study in the area of the infant-mother relationship.

The first important theoretical modification of Bowlby's theory of attachment was the hypothesized existence of a complementary infant behavioral system of "felt security" (Sroufe & Waters, 1977), which closely paralleled the attachment system. Based upon repeated

observations of independent samples of infants (Ainsworth et al., 1978; Ainsworth & Wittig, 1969; Schaeffer & Emerson, 1964), it was reported that infants characteristically exhibit both attachment and exploratory behaviors in the presence of their mothers. It was also observed that the timing and frequency of these behaviors often differed across situations. Ainsworth (1973) initially hypothesized the existence of a behavioral system which functioned in unison with the attachment system. The function of this second behavioral system was to facilitate the child's ventures out into the environment and shift the balance of the intraorganismic organization from attachment, the goal of which was proximity with the mother, to exploration (and back again, as necessary for protection) in response to environmental contingencies. In other words, Ainsworth suggested the addition of a second behavioral system that had as its goal the facilitation of the child's exploration of the environment. Sroufe and Waters (1977) referred to this experiential sense of security which allowed the child to venture out into the environment, confident of his/her mother's availability in the case of danger, as a sense of "felt security." The function of this particular behavioral system was to facilitate the child's development of competency and a sense of environmental mastery. These feelings of competency and environmental mastery were hypothesized to be the products of a history of infant-mother interactions characterized by maternal sensitivity and responsiveness to the child's needs. Ainsworth (1984) has further suggested that this interactional history of the dyad facilitated the child's development of a representational or "working model" (Bowlby, 1982)

of the mother which served to comfort and "hold" (Winnicott, 1974) the child during periods of separation. Children who have constructed a representational model of the "good-enough" mother (Winnicott, 1974) exhibit an appropriate balance of exploratory and attachment behaviors, the expression of which are influenced by environmental contexts. On the other hand, the child who has failed to create such a working model, or has created a faulty or incomplete representation of his/her mother, tends to exhibit distorted patterns of attachment and exploratory behaviors (Ainsworth et al., 1978).

A second important shift within attachment theory occurred when the original unifunctional construct of attachment was expanded and transformed into an organizational construct involving qualitative patterns of attachment and exploratory behaviors. Prior to this theoretical modification, attachment between the infant and his/her mother had been discussed as a linear construct, the presence of which could be inferred from the observation of the frequency and intensity of behaviors assumed to be expressions of the affective bond. Research employing discrete measures of "attachment behaviors," such as smiling, looking, and touching, often demonstrated little empirical support for a linear and unidimensional construct of attachment (Masters & Wellman, 1974). Construct validity requires that the observable behaviors which define the construct be empirically evident, intercorrelated, and stable over time (Cronbach & Meehl, 1955). The assessment of independent measures of attachment behaviors did not meet the psychometric criteria for construct validity and the traditional construct of attachment, which focused on the

unidimensional function of maintenance of proximity between the child and mother, was suspect (Joffe & Vaughn, 1982).

However, with the addition of the complementary behavioral system denoting the infant's sense of "felt security," in conjunction with the original attachment behavioral system, emphasis shifted from an unifunctional construct to a broader organizational construct. As such, attachment was no longer viewed as a set of interrelated behaviors from which the strength of the infant-mother attachment was inferred (Maccoby & Masters, 1970). Rather, it was now presumed to represent a stable, internal organization of behavioral systems that served to mediate infant proximity to the mother as well as qualitatively organize the pattern of specific attachment and exploratory behaviors through which optimal levels of infant comfort and safety were maintained. Within such a framework, infants were not only expected to differ in the frequency and intensity of the attachment and exploratory behaviors exhibited, but also, individual differences in the organized patterns of these behaviors were predicted. It was these patterns of behaviors that were assumed to differentiate among types of infant-mother attachment relationships (Ainsworth, 1972; Ainsworth et al., 1978). In particular, infants were hypothesized to exhibit differential patterns of both attachment and exploratory behaviors from which qualitative differences in the affective bond between child and mother could be assessed.

The recognition that qualitative differences in the patterns of dyadic attachment existed was a conceptual advancement for the theoretical understanding of the infant-mother relationship (Joffe,

Vaughn, Barglow, & Benveniste, 1985). This more complex and sophisticated conceptualization of attachment required new methods of assessment and evaluation which exceeded mere frequency counts of discrete attachment behaviors. Ainsworth and her colleagues (Ainsworth et al., 1978; Ainsworth & Wittig, 1969), based upon longitudinal observations of infant-mother dyads, devised a standardized laboratory procedure to assess qualitative differences in patterns of dyadic attachment. This procedure, the Strange Situation, is currently the most popular and widely employed measure for the assessment of infant-mother attachment (Joffe et al., 1985).

Assessing Infant-Mother Attachment: The Strange Situation

The contemporary perspective of attachment views it as an organizational construct (Ainsworth, 1979, 1984; Bowlby, 1982; Sroufe & Waters, 1977). As such, the term attachment is used to refer to an intraorganismic organization that mediates both the external and observable manifestation of attachment behaviors, as well as provides an internal organization or pattern for the expression of these behaviors. It has been further hypothesized that it is the behavioral organization or the quality of the attachment relationship that endures beyond infancy between the child and his/her mother (Ainsworth et al., 1978; Sroufe & Waters, 1977), while discrete behaviors observed between dyadic partners may wax and wane over time. It has also been hypothesized (Ainsworth et al., 1978) that the quality of the attachment may be inferred from the patterns of behaviors that the child exhibits towards his/her mother. In particular, primary attention has been directed towards the organization of the child's behaviors

along a dimension of security-insecurity (Ainsworth, 1979). Security of attachment denotes the relative balance between the attachment (proximity and comfort-seeking) and exploratory behavioral systems (Ainsworth et al., 1978; Sroufe, 1985; Sroufe & Waters, 1977). The child's ability to appropriately move towards and away from his/her mother is implicit to the notion of secure attachment. By the end of the first year of life, the adaptive and secure infant-mother attachment relationship emerges, characterized by the infant's confidence in the availability and responsiveness of his/her caretaker.

The change in focus from an unidimensional linear construct of attachment to an organizational and qualitative construct such as that proposed by Ainsworth (1979) and Sroufe and Waters (1977) introduced a variety of measurement problems in its use. However, Ainsworth and her colleagues (Ainsworth et al., 1978; Ainsworth & Wittig, 1969) have suggested that the security of attachment dimension can be assessed through the observation of infant-mother interactions. In particular, security of attachment can be assessed through the examination of (1) the extent to which stress promotes a shift from predominant exploratory to predominant attachment behavior, and (2) the extent to which the infant employs his/her mother as a secure base from which to explore the environment (Ainsworth et al., 1978). Employing these criteria, Ainsworth and her associates (Ainsworth et al., 1978; Ainsworth & Wittig, 1969) developed a standardized laboratory procedure to examine the qualitative differences in the behavioral organization of the attachment relationship between the infant and mother.

This laboratory procedure, the Strange Situation, takes the infant through eight relatively brief (approximately three minutes each) episodes in an unfamiliar room with toys, a stranger, and two brief separations and reunions with the mother. The Strange Situation, as a standardized procedure, allows for the opportunity to assess the balance of exploration and attachment behaviors under a cumulative stress situation. Based upon the infant's responses to the differential environmental contingencies in the 20-minute laboratory session, Ainsworth has argued that individual differences in the quality of the infant-mother attachment can be assessed.

Utilizing multiple discriminant function analyses (see Ainsworth et al., 1978, for further details), Ainsworth et al. (1978) reported that the Strange Situation can differentiate three primary types of infant-mother attachment relationships based upon the organization of the child's attachment and exploratory behaviors exhibited during the procedure. The patterns of these behaviors are especially discernible from observation of the infants during the reunion episodes of the Strange Situation. Subsumed under each major classification are a number of subgroupings which reflect subtle behavioral variations within the larger classification. Ainsworth (1984) reported that while the eight subgroups contribute to the clinical understanding of the dynamics of the infant-mother relationship, the three primary classifications have proven to have more than adequate utility and meaningfulness for research purposes. Of the three primary classifications, two (Type A and C) denote insecure, or anxious patterns of infant-mother attachment. Type B represents a

secure, or adaptive, pattern of attachment. A brief description of the three major types of infant-mother attachment relationships follows:

Type B--Securely Attached: According to Ainsworth et al. (1978) the majority (66%) of white-middle-class American infants would be classified as Type B, or securely attached, on the basis of behaviors exhibited during the Strange Situation. Type B infants are characterized by their tendency to show heightened proximity and contact-seeking behaviors with their mothers during the reunion episodes of the Strange Situation. What separates this particular group of infants from their insecurely attached counterparts is that upon reunion with the mother, Type B infants respond with positive affect and sincere pleasure to the caretaker's return. Behaviorally, these infants are easily comforted with physical contact upon reunion with the mother and often resume exploratory and/or play activity in the presence of the mother following separation. In addition, Type B infants tend to exhibit fewer attachment behaviors toward their mothers during the nonstressful preseparation episode of the standardized procedure than do their insecurely attached counterparts, preferring to explore the novel environment in the presence of their mothers.

Type A--Anxious/Avoidant: Ainsworth et al. (1978) have suggested that approximately 25% of the white, middle-class American infant population would be classified as anxious/avoidant in their attachment to their mothers, according to ratings obtained through the Strange Situation. Infants classified as Type A are conspicuous

in their avoidance of their mothers during the reunion episodes of the laboratory procedure, often either ignoring them completely, or mixing proximity-seeking behaviors with avoidance. Avoidance may be inferred when the infant turns away from the mother, looks away, or attempts only half-heartedly to obtain contact following the separation. What is especially noteworthy about these infants is that they respond to the stranger in an equal or even more positive manner than they respond to their own mothers. Ainsworth (1984) suggested that the underlying disturbance in the infant-mother relationship is often overlooked because of the independent and socially competent presentation of these infants. In particular, these children are often praised for their autonomous and self-sufficient behaviors. However, Ainsworth hypothesized that, in fact, these infants do not have a positive affective relationship with their mothers and have developed these behaviors of independence and self-sufficiency as a defensive reaction to a history of frustrating separations and reunions with their own mothers. Ainsworth et al. (1978) postulated that these children have attempted to defend against their feelings of maternal rejection and abandonment by "displacing" their negative affects through active, often solitary, manipulations of objects in the environment. In addition, they are likely to show little affective differentiation among people in their environment.

Type C--Anxious/Resistant (or Ambivalent): Ainsworth et al. (1978) suggested that approximately 10% of the white, middle-class American infant population would be rated as anxious/resistant, on the basis of behaviors exhibited during the Strange Situation. Type C

infants are characterized by their simultaneous exhibition of contact-seeking and proximity-seeking behaviors as well as evident resistance in their interactions with their mothers during the reunion episodes of the laboratory procedure. In addition, these infants do not appear to be readily comforted by physical contact from their mothers upon reunion. During the preseparation episodes of the Strange Situation, Type C infants exhibit the least amount of exploratory behavior in the presence of their mothers. Rather, they tend to "hover" around their mothers, attempting to maintain frequent physical and/or visual contact with them. In essence, these infants appear fearful that their mothers will leave them if contact is not maintained. However, at the same time, these infants also appear to resist physical contact and often break off such contact through angry pushing, shoving, squirming, and, at times, hitting. There is an "approach-avoid" quality which characterizes their interactions with their mothers.

Although Ainsworth (1979, 1984) suggested that the Strange Situation provides reliable classification of the quality of the infant-mother attachment relationship, her own work lacked empirical validation to support this claim. Subsequent research, however, has investigated the psychometric properties of the Strange Situation as an assessment measure of the quality of the infant-mother attachment relationship (Sroufe & Waters, 1977; Thompson, Lamb, & Estes, 1982; Vaughn, Egeland, Sroufe, & Waters, 1979; Waters, 1978).

Sroufe and Waters (1977) examined the interrater reliability of the Strange Situation. They reported that when trained raters were asked to classify 70 infants according to the criteria

established by Ainsworth and her colleagues (1978), interrater reliability was calculated to be 0.94 for the three primary attachment categories (A,B, and C). Interrater reliability for the eight subgroups was 0.88. On the basis of these data, Sroufe & Waters concluded that the Strange Situation, as an assessment of the quality of the infant-mother attachment relationship, possessed interrater reliability. Subsequent research (Antonucci & Leavitt, 1984; Joffe & Vaughn, 1982) has reported interrater reliability for the three primary attachment classifications ranging from 0.88 to 1.00, thus supporting Sroufe and Waters' conclusion regarding the interrater reliability of the Strange Situation.

Other research has focused upon the assessment of the stability of attachment ratings obtained from the Strange Situation. Waters (1980) classified 50 infants according to the Strange Situation at both 12 and 18 months. He reported that 48 of these infants (96%) obtained the same attachment classification at both times. On the basis of these data, Waters concluded that the Strange Situation classifications of attachment possessed temporal stability and reflected stable individual differences in the organization of the infant's attachment to his/her mother. Connell (1976) and Main and Weston (1981) have reported similar results, indicating correlations between 12 and 18 month attachment classifications ranging from 0.73 - 0.86. Moreover, Main, Kaplan, and Cassidy (1985) have reported a strong relationship ($r = 0.76$) between quality of attachment ratings obtained through the Strange Situation at one year of age and a Strange Situation analogue obtained at six years of age.

Other research on the temporal stability of the Strange Situation classifications has not been so overwhelmingly conclusive and has suggested that the quality of the infant-mother attachment relationship may be influenced by environmental and/or dyadic changes over time. Vaughn et al. (1979), in an investigation of the temporal stability of attachment classifications between 12 and 18 months, reported that only 62 out of 100 infants in an economically disadvantaged sample obtained the same attachment classification at both assessments. However, in analyzing their results, Vaughn and his colleagues discovered that the mothers of the infants originally classified as securely attached at 12 months and subsequently rated as insecurely attached at 18 months, reported significantly higher levels of stress than did mothers of infants who had obtained the same attachment classification at both assessments. Similarly, Thompson et al. (1982) reported that only 23 of 43 (53%) infants classified according to the Strange Situation obtained the same attachment classification at both 12 and 18 months. These findings corresponded closely with those reported by Vaughn et al. (1979). Once again, the shift in the attachment classification ratings from secure to insecure was mediated by an increase in family stress, most often associated with maternal employment and nonmaternal caretaking. However, in Thompson et al.'s sample, shifts from an initial attachment classification of insecure to a later rating of secure were not accompanied by an appreciable decrease in the level of family stress reported by the mother. Research with infants suffering from maltreatment in the home (Egeland & Sroufe, 1981; Schneider-Rosen, Braunwald, Carlson, &

Cicchetti, 1985) has indicated that the quality of the infant-mother attachment deteriorates between assessments obtained at 12 and 18 months, with concomitant decreases in the child's overall social-emotional development.

What are the implications of these discrepant findings for evaluating the stability of the attachment classifications obtained through assessment by the Strange Situation? Ainsworth (1984) has argued that these data demonstrating only modest evidence of the temporal stability of the attachment classifications do not invalidate the measure. Rather, she contends that such data strengthen the claim that the attachment classification is a sensitive measure of both the quality of the interactional history of the dyad, as well as the quality of the current dyadic relationship. Ainsworth hypothesized that environmental and emotional stress can serve to adversely affect the quality of the mother's interactions with the child. This change, in turn, can directly affect the child's developing representation of the mother, as well as contribute to the reorganization of the quality or pattern of the attachment relationship. Ainsworth argues that the attachment classifications obtained through assessment by the Strange Situation sensitively reflect the affective relationship between child and mother. Given a relative amount of stability in the environment, it is likely that the affectional relationship between the dyadic members will remain consistent over time. However, in the case of environmental flux and disorganization, it is possible that the affectional bond between the child and mother will reflect these changes. Thus, the instability of the attachment classifications is

not a function of a poor assessment measure; rather, it is an accurate barometer of the affectional environment in which the dyad is located at the time of assessment. However, it has not been determined at this time whether these changes in the pattern of the infant-mother attachment relationships are enduring and irrevocable given a period of environmental stability and reorganization (Bretherton, 1985). Additional research in this area is needed before conclusions about the reversibility of attachment classifications can be made with certitude.

Campos et al. (1983) have offered an additional interpretation of the observed instability of classifications derived from the Strange Situation to account for changes in the infant's quality of attachment to his/her mother when shifts occur from an initial rating of insecure to a subsequent rating of secure. They suggested that such a change may reflect the "self-righting" (Sameroff & Chandler, 1975) principle of human adaptation, through which the infant experiences a greater sense of security and control in his/her interactions with the caretaker. This experiential sense of security does not necessarily result from adaptive changes made by the caretaker. Rather, it may be a product of the child's increasing cognitive and social skills which facilitates his/her adaptation to maternal needs and expectations. Because of the child's ability to adapt to external demands, what once was chaotic and insensitive caretaking becomes more predictable, and thus, less anxiety-provoking. Following this argument, the change in the attachment classification may reflect the child's increasing ability to master and control his/her environment through

adaptation.

In summary, the data suggest that the attachment classifications obtained from the Strange Situation are sensitive measures of both the interactional history of the dyad as well as serve as a barometer of the current affective relationship between the infant and the mother. As such, these ratings may be thought of as "snapshots" of the unfolding dynamic interactional process between dyadic partners. Instability between assessments of the infant-mother attachment relationship are related to the dynamic affective shifts which may characterize the dyad, and are not necessarily a function of the assessment measure itself. Thus, research demonstrating only moderate support for the stability of attachment classifications across time periods marked by family discord does not invalidate the measure, but rather, highlights the dynamic nature of the phenomenon under consideration. Additional research examining the nature of these affective shifts within the infant-mother relationship is needed in order to better understand the continuities of developmental processes. At the present time, however, focus of empirical study in the area of attachment has been directed towards determining the relationship between quality of infant-mother attachment and subsequent developmental outcomes in order to better specify continuity in individual development (Belsky & Isabella, in press; Sroufe, 1979).

Developmental Consequences of Attachment

The primary focus of empirical research in the area of the infant-mother attachment relationship has examined the relationship between quality of the attachment and subsequent functioning. In

particular, the vast majority of the research in this areas has investigated the relationship between attachment classification and later cognitive and social-emotional development.

Although attachment theory does not predict differences in cognitive performance and academic performance per se, it does suggest that individual differences in the organization and style of cognitive performance should be associated with the quality of the infant-mother attachment (Campos et al., 1983). Main (1973) examined the relationship between the quality of the infant-mother attachment and cognitive performance, as measured by the Mental Scale of the Bayley Scales of Infant Development, assessed at 21 months. She reported a significant difference in performance between the securely and insecurely attached infants, as classified according to the Strange Situation at twelve months, with securely attached infants achieving at higher levels. In addition, Main reported that the securely attached infants exhibited longer attention spans and more positive affect than did their insecurely attached counterparts.

Although Matas, Arend, and Sroufe (1978) were unable to replicate Main's findings, their research indicated a relationship between the quality of the infant-mother attachment, assessed at 18 months, and differences in problem-solving strategies, assessed at 24 months. They reported that securely and insecurely attached infants differed significantly on a variety of important behaviors involved in the completion of a series of three problem-solving situations. These behaviors included such characteristics as enthusiasm in approach, positive and negative affect displayed, frustration tolerance, time

spent in non-involvement with the task, and compliance with the mother, who was present for the procedure. Securely attached infants were found to be both more effective problem-solvers than their insecurely attached counterparts, as well as more likely to exhibit adaptive and socially appropriate behaviors during the situation.

Research has also examined the relationship between the quality of the infant-mother attachment and subsequent social-emotional development and personality functioning. Londerville & Main (1981) reported a significant relationship between attachment classification at twelve months and measures of child compliance and cooperation with their mothers at 21 months. In general, their findings have suggested that securely attached infants tended to exhibit more positive and developmentally appropriate interactions with their mothers during structured and free play activities than did insecurely attached infants. Subsequent research (Erikson & Crichton, 1981; Maslin & Bates, 1983; Sroufe & Rosenberg, 1982) reported similar relationships between the quality of infant-mother attachment and later indices of compliance and cooperation with the mother. Extending the hypothesis that securely attached infants are more likely to engage in socially appropriate and adaptive behaviors, Pastor (1981) examined the relationship between the quality of the infant-mother attachment and subsequent peer sociability. He reported that infants who had been assessed as securely attached to their mothers at 18 months of age exhibited more socially responsive behaviors towards peers than did the insecurely attached group, when observed in a free play situation between the ages of 20 and 23 months.

Sroufe (1983) examined the relationship between the quality of the infant-mother attachment and subsequent personality functioning. He reported that a follow-up study involving 39 four-year-old children, originally assessed by means of the Strange Situation between the ages of 12 and 18 months, indicated that the children who had been classified as securely attached were rated by teachers as more confident, popular, independent, and emphatic to peers than were children who had been classified as insecurely attached. In addition, the insecurely attached children exhibited differential patterns of maladaptive behaviors with peers. Children who had been previously rated as anxious/resistant, according to behaviors exhibited in the Strange Situation, showed greater social incompetence than did the children rated as anxious/avoidant. This latter group characteristically interacted with peers in a hostile or distant manner. Moreover, the anxious/avoidant children were less likely to seek out teacher support or aid when injured, frustrated, or disappointed in interactions with peers. On the other hand, those children rated as anxious/resistant exhibited greater dependency towards the teacher, often hovering at a near distance. Both these observed patterns of maladaptive social behavior reflect important behavioral dimensions of the original attachment classifications. Similarly, Waters, Wippman, and Sroufe (1979) demonstrated a relationship between quality of attachment, assessed at 15 months, and the level of social competence with peers, assessed at 3½ years of age. The results indicated that children who had been classified as securely attached to their mothers exhibited more leadership, friendliness, and social involvement with peers than did their

insecurely attached counterparts.

In summary, there is strong and compelling data to support the claim that there is a relationship between the quality of the infant-mother attachment relationship, assessed at 12 to 18 months, and subsequent developmental outcomes (Lamb, Thompson, Gardner, Churuv, & Estes, 1984; Bretherton, 1985). These data suggest that the child's first affective relationship with his/her mother holds important implications for how the child will feel about himself/herself as well as the type of expectations he/she will have for the encompassing social environment.

Antecedents of Attachment

Despite compelling evidence suggesting that the quality of the infant-mother attachment is associated with the quality of developmental outcomes, systematic attention has only recently been directed towards specifying the antecedents of this affective relationship. Part of the reason for this discrepancy may be a result of Ainsworth's (1973, 1984) emphasis on the importance of the role that the mother plays in the development of the attachment relationship. Indeed, Ainsworth suggested that the level of maternal sensitivity and responsiveness to her child's behaviors may be the single most important determinant of the quality of the attachment relationship. Evidence supporting this conclusion was obtained from a longitudinal study of 23 infant-mother dyads during the first year of life (Ainsworth et al., 1978). Repeated home observations indicated that maternal sensitivity to the infant's signals during feeding, physical contact, face-to-face interactions, and episodes of distress was associated with the quality

of the infant-mother attachment relationship assessed at twelve months. Overall, the data suggested that the mothers of securely attached infants were more affectionate, engaged in more frequent physical contact and face-to-face interaction with their children, and were better able to assess their children's needs than were the mothers of the insecurely attached infants.

Ainsworth et al. (1978) also reported that certain patterns of maternal behavior were found to differentiate between types of insecure infant-mother attachment. From their observations, they concluded that mothers of avoidant infants (Group A) were more likely to express controlled anger towards their children, as well as interfere with the children's attempts to exhibit autonomous and independent behavior. These mothers also tended to reject attempts at physical contact initiated by their children. On the other hand, mothers of resistant infants (Group C) were more likely to present themselves as insensitive to their infants' needs, but did not appear rejecting and controlling as did the mothers of avoidance infants.

Subsequent research has supported Ainsworth et al.'s (1978) statement that maternal behaviors during the first year of life are significantly associated with the quality of the infant-mother attachment. Crockenberg (1981) reported that mothers who responded quickly to signals of distress from their infants were likely to have children, who at the age of one year, exhibited more proximity-seeking behaviors and less resistant behavior in the Strange Situation than did mothers who did not readily respond to such signals. Similarly, Belsky, Taylor, and Rovine (1984) reported that differential levels of maternal

stimulation of the infant were associated with differential patterns of infant-mother attachment. They reported that high levels of maternal stimulation were related to avoidant (Group A) attachment relationships, while too little stimulation was associated with resistant (Group C) attachment. Belsky et al. concluded that there is an optimal moderate level of maternal stimulation, reflecting sensitive caretaking, which facilitates the development of a secure infant-mother attachment.

Examining maternal behaviors at six months, Maslin and Bates (1983) reported a relationship between level of affectionate physical contact between infant and mother, with higher levels of contact associated with secure attachment. Cross-cultural studies have suggested a similar relationship between maternal behaviors during the first year and attachment outcome. Grossman, Grossman, Spangler, Suess, and Unzer (1985) reported that assessments of maternal sensitivity at two and six months were associated with the quality of the subsequent attachment. In general, they observed that the infants of sensitive mothers cried less, engaged in more physical contact, and were more readily soothed by their mothers than were infants of mothers who exhibited less sensitivity. Miyake, Chen, and Campos (1985) reported that Japanese infants, assessed as securely attached by means of the Strange Situation at twelve months, had mothers who exhibited significantly less intrusive behaviors towards them than did their insecurely attached counterparts.

Other research, however, has failed to demonstrate this relationship between maternal behaviors during the first year of life and attachment outcome. Egeland and Farber (1984) reported no

differences between mothers of securely and insecurely attached infants in terms of quality of physical contact and positive regard for the infant as assessed during observations of three- and six-month feeding episodes, nor in the amount of reciprocity observed in a standardized play episode at six months. Similarly, Miyake et al. (1985) reported no differences in responsivity and amount of physical contact between mothers of secure and insecure infants. Such data is not consistent with the notion of a relationship between maternal behavior and quality of attachment outcome. These discrepant findings have led some researchers to conclude that there is little relationship between maternal behaviors and attachment outcome (Lamb et al., 1984) or turn to an examination of possible infant characteristics and behaviors which might be associated with the quality of attachment. In particular, recent empirical study has focused upon the relationship between infant temperament and attachment outcome. In general, the findings have been mixed (Bretherton, 1985). Research examining the effects of infant temperament, as assessed by maternal report (Belsky et al., 1984; Egeland & Farber, 1984; Maslin & Bates, 1983) have reported no relationship between infant temperament and quality of the infant-mother attachment relationship. However, examinations of this proposed relationship employing behavioral assessments of the child have produced interesting results. In particular, there appears to be a relationship between early infant behaviors and characteristics and the development of resistant attachment. Connell (1976) reported a significant relationship between low Apgar scores and birth weight and the development of resistant infant-mother attachment. Similarly,

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Waters, Vaughn, and Egeland (1980) reported a significant relationship between 5-minute Apgar scores and Brazelton Neonatal Assessment Scale (NBAS) ratings at seven days and subsequent Group C attachment classifications. The results indicated that low Apgar scores and increased ratings of irritability, as assessed by the NBAS, were associated with resistant attachment at twelve months. Though promising, research at this time has failed to demonstrate strong "main effects" (Belsky & Isabella, in press) between infant characteristics and behaviors and the quality of the infant-mother relationship.

In summary, research examining the antecedents of infant-mother attachment has emphasized the relationship between maternal characteristics and behaviors and the quality of the dyadic bond. In particular, the data suggest a strong association between maternal sensitivity and the development of a secure attachment relationship (Belsky & Isabella, in press). However, inconsistent and contradictory findings have also been reported and greater attention has been directed towards investigating the infant's contribution to the developing affective bond. Such research is consistent with contemporary developmental theory which emphasizes the transactional nature of the infant-mother relationship (Bell, 1979; Sameroff & Chandler, 1975). Though limited, the findings have suggested a relationship between infant temperament and the development of anxious/resistant patterns of attachment. It is evident that additional research is needed to delineate those aspects of the infant-mother system which influence the developmental course of the affectional bond between child and mother.

Statement of Problem and Hypotheses

Attachment theory has provided the single most comprehensive framework for the study of early human social development. As a theoretical model, it offers a descriptive overview of the developmental course of the affectional tie that characterizes the infant-mother relationship, as well as generates specific hypotheses regarding developmental outcomes associated with the quality of this affective bond. In addition, the model has organized the empirical study of the infant-mother relationship, particularly as it influences cognitive, social, and emotional development. Contemporary research in the area has argued persuasively for the position that the quality of the dyadic attachment relationship is strongly associated with the quality of subsequent developmental outcomes.

Given the nature of the proposed relationship between attachment and subsequent cognitive and social-emotional functioning, it becomes imperative to delineate the antecedents of a secure affectional bond between child and mother. Knowledge of these antecedents would contribute greatly to both developmental theory and clinical intervention efforts designed to maximize optimal developmental outcomes. At the present time, knowledge of the maternal and infant antecedents of secure attachment is neither systematic nor comprehensive. Cognizant of this state of incomplete knowledge, the current study was designed to address this very issue. The purpose of this study was to specify those aspects of the infant-mother system that are most associated with the development of a secure attachment. Consistent with past research in the area, relevant maternal and infant behaviors and

characteristics were assessed in order to determine the significance of their independent contributions to the development of a secure dyadic attachment. However, unlike past research, the current study also examined the possible interactive effects between infant and maternal behaviors and characteristics as they may impact upon subsequent development of the attachment relationship. The focus of this investigation was directed towards the identification of the interactional processes which occur between the child and his/her mother; to look at either member of the dyad in isolation, apart from the other, offers only an incomplete picture of the developmental social processes which occur. The current study was designed to examine the dynamic interface between the child and his/her mother as they change and develop within the dyad as a result of mutual adaptation and transaction which occurs over time (Sameroff & Chandler, 1975).

In order to investigate the antecedents of attachment, the infant-mother system must be examined at a point prior to the development of a stable affective dyadic bond. Ainsworth et al. (1978) hypothesized that the formation of the infant-mother attachment relationship occurs during the fourth quarter of the child's first year. With this in mind, attention was directed towards assessment of the infant-mother system at six months. This particular observational point was chosen for a variety of theoretically important reasons. First, Ainsworth et al. (1978) hypothesized that by the infant's sixth month, he/she has typically developed a characteristic style of interaction with the mother that remains relatively stable over time. This stability is important for the accurate and reliable assessment of

both infant and maternal variables. Second, developmental theories (Mahler, Pine, & Bergan, 1975; Piaget, 1954) have suggested that around the sixth month, important cognitive and psychological developments occur which hold important implications for the organization of the child's relationship with his/her mother. Finally, it was assumed that there will be an observable relationship between third and fourth quarter infant-mother interactions that will facilitate the identification of subtle relationships and continuities in behavior over the course of the developmental process (Sroufe, 1979).

In order to assess the infant of early maternal and infant variables upon the development of the dyadic attachment relationship, a number of theoretically important behaviors and characteristics were sampled. Due to the exploratory nature of the current study, potentially relevant variables were obtained through extrapolation from the literature on the infant-mother relationship (Osofsky & Connors, 1979). Maternal variables included age, level of education, work status, parity, and perceptions about one's own child as well as children in general. In addition, a number of interactive variables were examined and these included visual regard, touch, smiling, and vocalization behaviors directed towards the child. Important infant variables included in the current study were temperament, developmental abilities, cognitive functioning, physical growth, state, and face-to-face interactive behaviors similar to those assessed for the mother. These maternal and infant variables were chosen as important representative components of the dyadic interactional system (Bates, Olson, Pettit, & Bayles, 1982).

Given the exploratory nature of this study, it was not evident which infant and maternal behaviors and characteristics independently and jointly would be most predictive of quality of the dyadic attachment relationship. As a result, the variables under consideration were subjected to factor analytic procedures in order to assess possible underlying relationships between the variables. Factor analysis is a statistical procedure which allows for the identification of underlying dimensions, or factors, that characterize the data. The identification of such factors allows for both a reduction in the number of variables as well as combines interrelated variables into meaningful units that possess more reliability and stability than the original discrete measures of behavior (Cohen & Cohen, 1975). It was assumed that the factors emerging from these analyses would represent stable constellations of maternal and infant behaviors and characteristics which would be descriptive of the dyadic interactional system.

Having identified the salient components of the infant-mother system, the current study sought to investigate the relationship between the infant and maternal behaviors and characteristics, assessed at six months, and the quality of the dyadic attachment, assessed at twelve months. In other words, the goal of the study was to specify those constellations of infant and maternal behaviors and characteristics that were most predictive of attachment outcome. Both the behaviors and characteristics of the individual members of the dyad, as well as the possible interaction between these variables, were examined. Three hypotheses served to organize this study. First, consistent with past research, it was hypothesized that there is an

identifiable constellation of maternal behaviors and characteristics that is associated with the quality of the infant-mother attachment relationship. It was expected that this particular constellation would reflect a dimension of sensitivity and/or responsivity to the child's needs. Second, it was hypothesized that there is not an identifiable constellation of infant behaviors and characteristics that is associated with the quality of the infant-mother attachment relationship. This hypothesis is consistent with Belsky & Isabella's (in press) argument that research has not demonstrated a "main effects" relationship between infant variables and quality of dyadic attachment. Third, it was hypothesized that there is an identifiable constellation of infant and maternal behaviors and characteristics that is associated with the quality of the infant-mother attachment relationship. This hypothesis is consistent with the transactional model of Sameroff & Chandler (1975) and emphasizes the continual process of change and adaptation which characterizes the dyadic interaction. It is expected that knowledge of the interaction between infant and maternal behaviors and characteristics would provide the most comprehensive knowledge of the dyadic system, facilitating observation of the dynamic processes which underlie the affective relationship. Such knowledge of the possible interactive relationship that exists between dyadic partners should increase our ability to understand better the developmental course of the child as well as allow for more precise prediction of developmental outcome.

CHAPTER III

METHOD

Subjects

A total of 32 infant-mother dyads participated in the current study, which was part of a larger longitudinal study of early childhood development conducted under the joint auspices of the Evanston Hospital, Evanston, Illinois, and Loyola University of Chicago. Parents were recruited from the nurseries of the Evanston Hospital for their participation in the longitudinal study. In conjunction with this project, a variety of physical, cognitive, and social-emotional assessments were obtained on both the infant and parental participants at birth, 2, 4, 6, 9, 12, 18, 39, 60, and 70 months of age. The present investigation included assessments obtained at six and twelve months. Complete data at both the six- and twelve-month assessments were available for 32 of the infant-mother dyads.

All of the infants included in the study (16 males and 16 females) were from intact middle-class families, had received appropriate prenatal care, and exhibited no evidence of damage to the central nervous system at time of birth. The infants selected for participation in the longitudinal study systematically differed in terms of length of gestation, length of hospitalization, and severity of perinatal complications. This particular sample was chosen in order

to maximize individual differences among the infants which might contribute to differential outcomes in development. The infants were classified as either High-Risk or Low-Risk according to the following criteria:

High-Risk--High-risk infants were of two types, based upon length of gestation and severity of perinatal medical complications assessed at time of birth. The two groups included:

- (1) Infants determined to be short-gestation infants as assessed by the Dubowitz assessment (1970) and who exhibited some degree of postnatal medical problems secondary to their prematurity and were hospitalized in the Intensive Care Nursery (ICN) for a minimum of six days ($N = 11$); or
- (2) Full-term infants with a gestational age of at least 37 weeks who exhibited some degree of postnatal medical complication which necessitated hospitalization in the ICN for a minimum of six days ($N = 3$). These infants are often assumed to be "at-risk" for subsequent developmental and/or psychological problems (Divitto & Goldberg, 1979) due to atypical physiological and environmental factors believed to affect the ongoing developmental process. In other words, because of atypical early experiences resulting from medical illness and the associated hospitalization and parental separation which often accompanies such perinatal complications, these infants are hypothesized to exhibit differences in developmental outcomes. As such, these differences between infants might affect the quality of the infant-mother attachment relationship, and thus were

examined in the contexts of the current study. A total of 14 infants (6 males and 8 females) were classified as High-Risk in accordance with these criteria.

Low-Risk--Infants were classified as Low-Risk if they were full-term gestational babies (at least 37 weeks) and exhibited no medical complications at time of birth. However, for one-third of this group ($N = 6$), maternal illness at time of birth necessitated hospitalization in the Newborn Nursery for a minimum of five days. The remaining infants ($N = 12$) were hospitalized for a minimum of two days following birth. The Low-Risk group was comprised of 18 infants (10 males and 8 females).

Table 1 provides descriptive information for all of the infants included in the sample at time of birth.

Mothers of the infants ranged in age (at time of infant's birth) from 20 to 35 years (mean age = 28.65, $SD = 2.93$). Approximately 90% of the mothers had completed two or more years of college. Sixty-five percent of the maternal sample had been employed full-time prior to the birth of the infant, and 50% of the mothers had returned to either part-time or full-time employment by the infant's sixth month. Seventy-five percent of the mothers in the sample were primiparous. Table 2 provides descriptive information about the maternal sample.

Procedure

At approximately 36 hours post-partum, the parents of infants selected for participation in the longitudinal study of early childhood

Table 1

Neonatal Characteristics of Infant Sample

<u>Sex</u>		
Total Sample:	Male	16
	Female	16
High Risk:	Male	6
	Female	8
Low Risk:	Male	10
	Female	8

<u>Birthweight</u>	<u>Mean</u>	<u>SD</u>
Total Sample:	2876.73 grams	521.45 grams
High Risk:	2263.93 grams	702.97 grams
Low Risk:	3488.33 grams	339.92 grams

<u>Gestational Age</u>		
Total Sample:	37.69 weeks	1.99 weeks
High Risk:	34.93 weeks	3.12 weeks
Low Risk:	40.44 weeks	.86 weeks

<u>Length of Hospitalization</u>		
Total Sample:	13.98 days	11.21 days
High Risk:	23.07 days	19.88 days
Low Risk:	4.89 days	2.54 days

<u>Obstetric Complication Score</u>		
Total Sample:	99.18	22.68
High Risk:	89.79	17.40
Low Risk:	108.56	27.96

Table 1 (continued)

<u>Birthweight</u>	<u>Mean</u>	<u>SD</u>
<u>Postnatal Complications Score</u>		
Total Sample:	121.33	17.56
High Risk:	85.79	21.91
Low Risk:	156.89	13.20

Table 2

Characteristics of the Maternal Sample

<u>AGE</u>		<u>M</u>	<u>SD</u>
Total Sample:	(<u>N</u> = 32)	28.63 yr.	2.93 yr.
High-Risk:	(<u>N</u> = 14)	28.64 yr.	3.50 yr.
Low-Risk:	(<u>N</u> = 18)	28.61 yr.	2.50 yr.

<u>EDUCATION</u>	H.S. only (%)	Some College/ Graduate (%)	Post-graduate Studies (%)
Total Sample:	9.4	56.3	34.4
High-Risk:	14.3	50.0	35.7
Low-Risk:	5.6	61.1	33.3

<u>PARITY</u>	First-Born (%)	Second-Born (%)
Total Sample:	75.0	25.0
High-Risk:	64.3	35.7
Low-Risk:	83.3	16.7

<u>EMPLOYMENT</u> (At Time of Birth)	Not Employed (%)	Part-Time (%)	Full-Time (%)
Total Sample:	12.5	3.1	84.4
High-Risk:	21.4	7.1	71.4
Low-Risk:	5.6	0.0	94.4

<u>RETURN TO EMPLOYMENT</u> (By Infant's 6th Month)	No/Did Not Return (%)	Part-Time (%)	Full-Time (%)
Total Sample:	50.0	40.6	9.4
High-Risk:	42.9	50.0	7.1
Low-Risk:	55.6	33.3	11.1

development were contacted by one of the principal investigators. At that time, they were informed about the longitudinal study, its purpose and nature, and the procedures. Parents who agreed to participate in the research signed appropriate consent forms. Because the purpose of the current study was to investigate the antecedents of the infant's attachment to his/her mother within the timeframe already described, only those assessments obtained at six and twelve months relevant to this question are discussed.

Each infant-mother dyad was contacted at six and twelve months of age (corrected for gestational age) for return visits to the Infant Development Laboratory at the Evanston Hospital. At the six-month follow-up visit, each mother was asked to complete several questionnaires regarding her child's social-emotional development. These included the Infant Temperament Scale and the Parental Perception Inventory, as well as a third questionnaire designed to elicit descriptive information about the infant and his/her family environment. In addition to these self-report measures, each infant was assessed by a trained examiner on a variety of physical, cognitive, and social-emotional measures. These assessments included the Denver Developmental Screening Test, a test of visual information processing, and a standard physical examination. Each infant-mother dyad was also asked to participate in a standardized interactional sequence which was videotaped for subsequent observation and rating. At the twelve-month visit, a videotaped recording of the Strange Situation, a standardized laboratory procedure which assesses the quality of the infant's attachment to his/her mother, was obtained for each dyad, in addition

to other cognitive and social-emotional assessments. The Strange Situation was employed as the outcome measure for this study.

A more detailed description of the assessment measures follows.

Assessment Measures

Infant

Developmental abilities: In order to assess individual differences among the infant in developmental abilities, the Denver Developmental Screening Test (DDST) (Frankenburg & Dodds, 1977) was administered at six months by an experienced examiner to all of the infant subjects. Designed primarily as a screening device for the assessment of the developmental progress of infants and preschool children, the DDST evaluates four areas of development: (1) personal-social development, (2) fine motor-adaptive development, (3) language development, and (4) gross-motor development. Examples of items relevant to the assessment of a six-month-old infant include:

Smiles spontaneously. (Personal-social domain)

Sits, takes two cubes. (Fine motor-adaptive domain)

Turns to a voice. (Language domain)

Pulls to sit, no head lag. (Gross-motor domain)

For each item tested, the examiner evaluates the best of three attempts on the item (as needed) and scores the child's performance as Pass, Fail, or Refuse. Four scores corresponding to the four areas of developmental abilities assessed by the DDST were obtained for each infant by summing the number of items passed in each behavioral domain.

Frankenburg and Dodds (1977) have reported standardization, reliability, and validity data for the DDST.

Physical growth: In order to assess individual differences among the infants in physical development, a "physical growth" variable was computed from information obtained from routine physical examinations administered to all of the infants at six months. Norms developed by the National Center for Health Statistics (1976) were used to determine appropriate physical growth in terms of length, weight, and head circumference. Infants were judged to have attained appropriate physical development on each dimension if his/her measurement fell within a range from at or above the 5th percentile through the 95th percentile as determined by the national norms for six-month-old male and female infants. The physical growth variable was a summary variable comprised of the three independent physical measurements obtained. The range for this variable was from 0 (which represented atypical development on all three physical dimensions) to 3 (which represented normative development in all three areas).

Temperament: In order to assess individual differences among the infants in temperament, or characteristic behavioral style, the Infant Temperament Questionnaire (ITQ) (Carey & McDevitt, 1978) was completed by each of the mothers in the study at six months. The ITQ is a standardized parent-report which assesses both infant temperament and parental perceptions of these characteristics. It consists of 70 items relating to a variety of infant behaviors which are evaluated on a three-point scale. These items are arranged so as to yield nine temperamental scales (see scoring manual of Carey & McDevitt, 1978), ordered so that high values are associated with the positive or more adaptive end of the behavioral domain, while low values are associated

with the negative or more worrisome end of the continuum. These nine scales include:

Activity Level: This scale describes the level, tempo, and frequency of the motoric components present in the child's daily functioning and is rated on a continuum from low to high. A representative item would state: The infant plays actively with parents--much movement of arms, legs, and body.

Rhythmicity: This scale describes the degree of rhythmicity or regularity of the child's repetitive biological functions, and is rated on a continuum from arrhythmic to very rhythmic. A representative item would state: The infant wants and takes milk feedings at about the same time (within one hour) from day to day.

Approach/Withdrawal: This scale describes the child's initial reaction to any new stimulus, and is rated on a continuum from withdrawal to approach. A representative item would state: For the first few minutes in a new place or situation (new store or home) the infant is fretful.

Adaptability: This scale describes the ease with which the child's behaviors or responses to external stimuli can be modified in the direction desired by the parents, and is scored on a continuum from slowly adaptive to very adaptive. A representative item would state: The infant accepts regular procedures (hair brushing, face washing, etc.) any time without protest.

Intensity of Reaction: This scale describes the energy content of the child's responses, regardless of direction, and is scored on a continuum from mild to intense. A representative item would state: The infant reacts strongly to foods, whether positively (smacks, laughs, squeals) or negatively (cries).

Quality of Mood: This scale describes the amount of pleasant versus unpleasant behaviors exhibited by the infant, and is rated on a continuum from unpleasant to pleasant. A representative item would state: The infant cries when left alone to play.

Persistence: This scale describes two related categories of behavior, attention span, the length of time an action is pursued, and persistence, the ability to maintain a particular activity in light of external obstacles. This scale is rated on a continuum from low persistence to high persistence. A representative item would state: The infant watches other children playing for under a minute and then looks elsewhere.

Distractibility: This scale describes the efficacy of extraneous stimuli in interfering with, or altering the direction of the child's behavior, and is rated on a continuum from low distractibility to high distractibility. A representative item would state: The infant stops play and watches when someone walks by.

Threshold of Responsivity: This scale describes the level of external stimulation necessary to elicit an observable response from the child, and is rated on a continuum from low to high. A representative item would state: The infant reacts to a disliked food even if it is mixed with a preferred one.

Visual information processing: In order to assess individual differences among the infants in visual information processing and cognitive processing, a paired preference test, analogous to Fagan's novelty design paradigm (1971, 1973) was administered to all of the infants at six months. Infants were exposed to a black and white drawing of a face for two minutes. Ten seconds later, the infants were exposed to two trials, each involving the pairing of the original stimulus with a similar, but novel, stimulus. Presentation of the three stimuli was counterbalanced so that each stimulus appeared an equal number of times as the original stimulus, as well as in the position of first and second novel stimulus. During each of the paired situations, the amount of time the infant looked at the novel stimulus was recorded and converted into the percentage of fixation time to the novel stimulus. The amount of fixation time to novel stimulus for Trials I and II was summed and a mean time of fixation to novel stimulus was computed. This value served as an index of visual preference for novel stimuli, a measure of visual information processing and cognitive functioning (Fagan, 1973).

Maternal

Descriptive data: In order to assess individual differences

among the mothers in the sample on important demographic characteristics, descriptive information was obtained through a self-report questionnaire completed at six months. Such information as age, education, occupation, and current work status was obtained. Mothers were also asked about their work status prior to the pregnancy as well as at what stage of the pregnancy the decision was made to leave work. Information relevant to feeding practices, family size, and plans for more children was also obtained.

Perceptions of child: In order to assess individual differences among mothers in their perceptions of their infants, each woman was asked to complete a Parental Perception Inventory. This questionnaire, similar in structure to the Neonatal Perception Inventory developed by Broussard and Hartner (1970), is comprised of ten behavioral and affective items that assess the parent's perceptions of his/her child and the average child. The items are rated on a seven-point semantic differential with the items arranged in such a manner that higher values are associated with the more positive or least worrisome end of the continuum. (See Appendix A for a copy of this assessment measure).

The Parental Perception Questionnaire yielded three scores. The first score represented the mother's overall impression of her child. This score was obtained by summing the ratings of her child on all ten of the items and computing a mean value. The second score was obtained by summing the mother's rating of the average child on the same ten items and computing a mean value for these ratings. The final score obtained from this assessment measure was a difference score which represented the mother's perceived difference between her child and the

average child. This score was obtained by taking the absolute value of the difference between ratings of her child and the average child.

Infant and Mother Interactional Behaviors

In order to assess differential patterns of interaction behaviors between infants and their mothers, a standardized interactional sequence was completed at six months by the participants in the study (Lausen, Reich, Holmes, & Gyurke, 1984). This particular sequence was designed to maximize experimental control of the social situation and facilitate the display of a wide range of interactional behavior.

Each of the infant-mother pairs was videotaped in the laboratory at the Evanston Hospital. The infant was seated in an upright position directly in front of his/her mother. In this position, each mother was requested to direct her child through an interactional sequence which began with no interaction, progressed through increasing amounts of mother-initiated interaction, and concluded with withdrawal by the mother. In total, the sequence consisted of eleven 30-second episodes. (See Appendix B for a complete description of the instructions given to the mothers for the different interactional episodes.) Mothers were able to both read the instructions for the sequence as well as receive instructions via an earphone throughout the actual procedure.

Each videotaped recording was subsequently coded by a trained rater. The interactional sequence was rated for the occurrence and duration of a series of predetermined social behaviors which included state, visual regard, reach/movement, facial expression, and vocalization. The state variable was rated on five dimensions--drowsy, alert

inactive, alert active, fussing, and crying. The visual regard variable was coded into two mutually exclusive categories, looking towards and looking away. Similarly, the reach/movement variable was coded into two categories, reach/move towards and reach/move away. The facial expression variable was coded as either smiling or not smiling. Finally, the vocalization variable was coded as positive, negative, or none. Thus, coding yielded 14 observable behaviors. These variables were coded in 4-second intervals (one 4-second interval = one epoch) for both the infant and the mother. Total duration of each behavior was computed by summing up the number of epochs in which the behavior occurred.

The infant and maternal behaviors were rated independently by one of four trained observers. Each videotape recording was initially scored for the infant's behaviors across the eleven episodes, and then recoded for the maternal behaviors. This precaution was taken to insure that the occurrence of one partner's behavior did not affect the rating of the other partner. Interrater reliability was obtained for six dyadic interactions selected at random. Reliability ranged from .83 (facial expression) to 1.00 (state) for the maternal variables. Reliability for the infant behaviors ranged from .70 (facial expression) to .81 (state and vocalization). Reliabilities for all of the dyadic behaviors have been reported elsewhere (Lausen et al., 1984).

Outcome

Attachment: In order to assess individual differences in the quality of the infant's attachment to her mother, the Strange Situation, a standardized laboratory procedure (Ainsworth et al., 1978),

was completed by the participants in the study. The Strange Situation was designed to assess differences in the quality of the infant's attachment to her primary caretaker by observation of the infant's progression through eight episodes involving a new environment, a stranger, and two brief separations from and reunions with the caretaker.

Each of the infant-mother dyads was videotaped in the Strange Situation at the laboratory at the Evanston Hospital when the infants were 12 months old (corrected for gestational age). The setting for this procedure was in accord with Ainsworth et al.'s (1978) directions. Each mother was given oral and written instructions about the standardized procedure. (See Appendix C for a complete description of the eight episodes comprising the Strange Situation.) This designated format was followed unless infant distress, as determined by the mother and/or experimenter, necessitated curtailing the procedure.

Each videotape recording of the Strange Situation was subsequently scored by a trained rater according to the system developed by Ainsworth and her colleagues (1973, 1978). According to this scoring system, each episode is observed in 15-second intervals. During these intervals, the infant's behaviors are coded for the frequency and duration of locomotion, hand movements (touching, grasping, or reaching), visual regard, vocalization, oral behavior (thumb sucking or sucking on an inanimate object), and smiling. In addition, the infant's level of activity and initiative in establishing interaction with her mother in each episode is rated along six dimensions: proximity and contact-seeking, contact-maintaining, avoidant behavior, resistant behavior,

and distance interaction. Together, these data yield a descriptive classification of the infant's attachment to his/her mother. There are three primary classifications of attachment behavior derived from the observational data--Avoidance (Group A), Secure (Group B), and Resistant (Group C). In qualitative terms, the Secure attachment classification is considered the most adaptive interactive pattern for the infant-mother relationship. The other two classifications denote insecure or maladaptive patterns of attachment. (See Appendix D for a more detailed discussion of the classifications derived from the analysis of the Strange Situation.)

The videotape recordings of the Strange Situation were coded by one of two experienced raters. Interrater reliability for the three primary attachment classifications--Avoidant, Secure, and Resistant--was computed for 15 infant-mother dyads selected at random.

Rater agreement was 92% for the three primary classification groups. Subclassifications were also assessed but were not employed in the present analyses due to the small number of infants falling into each of the eight subgroups. For this sample of infants, 24 (75%) were classified as securely attached. Of the remaining infants, 6 (19%) were classified as avoidant, while 2 (6%) were classified as resistant. These percentages are consistent with those reported for middle-class infant samples (Belsky & Isabella, in press). Because of the small number of resistant infants (Group C), they were not included in further statistical analyses. This decision to omit the Group C infants from further analyses was based on the fact that past research (Ainsworth et al., 1978; Belsky et al., 1984) has suggested that

Group A and Group C infants exhibit qualitatively different patterns of attachment with their mothers and that different etiological factors are involved. Thus, collapsing the two groups would be inappropriate. Subsequent analyses examined the antecedents of secure (Group B) and insecure/avoidant (Group A) infant-mother attachment.

CHAPTER IV

RESULTS

The data will be presented in three sections. First, a brief summary of the statistical analyses examining the homogeneity of the infant and maternal samples will be presented. Second, a description of the factor analytic procedures employed to reduce the number of infant and maternal variables under investigation through the identification of underlying dimensions, or factors, which characterize the data will be presented. The final section will present the regression analyses which examined the relationships between the empirically derived factors and the quality of infant-mother attachment. These analyses investigated the relationships between infant and maternal behaviors and characteristics and attachment outcome originally hypothesized in this study.

Subject Characteristics

In order to evaluate the homogeneity of both the infant and maternal samples, multiple t-tests were computed between High- versus Low-Risk groups. As noted previously, the infants included in the longitudinal study of early child development systematically differed in terms of length of gestation, length of hospitalization, and severity of perinatal medical complications. Despite the theoretical significance of these conditions upon early social-emotional development

(Field, Sostek, Goldberg, & Shuman, 1979), such conditions were not expected to account for significant groups differences in the quality of the infant-mother attachment relationship for this particular sample. This expectation is consistent with Sameroff and Chandler's (1975) transactional model which suggests that early perinatal risk factors may be minimized or maximized by environmental circumstances. Sameroff and Chandler (1975) have hypothesized that environmental factors such as family constellation and socioeconomic class may help to dissipate the effects of early infant risk factors. Given the stability and socioeconomic class of the families in this sample, it was hypothesized that, by the six-month assessment, environmental circumstances have served to minimize the effects of the perinatal complications experienced by some of the infants in this sample. Similarly, in light of the transactional processes which were hypothesized to occur, mothers of High- versus Low-Risk infants should not demonstrate significant differences in behaviors or characteristics as a result of neonatal risk status. With this in mind, infants and mothers were divided into two groups--High- and Low-Risk--on the basis of criteria outlined in the Method section of this paper. T-tests were computed between the High- and Low-Risk infant and maternal groups on all of the variables under consideration in order to determine if perinatal risk factors were associated with differences in infant and maternal behaviors and characteristics between groups.

The results of these analyses for the infant sample are presented in Table 3. There were no significant differences between the High- and Low-Risk infants on any of the variables under investigation.

Table 3

Means, Standard Deviations, and T-Tests by High- Versus Low-RiskInfant Groups

VARIABLE ^a	High-Risk (N = 13)		Low-Risk (N = 17)		<u>t</u>	<u>p value</u> ^b
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Activity	1.50	0.42	1.59	0.23	-0.67	0.51 ^c
Rhythmicity	1.42	0.40	1.44	0.42	-0.20	0.84
Approach/Withdrawal	1.58	0.33	1.47	0.29	0.92	0.36
Adaptability	1.67	0.23	1.54	0.44	1.06	0.30 ^c
Intensity	0.86	0.20	0.94	0.30	-0.78	0.44
Threshold	0.91	0.30	0.97	0.38	-0.40	0.69
Mood	1.60	0.19	1.48	0.20	1.63	0.12
Distractibility	1.59	0.19	1.61	0.26	-0.30	0.76
Attention	1.21	0.31	1.18	0.35	0.26	0.80
Personal-Social	6.92	1.12	7.82	1.29	-2.01	0.06
Fine-Motor Skills	11.38	1.33	12.18	1.67	-1.40	0.17
Language	5.77	0.83	5.53	0.72	0.85	0.40
Gross-Motor Skills	8.92	1.44	9.47	1.63	-0.96	0.34
Vocalization to Mother	12.00	7.66	8.53	8.20	-1.20	0.14
Smiling to Mother	6.77	6.44	3.47	3.20	1.69	0.08 ^c
Reach to Mother	16.92	7.21	15.88	8.88	0.34	0.73
Looking to Mother	28.46	6.59	26.41	9.60	0.66	0.52
Alert	58.38	9.02	54.41	11.13	-0.44	0.14
Fuss ^d	6.85	8.47	8.76	7.85	-0.64	0.53
Cry ^d	0.77	2.77	2.59	5.22	-1.23	0.23 ^c
Physical Growth	2.23	0.93	2.76	0.44	-1.92	0.07 ^c
Novelty Preference	53.15	19.17	57.18	20.02	-0.58	0.58

^aVariables are coded so that the higher the score, the more adaptive or least worrisome is the behavior.

^bTwo-tailed test of significance

^cSeparate variance estimate

^dVariable is coded so that the higher the score the more negative or less adaptive the behavior.

Table 4 presents the results of the analyses for the maternal sample. There were no significant differences between the mothers of the High- versus Low-Risk infants on any of the antecedent variables under consideration in this study.

In conclusion, these results suggested that differences in quality of infant-mother attachment relationship were not a function of perinatal risk factors per se. Although such risk factors may interact with other infant and maternal behaviors and characteristics, they were not directly predictive of qualitative differences in attachment outcome.

Factor Analyses

In order to examine the interrelationships among the antecedent variables under investigation, as well as increase the efficacy of interpretation through data reduction, both infant and maternal variables were independently subjected to principle axis factoring (PAF), with varimax rotation.

Infant characteristics: Infant behaviors and characteristics, assessed at six months, were subjected to principle axis factoring (PAF), with varimax rotation. These variables included the nine temperamental scales from the Infant Temperament Questionnaire (Carey & McDevitt, 1978)--Activity, Rhythmicity, Approach/Withdrawal, Adaptability, Intensity of Reaction, Quality of Mood, Persistence, Distractibility, and Threshold of Responsivity, and the four developmental scales of the Denver Developmental Screening Test (Frankenburg & Dodds, 1977)--personal-social, development, fine motor-adaptive development, language development, and gross motor development. Face-to-face

Table 4

Means, Standard Deviations, and T-Tests by High- Versus Low-RiskMaternal Groups

VARIABLES	High-Risk (N = 13)		Low-Risk (N = 17)		t	p value ^a
	<u>M</u>	<u>SD</u>	<u>M</u>	<u>SD</u>		
Age	28.77	3.61	28.47	2.50	0.27	0.79
Level of Education	2.39	0.51	2.29	0.47	0.51	0.61
Employment	2.46	0.88	2.88	0.49	-1.56	0.14 ^b
Left Employment	3.92	1.71	3.71	0.37	0.37	0.72
Return Employment	1.08	0.28	1.12	0.33	-0.36	0.72
Number of Children	1.38	1.18	1.18	0.40	1.27	0.22
Perceptions of My Child ^c	5.24	0.56	5.28	0.66	-0.19	0.89
Perceptions of Average Child	4.57	0.62	4.66	0.63	-0.39	0.70
Difference Score ^d	0.87	0.60	0.62	0.52	1.20	0.24
Vocalization to Child	19.38	8.29	23.00	1.58	-1.34	0.19
Smiling to Child	28.31	7.05	23.41	9.13	1.60	0.37
Reaching to Child	22.92	15.12	22.65	14.70	0.05	0.96
Looking to Child	52.18	14.83	52.18	2.90	-1.02	0.33 ^b

^aTwo-tailed test of significant

^bSeparate variance estimate

^cVariable is coded so that the higher the score, the more positive the perception.

^dVariable is coded so that the lower the score, the less difference is perceived between "my child" and the "average child."

interactional behaviors with the mother, such as amount of time spent looking, smiling, vocalizing, and reaching, were included as were such state variables as alertness, crying, and fussing. Assessments of physical growth and preference for novelty were also included in the factor analysis. A total of five factors emerged and accounted for 57% of the total variance in the infant sample. Table 5 presents the results of the factor analysis of these variables.

Factor I, Malleability, accounted for 16% of the common variance in the analysis and was defined by the infant's level of adaptability, quality of mood, and fine motor-adaptive development. Fine motor-adaptive skills loaded negatively on this factor, while level of adaptability and quality of mood loaded positively. Infant Factor I presented a picture of an infant who was both adaptable and pleasant, although somewhat delayed in fine motor skills. It is suggested that such a child would be experienced in a positive way by his/her caretaker because the adaptable or malleable nature of the child would serve to facilitate cooperative social interaction with the caretaker.

The second factor, Irritability, accounted for 16% of the common variance in the infant sample and was defined by high levels of crying and low levels of alertness. The combination of these two types of behaviors suggested that infant Factor II characterized those behavioral patterns which might adversely affect the quality of the infant-caretaker interactions due to the child's irritability and low levels of alertness.

Factor III, Robust and Responsive, accounted for 11% of the common variance in the infant sample. It loaded positively on activity,

intensity of reaction, and physical growth and negatively on distractibility. This factor presented an infant who was physically robust and capable of sustained attention and responsivity to the environment. Such a constellation of behaviors would facilitate social interactions between the child and his/her caretaker.

Factor IV, Social, loaded primarily on the language and personal-social development scales of the DDST and accounted for 8% of the common variance. This factor presented a picture of an infant who possessed the verbal skills necessary to initiate and respond to individuals in his/her environment as well as exhibited a repertoire of socially responsive behaviors. As such, Factor IV identified another constellation of infant behaviors likely to facilitate infant-caretaker interaction in a positive fashion.

The final factor, Positive and Persistent, accounted for 7% of the variance and was defined by high levels of smiling behavior and persistence in activity. Factor V represented a constellation of infant behaviors which was characterized by positive affect and persistence. Such a pattern of behaviors would be likely to facilitate social interaction with others, particularly in situations requiring sustained attention or persistence.

Maternal variables: Both the descriptive data on the mothers in the sample, as well as the maternal variables assessed at six months, were subjects to principle axis factoring (PAF), with varimax rotation. Descriptive data included maternal age at time of child's birth, work status prior to time of child's birth, when she returned to work following the birth of the child, and parity. Maternal perceptions of

her child, the average child, and differences in perceptions between own child and the average child were included in the analysis. In addition, face-to-face interactional behaviors between mother and child, including amounts of smiling, looking, reaching, and vocalizing were examined. A total of four factors emerged and accounted for 56% of the total variance in the maternal sample. Table 6 presents the factor analysis of these variables.

The first maternal factor, Stimulation, accounted for 22% of the common variance in the maternal sample and was defined by high levels of maternal vocalizing, smiling, and reaching, as assessed through the face-to-face interactional sequence. This factor portrayed a constellation of maternal behaviors that appeared directed towards eliciting and/or responding to social behaviors from the infant. Based on the assumption that the mother is the more competent and goal-directed member of the dyad (Stern, 1977), it is suggested that these behaviors are directed towards eliciting responses from the child. This interpretation of the data emphasizes the mother's efforts to initiate and sustain interaction with her child through such social behaviors as smiling, reaching, and vocalizing.

Factor II, Perceptions of Own Child, accounted for 16% of the common variance in the maternal sample. This factor was defined by a single variable, Perceptions of My Child, and appeared to reflect an overall valuation of the child by his/her mother. As such, this factor represented a positive affective regard for the child which is likely to facilitate high quality interaction between parent and child.

The third factor, which accounted for 12% of the common variance,

Table 6

Factor Analyses of Maternal Variables

VARIABLES	LOADINGS			
	I	II	III	IV
<u>I. Stimulation</u>				
Vocalization to Infant	.93	-.08	-.01	.00
Smiling to Infant	.45	.19	.15	.40
Reach to Infant	.42	.26	.04	-.03
<u>II. Perceptions of Own Child</u>				
Perceptions of "My Child"	-.11	.97	.19	-.01
<u>III. Distal Positive Orientation</u>				
Perceptions of the "Average Child"	-.18	.23	.81	-.06
Looking to Child	.24	-.01	.50	-.12
<u>IV. Maturity</u>				
Age	.35	.02	-.21	.63
Education	-.16	-.04	-.07	.49

Note: Principal factor, varimax rotated solution. First four factors account for 56% of the variance. Eigen values: 1.78, 1.29, .93, and .43; $\underline{N} = 30$.

loaded positively on perceptions of the average child as well as amount of looking at own child in the face-to-face interactional sequence. As such, this factor was difficult to interpret. What was interesting was the finding that maternal looking behavior loaded highly on this factor and not on the Stimulation factor. This may be due to the fact that looking behavior is more distal in nature than is vocalization, reach, or smiling. This factor was labeled **Distal Positive Orientation** to emphasize the positive propensity that these mothers exhibited towards children in general, as well as their ability to utilize distal modes of affective communication with their children.

The final factor to emerge, **Maturity**, accounted for 6% of the common variance and loaded positively on age and level of experience. High scores on this factor represented greater age and more years of formal education.

Regression Analyses

In order to determine which constellations of infant and maternal behaviors and characteristics were most predictive of the quality of the infant-mother attachment, the empirically derived factors which emerged from previous analyses were subjected to regression analyses. However, due to the limited size of the sample, only six of these factors were retained for analyses, in accord with statistical convention suggesting a maximum of one factor per five subjects (Cohen & Cohen, 1975). As a result, the six factors with the highest eigen values were retained. These factors, with the associated eigen values, included four of the infant factors: **Malleability** (2.12), **Irritability** (2.01), **Robust and Responsive** (1.39), and **Social** (1.03). Two

maternal factors were retained for further analyses: Stimulation (1.79) and Perceptions of Own Child (1.29). Stepwise multiple regression analyses were computed, with the quality of infant-mother attachment as the criterion variable, and the six empirically-derived factors serving as independent predictor variables.

Maternal variables: In order to test the hypothesis that there is an identifiable constellation of maternal behaviors and characteristics that is associated with the quality of the infant-mother attachment relationship, the two maternal factors, Stimulation and Perceptions of Own Child, were subjected to a stepwise multiple regression. These two factors served as independent predictor variables, with quality of the dyadic attachment serving as the criterion variable.

The results indicated that the two maternal factors, Stimulation and Perceptions of Own Child, together accounted for 41% of the explained variance in the quality of the infant-mother attachment relationship, $F(2,27) = 9.15, p < .001$. Independently, the factor Perceptions of Own Child accounted for 27% of the explained variance in the criterion variable, $F(1,28) = 10.46, p < .003$. The Stimulation factor accounted for 14% of the explained variance in quality of dyadic attachment, $F(1,28) = 4.68, p < .03$. These results supported the hypothesis that there is an identifiable constellation of maternal behaviors and characteristics present at six months that is predictive of the subsequent quality of the infant-mother attachment relationship of twelve months. More specifically, the data suggested that positive maternal perceptions of her child, coupled with lower levels of stimulation of the child, were predictive of secure attachment. Conversely,

negative maternal perceptions of the child, coupled with high levels of infant stimulation, were predictive of insecure/avoidant attachment.

Infant variables: In order to test the hypothesis that there is no identifiable constellation of infant behaviors and characteristics that is associated with the quality of the infant-mother attachment relationship, the four infant factors retained for analyses were subjected to stepwise multiple regression. These factors included Malleability, Irritability, Robust and Responsive, and Social. These factors served as independent predictor variables, with the quality of infant-mother attachment serving as the criterion variable.

The results indicated that none of the infant factors made an independent significant contribution to the explained variance in attachment outcome. These results supported the hypothesis that stated there is not an identifiable constellation of infant behaviors and characteristics present at six months that is predictive of the quality of the dyadic attachment at twelve months.

Infant-mother variables: In order to test the interactive hypothesis of the study which stated that there is an identifiable constellation of infant and maternal behaviors and characteristics present at six months that is predictive of the subsequent quality of infant-mother attachment at twelve months, a stepwise multiple regression was computed. The quality of dyadic attachment served as the criterion variable, while the six empirically-derived infant and maternal factors served as independent predictor variables.

The results indicated that a constellation of three factors, Perceptions of Own Child, Stimulation, and Robust and Responsive,

accounted for 53% of the variance in the quality of the infant-mother attachment relationship, $F(3,26) = 9.83$, $p < .002$. Analysis of the results reveals that while the infant factor Robust and Responsive did not make an independent contribution to the explained variance in the criterion variable, when taken with the two maternal factors, Perceptions of Own Child and Stimulation, it contributed an additional 12% to the explained variance. These results supported the third hypothesis of the study which stated that there is an identifiable constellation of infant and maternal behaviors and characteristics that is predictive of the quality of the infant-mother attachment relationship. More specifically, the data suggested that secure patterns of attachment were most associated with dyads characterized by mothers who perceived their child in a positive fashion and engaged in lower levels of stimulation behavior with the child and infants who were robust and responsive. Conversely, insecure/avoidant patterns of attachment were most associated with dyads characterized by mothers who perceived their children in a negative fashion and engaged in higher levels of stimulating behaviors and infants who were less robust and responsive to the environment.

In sum, the three hypotheses of this study were supported by the data. First, the results indicated that there is an identifiable constellation of maternal behaviors and characteristics present at six months that is predictive of the quality of the infant-mother attachment relationship at twelve months. Second, the results indicated that there is not an identifiable constellation of infant behaviors and characteristics present at six months that is predictive of the quality

of the infant-mother attachment at twelve months. The results of the study did support the third hypothesis which stated that there is an identifiable constellation of infant and maternal behaviors and variables which is present at six months that is predictive of the quality of the infant-mother attachment relationship at twelve months. These findings suggested that knowledge of both the infant and maternal contributions to the dyadic system increased understanding of the social processes which occurred and impact upon the child's subsequent developmental functioning.

CHAPTER V

DISCUSSION

The purpose of the current study was to examine the relationship between a variety of infant and maternal behaviors and characteristics, assessed at six months, and the quality of the infant-mother attachment relationship at twelve months. Its goal was to delineate those aspects of the early dyadic interactional system that significantly influence the developmental course of the affectional bond between child and mother. Basic to the undertaking of this study was the assumption that the quality of the infant-mother attachment relationship holds important implications for the child's subsequent functioning. In particular, it is through the negotiation of this relationship that the child develops the necessary cognitive and social-emotional skills required for optimal adaptation to the environment (Schaffer, 1977). Accepting this premise, the focus of this study was directed towards specifying those infant and maternal behaviors and characteristics that were most predictive of the quality of the attachment outcome. The delineation of these important antecedents of attachment would increase both theoretical knowledge regarding the developmental course of early human social relationships as well as organize clinical interventions aimed towards "at-risk" populations. Three hypotheses served to organize the current study: (1) There is an identifiable constellation of maternal behaviors and characteristics present at six

months that is predictive of the quality of the infant-mother attachment relationship at twelve months; (2) There is no identifiable constellation of infant behaviors and characteristics present at six months that is predictive of the quality of the infant-mother attachment relationship at twelve months; and (3) There is an identifiable constellation of infant and maternal behaviors and characteristics present at six months that is predictive of the quality of the infant-mother attachment relationships at twelve months.

The results of the present study supported these hypotheses. The data indicated that there was an identifiable constellation of maternal and infant behaviors and characteristics that was predictive of the quality of the infant-mother attachment. These findings suggested that mothers who perceived their infants in a positive manner and engaged in lower levels of stimulating behaviors with them, defined by amounts of vocalization, smiling, and reaching assessed in a structured face-to-face interactional sequence, were likely to have infants who were subsequently rated as securely attached at twelve months of age. Conversely, mothers who perceived their infants in a more negative fashion and engaged in higher levels of stimulating behaviors with their children were likely to have infants who were subsequently rated as exhibiting insecure/avoidant patterns of attachment. This relationship between maternal behaviors and characteristics and the development of the dyadic attachment was expected and is consistent with past research in the area. Secondly, the data indicated that there was not an identifiable constellation of infant behaviors and characteristics that was predictive of subsequent attachment. This

particular finding was not unexpected and is also consistent with past research. Bates et al. (1982) suggested that stable and characteristic modes of social interaction with the environment may not coalesce until the latter half of the child's first year. Given this expected developmental instability, identification of stable patterns of behaviors predictive of quality of subsequent attachment would be difficult.

Thirdly, the results of this study indicated that there was a constellation of maternal and infant behaviors and characteristics that was predictive of the quality of the subsequent attachment relationship and accounted for a greater proportion of the variance in attachment outcome than that provided by only the maternal behaviors and characteristics. This data suggested that in addition to the quality of the maternal perceptions of the child and the amount of stimulating behavior directed towards the child, the infant's level of responsivity contributed to the quality of the attachment relationship. For this sample, secure patterns of attachment were most associated with dyads characterized by mothers who perceived their infants in a positive fashion and engaged in lower levels of stimulating behaviors and by infants who were robust and responsive to the environment. On the other hand, insecure/avoidant patterns of attachment were most associated with dyads characterized by mothers who perceived their children in a more negative fashion and engaged in higher levels of stimulating behaviors and by infants who were less robust and responsive to the environment. These findings lent support to Sameroff and Chandler's (1975) transactional model and shall be discussed within the framework of this model.

The most striking finding of the current study was the significant role that maternal behaviors and characteristics played in the development of the dyadic attachment. The results of this study suggested that 41% of the variance in the quality of the infant-mother attachment relationship was accounted for solely by maternal factors. Especially noteworthy was the finding that 27% of the explained variance in attachment outcome was accounted for by maternal perceptions of own child. The findings indicated that mothers who positively endorsed descriptive statements about their children's behavioral characteristics, such as sleeping and crying, and affective qualities, such as "happy" and "calm," as well as maternal-oriented statements as "causes me no worry," were likely to have infants who were rated as securely attached. On the other hand, mothers who negatively endorsed these statements were likely to have infants who were subsequently rated as insecure/avoidant in their attachment to their mothers.

It is interesting to speculate on the origins of these differential maternal perceptions. One likely explanation for the differences in maternal perceptions of their children may be related to quality of maternal feelings about the child. Ainsworth et al. (1978) have suggested that mothers of insecure/avoidant infants (Group A) tend to present as more rejecting and angry in their interactions with their infants than do mothers of securely attached infants. In addition, it has also been hypothesized (Ainsworth et al., 1978; Main, 1977) that mothers of insecure/avoidant infants express a controlled anger and compulsive kind of adjustment which impinges upon their ability to sensitively perceive and respond to their infants' needs. As a result,

dyadic interactions are often characterized by a subtle hostility and discomfort on the part of the mother.

Although such behavioral differences between mothers of securely attached infants (Group B) and insecure/avoidant infants (Group A) were not reflected in current assessments, it is suggested that this dimension of anger may be underlying differences in maternal perceptions of their children. It is further suggested that the lowered, or more negative perceptions, of the child by his/her mother may reflect negative affects, such as anger or ambivalence, experienced by the mother towards her child. These negative affective responses may subtly color maternal perceptions so that the child looks a little worse in the mother's mind. It is suggested that these perceptions of the child may be a clearer reflection of the mother's negative feelings toward the child than an accurate representation of the child's behaviors and personality.

In line with this reasoning, it is further hypothesized that these negative feelings toward and perceptions of the child may qualitatively affect the nature of the mother's interactions with the infant. This, in turn, brings us to the second maternal factor, Stimulation, which accounted for an additional 14% of the variance in the quality of the dyadic attachment relationship. As noted, the current findings suggested that high levels of stimulating behaviors of the infant were associated with negative maternal perceptions of the child. In turn, these maternal behaviors toward the child were associated with the development of insecure/avoidant patterns of attachment. Such findings are consistent with the work of Stern (1977)

and his observations are most useful in interpreting the data.

Stern (1977) suggested that maternal sensitivity to the infant's signals and behaviors is paramount in the development of a secure and adaptive infant-mother relationship. He hypothesized that maternal overstimulation of the infant, defined by controlling and intrusive structuring of the dyadic interaction, reflects one form of insensitive caretaking. It is Stern's position that the mother who overstimulates the infant acts in ways that are not contingent upon the communications she receives from the child. Rather, her behaviors are motivated by her own concerns and/or misrepresentations of the child's behaviors and signals. Furthermore, Stern argued that the "intrusive" mother demonstrates little respect for the child's attempts to assert his/her own individuality and self-regulatory behaviors. He sees the intrusive mother as one who often exaggerates or overly structures the environment for the child in order to refocus the child and prompt patterns of dyadic interaction based upon her own needs and expectations. Such environmental structuring by the mother, through the dramatic escalation of a variety of apparently interactive social behaviors, serves to invalidate the child's communications and his/her sense of efficacy should this type of interactional pattern persist over time. Stern suggested that the intrusive mother fails to provide two important maternal functions for her child. First of all, she fails to demonstrate sensitivity to the child's communications by misreading, or ignoring, the infant's signals. Second, she fails to regulate environmental stimulation for the child, thus allowing him/her to experience feelings of disequilibrium and disorganization. As a result of these

two failures in maternal function, the infant may need to rely upon atypical behavioral responses to reduce his/her experiences to tension and discomfort. Stern hypothesized that the repeated use of maladaptive behaviors by the child to organize his/her experiences of the world may profoundly impact upon overall cognitive and social-emotional functioning.

The findings of the current study suggested that there is a relationship between maternal insensitivity, negative maternal affect, and overstimulation and the subsequent development of insecure/avoidant patterns of attachment. The data suggested that mothers who perceived their infants in a negative manner were more likely to engage in overstimulation of their children. One possible explanation for this behavior emphasizes the notion of overcompensation. The mother, aware at some level of her negative affective responses to her child, attempts to deny and distort these feelings through an exaggeration of those behaviors which are highly admired in middle-class society as representative of "good mothering." By this, reference is made to such interactive behaviors as vocalization, smiling, and reaching. However, in such cases as described here, there may exist too much of a good thing. In other words, such high levels of stimulation may, in fact, interfere with the infant-mother interaction, rather than facilitate it. The result of this exaggerated interaction, initiated by the mother, may be increased frustration between dyadic partners due to the continual experience of "mismatching" between them.

Although there is a great deal of validity to the notion of overstimulation of the child by the mother as a compensatory reaction,

there is an alternative interpretation. This interpretation suggests that overly high levels of maternal stimulation may reflect maternal insensitivity (Stern, 1977). The roots of this maternal insensitivity may be found in the mother's negative affective responses to her child. It is suggested that those mothers who experience these negative affects may not be as sensitive and responsive to the communications of their children as are mothers who are more positive in their perceptions and attitudes about their children. As a result, they are more likely to interpret the child's signals and behaviors from an idiosyncratic, or more personalized, frame of reference. This, in turn, may dramatically affect the mother's ability to respond appropriately to her child's needs. Under optimal conditions, the mother will respond to the signals and communications of her child in a manner that reflects an understanding and sensitivity to the content of the communication. However, in the case of a mother who is unable to respond in such a manner, it is likely that her responses will be colored by personal needs and expectations. Thus, the communicative gestures and signals emitted by the child are ignored and/or overlooked. If this were to continue as a defining characteristic of the dyad, it is highly probable that this continual insensitivity would affect the child's experiences of the environment, as well as affect his/her developing sense of self-efficacy and control. The infant, helpless in such a chronically frustrating interpersonal situation, has a limited repertoire of behaviors available to alleviate the sense of disorganization he/she experiences. Stern (1977) suggested that one of the adaptive responses available to the infant under such

circumstances is for his/her to "shut off" the maternal intrusion in order to gain internal equilibrium. This may be accomplished by means of turning away from or avoiding the mother.

Stern (1977) hypothesized that each child possesses an upper limit to his/her threshold for stimulation. Once this particular threshold has been crossed, the infant's typical response is to dramatically withdraw attention from the offending stimulus. In the case of a mother who is experienced as overstimulating, the child, having reached his/her own unique level of tolerance, attempts to withdraw from interaction with the mother in order to facilitate a state of reorganization and equilibrium. Extrapolating further from Stern's argument, it is suggested that repeated occurrences of such dyadic interactions characterized by maternal overstimulation and infant withdrawal may contribute to the child's development of a characteristic style of withdrawal and avoidance from interpersonal situations perceived as aversive and/or overstimulating.

Subsequent research has supported Stern's conclusions. Belsky et al. (1984) suggested that there is a relationship between level of maternal involvement with the child, defined by amounts of attention, responsive vocalization, and stimulate/arouse behaviors, and the development of qualitatively different patterns of attachment. Their work indicated that the quality of the infant-mother attachment relationship may be a function of the developmental process through which maternal overstimulation leads to the development of avoidance in the child, while understimulation leads to angry resistance in the child. Belsky and his colleagues hypothesized that there may be an optimal

"middle-range" of maternal stimulation that facilitates the development of secure attachment.

The results of the current study are consistent with those reported by Stern (1977) and Belsky et al. (1984). In addition to the two maternal factors already discussed, the results indicated that the infant factor Robust and Responsive, was useful in helping to differentiate among patterns of infant-mother attachment relationships. Although not a significant independent predictor of quality of attachment, in conjunction with the factors Perceptions of Own Child and Stimulation, the addition of this factor to the regression equation increased the amount of explained variance to 53%. In other words, patterns of secure attachment were most associated with dyads characterized by mothers who perceived their children in a positive manner and engaged in lower levels of stimulating behaviors with them and infants who were robust and responsive to the environment. Conversely, insecure/avoidant patterns of attachment were most associated with dyads characterized by mothers who perceived their children in a negative manner and engaged in high levels of stimulating behaviors with them and infants who were less robust and responsive to the environment.

There are two possible explanations for the observed phenomena. Both of these emphasize the transactional nature of the infant-mother relationship. The first hypothesized explanation for these findings is that the infants who were subsequently rated as insecure/avoidant were, indeed, less robust and responsive to their interactions with their mothers than were their more securely attached counterparts.

Continuing this line of reasoning, it is likely that the mothers of these infants, observing these behavioral manifestations of inactivity and lack of responsivity, attempt to elicit greater responses from their infants through increasing their own levels of interactive behaviors. As a result, these mothers engage in higher levels of stimulating behaviors, such as vocalizing, smiling, and reaching, in order to elicit and sustain a response from their children. However, in reality, such attempts to facilitate social interaction may actually have the reverse effect, particularly if the child experiences these behaviors as intrusive and overstimulating. Because of his/her inability to deal with these increased levels of stimulation and the concomitant feelings of disorganization and disequilibrium, the infant attempts to withdraw from the offending stimulus--the mother--through avoidance. The patterns of these hypothesized interactions bear a marked resemblance to those described by Field (1979) as occurring between preterm infants and their mothers. In the case of the insecure/avoidant infants, there is the possibility that physiological or temperamental factors might underlie their inability to initiate and sustain interactions with others in the environment. Unfortunately, in these cases, the mothers do not appear to be sensitive to the infant's special needs, tending rather to experience the infants as difficult or unresponsive. The response to such perceptions is to increase social interaction in order to increase infant responsivity. This particular set of circumstances is likely to set the stage for a vicious cycle involving increasing levels of maternal stimulation as well as infant avoidance and withdrawal. Given the repeated occurrence

of such negative infant-mother interactions, it is easy to see how maternal perceptions of the child become colored by feelings of anger, disappointment, or frustration.

An alternative explanation for this interactive constellation of infant and maternal behaviors emphasizes the maternal contributions to the ongoing developmental social processes that occur between the dyadic partners. There are two reasons to support this explanation. The first reason is rooted in the assumption that the mother is the more competent member of the dyad (Stern, 1977), and thus, better able to structure and pattern the nature of the unfolding affective relationship. Second, and perhaps more compelling, is that as the results of this study indicate, maternal behaviors and characteristics alone, without the contribution of any infant behaviors, were predictive of the quality of the attachment relationship. In terms of the relationship between levels of maternal stimulation and infant responsivity, the following hypothesis is suggested. It is possible that the infants who are subsequently rated as insecure/avoidant may, in fact, not behaviorally present as inactive or unresponsive. Rather, the mothers of these infants experience these children as inactive and nonresponsive. Such "misrepresentations of reality" may be the product of negative feelings experienced towards the child or a function of unrealistic expectations and needs on the part of the mother. In any case, such a discrepancy between how the child is experienced and how the child should act may result in attempts by the mother to elicit the desired responses from the child. However, it is likely that these efforts by the mother to produce a desired response are experienced as

intrusive by the child. As in the previous example, the child is likely to adapt to the overstimulating environment structured by his/her mother by defensively turning away or shutting down. This pattern of overstimulation and avoidance becomes routine over time and characterizes the pattern of the dyadic interactions.

Extending this hypothetical situation, it becomes easy to see where the feelings of maternal anger or disappointment might originate. It is likely that negative affects might develop and coalesce from the continued interactions between the mother and her infant that are characterized by frustration and non-gratification. In this manner, it is easy to imagine how the cycle of frustration, overstimulation, and withdrawal begins and continues in an upward spiral.

Although the exact nature and direction of the influences cannot be specified by this particular study, the findings do indicate that differences in the quality of the infant-mother attachment are functions of both maternal and infant behaviors and characteristics. However, based upon the data, it is suggested that, at least by six months, the mother plays the primary role in structuring the dyadic interactions which provide the cornerstone for the subsequent attachment relationship. It must be reiterated that such a conclusion does not preclude the importance of the infant's contribution to the unfolding social relationship. It may be the case that infant behaviors and characteristics affect maternal perceptions and behaviors to a greater extent prior to the six-month observational point employed in the current study. It would be interesting to assess both dyadic partners from the time of the infant's birth and examine the vicissitudes of the

relationship from day one. Utilizing a variety of psychological and physiological measures, it might be possible to tease out the relative contributions of maternal personality, infant temperament, and their interaction, in addition to important dyadic variables, as they impact upon the developing affectional bond between child and mother. Such an approach must also take into consideration the mother's prenatal perceptions, expectations, and level of personality organization in order to specify the nature of the changes which occur and influence the developing relationship. In understanding the affective nature of the dyadic relationship, it is important to realize that each mother has an entire life history which will influence the quality of her interactions with her child.

In conclusion, the results of this study support a transactional model of early social development. Although it is difficult to clearly specify the direction of the influences between mother and child, the results clearly underscore the mutual adaptation and modification in behaviors between the dyadic members, particularly as these transformations affect the quality of the ongoing affective relationship. This study demonstrated that there is an identifiable constellation of infant and maternal behaviors and characteristics present at six months that is predictive of the quality of attachment at twelve months. Further research directed towards the delineation of characteristics of the dyadic members occurring at earlier points in the developmental process would contribute greatly to the contemporary understanding of infant-mother attachment. Such knowledge is fundamental for both theoretical understanding of early human social

development as well as for clinical application with at-risk populations. Early intervention into disturbed patterns of infant-mother interaction may very well facilitate corrective changes which, in turn, may contribute to more successful and adaptive developmental outcomes for the child. In particular, it is suggested that interventions geared toward maximizing "perceived match" between mother and infant would facilitate the development of qualitatively better interactions between the dyadic partners.



CHAPTER VI

SUMMARY

Contemporary research in the area of attachment has argued persuasively for the position that the quality of the infant-mother attachment is related to the quality of later cognitive, social, and emotional functioning. Less systematic attention, however, has been directed towards the delineation of the antecedents of the attachment relationship, particularly those characteristics of the infant-mother system. It was the purpose of the current study to examine the relationship between a variety of maternal and infant characteristics, assessed at six months, and the quality of attachment between child and mother, assessed at twelve months. Relevant variables were extrapolated from the literature on the infant-mother relationship to determine what constellations of behaviors and characteristics of the dyadic members were most predictive of the subsequent quality of the attachment relationship.

A total of 32 infant-mother dyads participated in the study. In order to maximize differences among the infant sample, the infants systematically differed in length of gestation, length of hospitalization, and severity of perinatal complications. Infants and their mothers were assessed on a variety of cognitive, social, and face-to-face interactive measures at six months (corrected for gestational

age). Each dyad was assessed in the Strange Situation, a laboratory procedure which yields a qualitative measure of the infant-mother attachment, at twelve months.

In order to reduce the number of variables and combine them into meaningful units, both infant and maternal data were subjects to independent principle factor analyses, with varimax rotation. For the infant variables, five significant factors emerged which accounted for 57% of the variance. These included Malleability, Irritability, Robust, and Responsive, Social, and Positive and Persistent. The maternal data yielded four significant factors which accounted for 56% of the variance. These included Stimulation, Perception of Own Child, Distal Positive Orientation, and Maturity. To maintain statistical rigor, only six of these factors--Malleability, Irritability, Robust and Responsive, Social, Stimulation, and Perceptions of Own Child--were retained and subjected to stepwise multiple regression analyses in order to determine what constellations of behaviors and characteristics were most predictive of subsequent quality of attachment.

The results of the analyses indicated that two maternal factors, Perceptions of Own Child and Stimulation, accounted for 41% of the variance in the quality of the infant-mother attachment. The factor, Perception of Own Child, accounted for 27% of the variance, while Stimulation accounted for 14% of the variance in the outcome measure. The addition of a third constellation of infant behaviors and characteristics, Robust and Responsive, increased our proportion of explained variance to 53%, although it did not make a significant independent contribution to the explained variance in the quality of attachment.

These results indicated that secure patterns of infant-mother attachment were most associated with dyads characterized by mothers who perceived their children in a positive fashion and engaged in lower levels of stimulating behaviors and infants who were robust and responsive to the environment. On the other hand, insecure/avoidant patterns of infant-mother attachment were most associated with dyads characterized by mothers who perceived their children in a negative fashion and engaged in higher levels of stimulating behaviors and infants who were less robust and responsive to the environment.

These results indicated that, at least at six months, maternal behaviors and characteristics play a primary role in determining the nature of the infant-mother attachment. However, these findings do not preclude the possible infant contributions to the unfolding affectional process. The results suggested that both the infant and his/her mother adapt and modify their behaviors in response to the behaviors of the other, although, at least at six months, the mother plays the more dominant role in structuring the dyadic interactions that provide the foundation for the subsequent attachment relationship. More attention needs to be focused on the transactional processes which appear to characterize the dyadic relationship from the time of the child's birth. Such knowledge would contribute greatly to contemporary theory in the area of early social-emotional development as well as facilitate the development of systematic clinical interventions for at-risk populations. Early intervention into disturbed patterns of infant-mother interactions holds important implications for the child's cognitive, social, and emotional development.

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APPENDIX A

Name _____

Date _____

On the left side of the page, circle the point between the two words on each line which you think best describes your child now. Then, on the right side of the page, circle the point which gives your impression of the average child now.

MY CHILD NOW								THE AVERAGE CHILD									
calm	1	2	3	4	5	6	7	excitable	calm	1	2	3	4	5	6	7	excitable
sleeps poorly	1	2	3	4	5	6	7	sleeps well	sleeps poorly	1	2	3	4	5	6	7	sleeps well
weak	1	2	3	4	5	6	7	strong	weak	1	2	3	4	5	6	7	strong
does not cry/ quiet	1	2	3	4	5	6	7	cries a lot	does not cry/ quiet	1	2	3	4	5	6	7	cries a lot
eats well	1	2	3	4	5	6	7	eats poorly	eats well	1	2	3	4	5	6	7	eats poorly
passive	1	2	3	4	5	6	7	alert & active	passive	1	2	3	4	5	6	7	alert & active
different	1	2	3	4	5	6	7	normal	different	1	2	3	4	5	6	7	normal
small for age	1	2	3	4	5	6	7	big for age	small for age	1	2	3	4	5	6	7	big for age
happy	1	2	3	4	5	6	7	unhappy	happy	1	2	3	4	5	6	7	unhappy
causes me a lot of worry	1	2	3	4	5	6	7	causes me no worry	causes me a lot of worry	1	2	3	4	5	6	7	causes me no worry

APPENDIX B

Summary of Episode Instructions for Infant-Mother
Interactional Sequence

1. Impassive Face: Sit face-to-face with your baby. Do not smile, talk, or move your head or body.
2. Smile: Sit face-to-face with your baby and smile at him or her. Do not talk or move your head or body.
3. Smile and Talk: Sit face-to-face with your baby and smile and talk to him or her.
4. Attract Baby's Attention: Sit in front of your baby and try to get him or her to look at you.
5. Try to Get Baby to Imitate: Try to get your baby to imitate a facial expression such as opening your mouth wide or sticking out your tongue.
6. Imitate Baby: Imitate everything your baby does.
7. Visual Following: Move the red ball slowly and try to get your baby to follow it with his or her eyes.
8. Grasping: Pick up one of the toys from the box and try to get your baby to grab hold of it.
9. Impassive Face: Sit face-to-face with your baby. Do not smile, talk, or move your head or body.
10. Read Magazine: Look away from your baby and read a magazine.
11. Leave Room: Stand up and walk out of the baby's sight.

APPENDIX C

Summary of Episodes of the Strange Situation

Number of Episode	Persons Present	Duration	Brief Description of Action
1	Mother, baby, & observer	30 sec.	Observer introduces mother and baby to experimental room, then leaves.
2	Mother & baby	3 min.	Mother is nonparticipatant while baby explores; if necessary, play is stimulated after 2 minutes.
3	Stranger, mother & baby	3 min.	Stranger enters. First minute: Stranger silent. Second minute: Stranger converses with mother. Third minute: Stranger approaches baby. After 3 minutes mother leaves unobtrusively.
4	Stranger & baby	3 min. or less ^a	First separation episode. Stranger's behavior is geared to that of baby.
5	Mother & baby	3 min. or more ^b	First reunion episode. Mother greets and/or comforts baby, then tries to settle him again in play. Mother then leaves, saying "bye-bye."
6	Baby alone	3 min. or less ^a	Second separation episode.
7	Stranger & baby	3 min. or less ^a	Continuation of second separation. Stranger enters and gears her behavior to that of baby.

Summary of Episodes of the Strange Situation (continued)

Number of Episode	Persons Present	Duration	Brief Description of Action
8	Mother & baby	3 min.	Second reunion episode. Mother enters, greets baby, then picks him up. Meanwhile, stranger leaves unobtrusively.

^aEpisode is curtailed if the baby is unduly distressed.

^bEpisode is prolonged if more time is required for the baby to become re-involved in play.

APPENDIX D

Criteria for Group and Subgroup Classification
of Infant Behavior in the Strange Situation

GROUP A:

--Conspicuous avoidance of proximity to or interaction with the mother in the reunion episodes. Either the baby ignores his mother on her return, greeting her casually if at all, or, if there is approach and/or a less casual greeting, the baby tends to mingle his welcome with avoidance responses--turning away, moving past, averting the gaze, and the like.

--Little or no tendency to seek proximity to or interaction or contact with the mother, even in the reunion episodes.

--If picked up, little or no tendency to cling or to resist being released.

--On the other hand, little or no tendency toward active resistance to contact or interaction with the mother, except for probable squirming to get down if, indeed, the baby is picked up.

--Tendency to treat the stranger much as the mother is treated, although perhaps with less avoidance.

--Either the baby is not distressed during separation, or the distress seems to be due to being left alone rather than to his mother's absence. For most, distress does not occur when the stranger is present, and any distress upon being left alone tends to be alleviated when the stranger returns.

Subgroup A₁

Conspicuous avoidance of the mother in the reunion episodes, which is likely to consist of ignoring her altogether, although there may be some pointed looking away, turning away, or moving away.

If there is a greeting when the mother enters, it tends to be a mere look or smile.

Either the baby does not approach his mother upon reunion, or the approach is "abortive" with the baby going past his mother, or it tends to occur only after much coaxing.

If picked up, the baby shows little or no contact-maintaining behavior. He tends not to cuddle in; he looks away; and he may squirm to get down.

Subgroup A₂

The baby shows a mixed response to his mother on reunion, with some tendency to greet and to approach, intermingled with a marked tendency to turn or move away from her, move past her, avert the gaze from her, or ignore her. Thus, there may be moderate proximity seeking, combined with strong proximity avoiding.

If he is picked up, the baby may cling momentarily; if he is put down, he may protest or resist momentarily; but there is also a tendency to squirm to be put down, to turn the face away when being held, and other signs of mixed feelings.

GROUP B:

--The baby wants either proximity and contact with his mother or interaction with her, and he actively seeks it, especially in the reunion episodes.

--If he achieves contact, he seeks to maintain it, and either resists release or at least protests if he is put down.

--The baby responds to his mother's return in the reunion episodes with more than a casual greeting--either with a smile or a cry or a tendency to approach.

--Little or no tendency to resist contact or interaction with his mother.

--Little or no tendency to avoid his mother in the reunion episodes.

--He may or may not be friendly with the stranger, but he is clearly more interested in interaction and/or contact with his mother than with the stranger.

--He may or may not be distressed during the separation episodes, but if he is distressed this is clearly related to his mother's absence and not merely to being alone. He may be somewhat comforted by the stranger, but it is clear that he wants his mother.

Subgroup B₁

The baby greets his mother, smiling upon her return, and shows strong initiative in interaction with her across a distance, although he does not especially seek proximity to or physical contact with her.

If picked up, he does not especially seek to maintain contact.

He may mingle some avoiding behavior (turning away or looking away) with interactive behavior, but he shows little or no resistant

behavior, and, in general, seems not to have feelings as mixed as an A_2 baby.

He is likely to show little or no distress in the separation episodes.

Subgroup B_2

The baby greets his mother upon reunion, tends to approach her, and seems to want contact with her, but to a lesser extent than a B_3 baby. Some B_2 babies seek proximity in the pre-separation episodes, but not again until Episode 8, and then perhaps only after some delay.

The B_2 baby may show some proximity avoiding, especially in Episode 5, but this gives way to proximity seeking in Episode 8, thus distinguishing him from the A_2 baby.

Although he accepts contact if he is picked up, he does not cling especially, and does not conspicuously resist release.

On the other hand, he shows little or no resistance to contact or interaction, and in general shows less sign of mixed feelings than A_2 babies.

He tends to show little distress during the separation episodes.

He resembles a B_1 infant, except that he is more likely to seek proximity to his mother.

Subgroup B_3

The baby actively seeks physical contact with his mother, and when he gains it he is conspicuous for attempting to maintain it, actively resisting her attempts to release him. Most B_3 babies show their strongest proximity-seeking and contact-maintaining behavior in Episode 8, but some do so in Episode 5 and are so distressed in the second separation episode that they cannot mobilize active proximity-seeking and resort to signaling. Occasionally, a baby who seems especially secure in his relationship with his mother will be content with mere interaction with and proximity to her, without seeking to be held.

At the same time, the B_3 baby may be distinguished from other groups and subgroups by the fact that he shows little or no sign of either avoiding or resisting proximity to or contact or interaction with his mother.

He may or may not be distressed in the separation episodes, but if he shows little distress, he is clearly more active in seeking contact and in resisting release than B_1 or B_2 babies.

Although his attachment behavior is heightened in the reunion episodes, he does not seem wholly preoccupied with his mother in the preseparation episodes.

Subgroup B₄

The baby wants contact, especially in the reunion episodes, and seeks it by approaching, clinging, and resisting release; he is, however, somewhat less active and competent in these behaviors than most B₃ babies, especially in Episode 8.

He seems wholly preoccupied with his mother throughout the Strange Situation. He gives the impression of feeling anxious throughout, with much crying. In the second separation, particularly, he seems entirely distressed.

He may show other signs of disturbance, such as inappropriate, stereotyped, repetitive gestures or motions.

He may show some resistance to his mother, and indeed he may avoid her by drawing back from her or averting his face when held by her. Because he also shows strong contact-seeking behavior, the impression is of some ambivalence, although not as much as is shown by Group C infants.

GROUP C

--The baby displays conspicuous contact- and interaction-resisting behavior, perhaps especially in Episode 8.

--He also shows moderate-to-strong seeking of proximity and contact and seeking to maintain contact once gained, so that he gives the impression of being ambivalent to his mother.

--He shows little or no tendency to ignore his mother in the reunion episodes, or to turn or move away from her, or to avert his gaze.

--He may display generally "maladaptive" behavior in the Strange Situation. Either he tends to be more angry than infants in other groups, or he may be conspicuously passive.

Subgroup C₁

Proximity-seeking and contact-maintaining are strong in the reunion episodes, and are also more likely to occur in the preseparation episodes than in the case of Group B infants.

Resistant behavior is particularly conspicuous. The mixture of seeking and yet resisting contact and interaction has an unmistakably angry quality and, indeed, an angry tone may characterize behavior

even in the preseparation episodes.

Angry, resistant behavior is likely to be shown toward the stranger as well as toward the mother.

The baby is very likely to be extremely distressed during the separation episodes.

Subgroup C₂

Perhaps the most conspicuous characteristic of C₂ infants is their passivity. Their exploratory behavior is limited throughout the Strange Situation, and their interaction behaviors are relatively lacking in active initiative.

Nevertheless, in the reunion episodes they obviously want proximity to and contact with their mothers, even though they tend to use signaling behavior rather than active approach, and protest against being put down rather than actively resist release.

Resistant behavior tends to be strong, particularly in Episode 8, but in general the C₂ baby is not as conspicuously angry as the C₁ baby.

APPROVAL SHEET

The dissertation submitted by Janice M. Kowalski has been read and approved by the following Committee:

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The final copies have been examined by the Director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

Dec 3, 1985
Date

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