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FACTORS THAT INFLUENCE THE QUALITY OF MATERNAL CARE:
A SYSTEMIC CONCEPTUALIZATION

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DEDICATION

Dedicated to the memory of Karen R. Lounsbury, Ph.D.,
scholar, role-model and friend who I am proud to have known.

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ABSTRACT

Previous research has suggested that the quality of mother infant interactions may be conceptualized as falling along a continuum from high-quality/optimal care to low-quality/abusive care. Similarly, these early patterns of interaction may be viewed as the center of an interrelated system of environmental variables. The major purpose of the present study then was to examine variations in the quality of early mother-infant interactions in relation to the following aspects of the systemic environment: infant characteristics, maternal personal characteristics, the social network, and the broader social environment.

Forty-four mothers and their 3 to 6 month old infants were recruited through introductory letters issued by social-service and medical staff as well as personal associates of the investigator. The income status of the 34 families with complete data was distributed in the following manner: 35 percent poverty, 18 percent low-middle income, 29 percent middle income and 18 percent upper-middle income families. Primary procedures involved five 1 hour visits to each subject's home by trained observer/interviewers. The first visit entailed collection of the infant characteristics information. Second, third, and fourth visits each involved a 25 minute observation of mother-infant interactions

followed by a structured interview concerning support from the social network experienced over the past 24 hours. The final visit involved mothers completing a personal characteristics inventory and listening to a study debriefing.

Using a coding system devised by Bakeman and Brown (1977), the observational data were coded into a series of dyadic states and indices of interaction quality were formed. These indices of interaction quality then served as the criterion variables for correlations, multiple regressions and canonical discriminate analyses involving the measured aspects of the systemic environment. Results indicated that one index of interaction quality, the social responsiveness index, was related to two aspects of the systemic environment, infant activity and social support quality. The other index of interaction quality, the social continuation index, was related to one aspect of the systemic environment, infant activity.

Results were interpreted as supportive of a general systemic framework that emphasizes direct and indirect levels of influence, rather than a framework indicating specific levels of influence. Further research also was indicated in order to determine other important aspects of the systemic environment and other forms of measurement for indexing the mother-infant interaction quality construct.

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CHAPTER I

INTRODUCTION

Understanding the path and factors that contribute to adaptive child development has been and continues to be a major goal of Developmental Psychology. Recently the identification of adaptive versus maladaptive developmental paths has gained in significance due to interests in preventive mental health. One of the first steps of effective prevention is being able to describe the course and discriminating factors of maladaptive development (Lorion, 1984). A logical place then to begin an understanding of the ontogeny of adaptive versus maladaptive development is the period of infancy.

For many years the period of infancy has been recognized by theory as an important period of psychological development (e.g., Freud, 1953; White, 1959; Erikson, 1963). Not until recently, however, has this theoretical importance been supported by empirical research. The work of Mary D. S. Ainsworth and colleagues has indicated that early styles of mother-infant interaction correlate with later patterns of infant attachment (Ainsworth, Blehar, Waters, & Wall, 1978). Specifically, mother-infant interactions described as responsive and sensitive have been associated with secure

infant attachment while mother-infant interactions described as insensitive and rejecting have been correlated with insecure infant attachment. Subsequent research has indicated that the quality of infant attachment then may be associated with the degree of cognitive and social competence displayed at age 3, with securely attached children displaying higher levels of competence (Matas, Arend, & Sroufe, 1978; Waters, Wippman, & Sroufe, 1979; Bakeman & Brown, 1980).

Additional empirical support of the importance of early mother-infant interactions comes from research concerning child abuse. Studies comparing infants with no history of abusive care to infants with a history of abusive care have indicated that a higher proportion of maltreated infants display insecure patterns of attachment (Egeland & Sroufe, 1981; Schneider-Rosen, Braunwald, Carlson, & Cicchetti, 1985). Early abusive care also has been associated with problems in later social competence (George & Main, 1979).

Essentially the research in both attachment and abuse suggests that early mother-infant patterns of interaction may have important ramifications for later child development. Early interactions characterized as responsive and sensitive tend to foster adaptive development while insensitive or abusive caretaking tends to support maladaptive development. As such, early mother-infant interactions may be conceptualized as falling along a continuum from high to

low quality. The quality of these interaction patterns in turn influences the development of the child, with higher quality interactions fostering more adaptive development. An important task for developmental research then is to identify variables that influence this continuum of the quality of mother-infant interaction.

Identifying factors relevant to development, however, is shaped strongly by the conceptual model chosen. In the study of parent-infant or child interactions, the unidirectional parent, unidirectional child and bidirectional parent-child models have each been used and supported by research (Peterson & Rollins, in press). Although each of these frameworks has suggested important factors, recent investigators have suggested that a systems model may provide a more useful framework for understanding parent-infant interactions (Lamb, 1978; Belsky, 1984). Basic to a systemic framework is the idea that (1) the environment may be conceptualized as a series of interrelated concentric levels, and (2) that development may be influenced by each of these levels of the environment. In order then to understand developmental phenomena, research must include variables from each level of the systemic environment. Relating this to the study of mother-infant interaction quality, variables from three primary environmental levels require attention: the infant, mother, and social environment.

The purpose of the present study was to contribute to the knowledge base necessary for effective primary prevention efforts. The promotion of high quality and responsive mother-infant interactions may be one of the major ways to enhance the likelihood of adaptive child development. Researchers and practitioners, therefore, need to know more about the factors which influence the continuum of mother-infant interaction quality. Since the infant, mother and social environment may be viewed as an interrelated system, attention to each of these levels should be given in any attempt to understand the quality of mother-infant interaction patterns. As such, the present study examined the relationship between measures of the quality of mother-infant interactions and characteristics of the infant, mother and social environment.

CHAPTER II

REVIEW OF THE LITERATURE

1. THE QUALITY OF MOTHER-INFANT INTERACTIONS

Much of the research concerning the quality of mother-infant interactions has stemmed from interests in understanding infant attachment. Most significant has been the research conducted by M. D. S. Ainsworth and colleagues on the different patterns of attachment exhibited by 12-18 month old infants. From her extensive observational work, Ainsworth has identified three primary patterns or qualities of infant attachment: secure, insecure-avoidant and insecure-resistant (Ainsworth & Witting, 1969; Ainsworth & Bell, 1970). The major differences between these classifications involves the infant's behavioral reaction to the absence of and reunion with mother. Securely attached infants tend to become distressed upon separation but eagerly seek mother and receive comfort from her upon return. Insecure-avoidant infants, however, show little distress when separated from their caregivers. During reunion, these infants display little attention toward their mothers, sometimes appearing to avoid her attempts to regain contact. In contrast to both the secure and insecure-avoidant patterns,

the insecure-resistant pattern involves intense infant distress upon separation from the mother. Yet when reunited with their mothers, these infants are unable to obtain maternal comfort since their intense distress often is mixed with avoidance of the mother.

As evident from the nomenclature, Ainsworth theorized that secure attachment patterns were reflective of adaptive infant development while insecure patterns were suggestive of maladaptive development. Noting this, Ainsworth and colleagues began a longitudinal study to examine the development of the different qualities of attachment. Twenty-six white middle-class mother-infant dyads were selected and followed during the infant's first year of life. During this time, each dyad was visited at home at 3-week intervals in order to record typical everyday patterns of mother-infant interaction. Narrative records from these visits then were used to develop a variety of rating scales measuring the quality of mother-infant interactions.

Comparing the different patterns of attachment observed at 12 months on these measures of earlier interaction quality, Ainsworth and colleagues found that the caretaking environment of securely attached infants was different from that of insecurely attached infants. Specifically, mothers of securely attached infants were rated as more sensitive and responsive to infant cues than mothers of insecurely

attached infants. Also, mothers of securely attached infants were found contingently to pace their behavior with that of the infants, respond quickly and appropriately, and have relatively longer bouts of interaction. In contrast, mothers of insecurely attached infants were found to be more rejecting and insensitive to infant cues. These mothers were observed to respond less quickly to their infants, behave in a more routine manner, and have shorter bouts of interaction (Blehar, Lieberman & Ainsworth, 1977; Ainsworth et al., 1978). Based on this body of work, the observed quality of attachment at 12 months appears to be related strongly to the quality of mother-infant interactions during the first year with sensitive and responsive interactions associated with secure attachment and insensitive interactions associated with insecure attachment.

Early mother-infant interaction patterns and subsequent attachment quality then has been shown important for adaptive child development. Clarke-Stewart (1973) investigated the relationship between mother-infant interactions, infant attachment and later child development in a sample of 38 low-income mother-infant pairs. Seven home visits were conducted when the infants were between the ages of 9-18 months. Several visits consisted only of behavioral observations and ratings of mother-infant interactions, while the remaining visits included assessments of infant development.

Analysis indicated a general "optimal" maternal care variable that was associated with child developmental competence. Specifically, mothers who were found to be warm, stimulating and responsive were associated with children displaying both secure attachment and higher cognitive and language abilities. Conversely, rejecting, unstimulating and insensitive maternal behavior was associated with insecure infant attachment and slower developmental progress.

Related to these findings, Matas et al. (1978) and Waters et al. (1979) have found the quality of infant attachment associated with the amount of cooperation displayed with both mothers and peers at 2 and 3.5 years, respectively. In both studies, children who had been classified as securely attached between 12-18 months were found to display cooperative behavior more frequently than children previously classified as insecurely attached. Particularly in the Matas et al. study, children classified as insecurely attached were associated with more frequent non compliance and displays of aggressive behavior.

Interestingly, the developmental correlates of the insecurely attached infant are not altogether unlike the developmental patterns exhibited by young abused children (Ainsworth, 1980; Main & Goldwyn, 1984). In a study conducted by B. Egeland and colleagues concerning the developmental sequelae of abuse, insensitive and rejecting mother-

infant interaction patterns were found to be highly predictive of later infant maltreatment (Egeland & Brunnequell, 1979; Egeland, Breitenbucher & Rosenberg, 1980). Similarly, both Egeland and Sroufe (1981) and Schneider-Rosen et al. (1985) reported significantly more infants displaying insecure attachment in a sample of abused and neglected infants than in a sample of demographically matched infants. Lastly, young children (between 1-3 years) with a history of abuse have been found to be more avoidant of social interactions with adults, as well as display more frequent aggressive and non-compliant behaviors (George & Main, 1979).

Notice of the similarities between the developmental correlates of insecure attachment and early child maltreatment has led several investigators to suggest that the quality of early mother-infant interactions and subsequent development may be conceptualized as falling along a continuum (Sameroff & Chandler, 1975; Ainsworth, 1980; Main & Goldwyn, 1985). One end of this continuum of care is marked by sensitive and responsive mother-infant interactions which then is associated with secure attachment and adaptive development. Moving away from this end, the quality of the interactions changes to less sensitive and more rejecting mother-infant interaction. This lower quality is then related to insecure attachment and less-than-optimal development. Finally, the other end of the continuum of care

is marked by abusive and inadequate mother-infant interactions which then is associated with insecure attachment and maladaptive development. From this perspective, understanding the factors that influence the quality of mother-infant interactions is a very important developmental topic.

Measurement of the Quality of Mother-Infant Interactions

By conceptualizing the quality of mother-infant interactions as a continuum, methods must be used that can measure the full range of the continuum. Previous methods basically may be classified into two major groups: (1) macroanalytic measures of maternal sensitivity and responsiveness, and (2) microanalytic measures of synchrony.

In that the quality of mother-infant interaction suggests a rather global concept, it is not surprising that many investigators have selected macroanalytic measures of interaction quality. Probably the most popular method of observing the quality of mother-infant interactions has been with rating scales (Osofsky, 1976; Ainsworth et al., 1978; Egeland & Brunnequell, 1979; Egeland et al., 1980; Field, 1980). Using rating scales allows observations to be made either in or outside the laboratory. Also, training with rating scales is relatively short and inexpensive. While these are important advantages, disadvantages to the rating

scale method must be considered. Rating scales typically do not include behaviorally specific definitions. In the case of mother-infant interaction quality, this lack of specificity is particularly evident. For example, Osofsky and Culp (1986) have developed five point rating scales to measure the quality of mother-infant interactions. One of the measured qualities is maternal attentiveness, defined basically as the degree to which the mother responds contingently to the cues of her child. Although relevant to the quality of mother-infant interaction, this definition does not identify the parameters of contingent responding and does not explain what constitutes child cues. This lack of behavioral clarity then allows for greater rater subjectivity and distortion.

In sharp contrast to the macroanalysis provided by rating scale methods is the fine-grained microanalysis of mother-infant interaction represented in the work of Brazelton, Koslowski and Main (1974) and Kaye and Fogel (1980). With this type of analysis, the mother and infant are each filmed during an interaction period. Stop-action filming is used in order that each second of interaction may be analyzed for changes in the behavior and position of each participant. By observing these very detailed behavioral records, Brazelton et al. suggested that mother-infant dyads may behave in intricate reciprocal patterns; the behaviors

of the mother and infant may be in synchrony. Mother-infant pairs who acted in synchrony then had prolonged periods of mutually satisfying interaction. The degree to which the dyad displayed such synchrony therefore was viewed as a measure of mother-infant interaction quality. Specifically, "This interdependency of rhythms seemed to be at the root of their 'attachment' as well as communication" (Brazelton et al., 1974, p.74). This microanalytic method of determining mother-infant interaction quality allows little room for observer subjectivity and most certainly provides detailed behavioral information. However, this procedure can not be conducted in the field and usually requires extensive training.

In light of both the advantages and disadvantages of each form of analysis, several investigators have devised methods of measuring mother-infant interaction quality that fall in between these two extremes. For example, Clarke-Stewart (1973) devised a behavioral observation system for recording specific mother and infant behaviors in the home setting. The observation system included 52 different behaviors, part of which reflected infant cues (e.g., cry, smile, vocalize) while another part consisted of maternal behaviors (e.g., hold, affection, smile). Frequencies and sequences of observed behaviors then were compiled to form seventy-six measures of interaction and environment quality.

Twenty-six of these variables were factor analyzed, resulting in a primary factor called "optimal maternal care." The composition of this factor included maternal affection, stimulation and responsiveness to infant social and distress cues. Another correlate of this factor was the proportion of time spent interacting with the infant, with mothers scoring high on the optimal maternal care factor associated with higher levels of mutually satisfying interaction time. Overall, this behaviorally derived measure of optimal maternal care (1) closely resembles the concepts of maternal sensitivity and responsiveness described by many macroanalytic rating scales, and (2) reflects the mutually satisfying interaction patterns described in the microanalytic studies.

While important in suggesting behaviors relevant to the quality of mother-infant interaction, the measures used by Clarke-Stewart (1973) were complex and required much data reduction. Noting the problems associated when measuring interaction quality, Bakeman and Brown (1977) devised a dialogic approach for reducing and describing mother-infant interactions. This approach involves viewing the behaviors of the mother and infant as communicative acts. As such, the interaction between them may be described as a sequence of four possible dyadic states: (1) mother alone, (2) infant alone, (3) coaction, and (4) quiescent. Transitions between these various dyadic states then can be used to characterize

the quality of mother-infant interactions. With this approach, responsiveness may be measured by examining the probability of the mother joining the infant in interaction since this probability would reflect the tendency for mothers to respond to the cues of the infant. Specifically, Bakeman and Brown suggested two dyadic transitions that reflected mother-infant responsiveness, the probability of mother joining the infant (infant alone followed by coaction) and the probability of the infant continuing alone (infant alone followed by infant alone). If a mother is responsive "the probability that the infant-alone state is followed by the coacting state will be higher and the probability that the infant-alone state is continued will be lower than if she is not responsive" (Bakeman & Brown, 1977, p.196).

Using the Bakeman and Brown measures of responsiveness may be difficult. These measures may require that the observational data be collected with continuous real-time or very short time-sampling procedures in order to capture fast paced mother-infant interchanges. In such circumstances, a collateral measure of interaction quality that did not depend on specific determination of mother joining the infant could be used. If coaction involved non-aversive behavior only, the probability of coaction following coaction may be useful since this measure would reflect the

probability of mutually satisfying interaction continuing. Higher levels of mutually satisfying interaction have been indicated previously as correlates of mother-infant responsiveness (Clarke-Stewart, 1973; Brazelton et al., 1974). Hence, the dialogic model can be used to create several measures of mother-infant interaction quality.

Although Bakeman and Brown (1977) used the dialogic model in conjunction with a 120 category observation system, the approach does not have to be restricted to this observation form. In that the behavioral categories devised by Clarke-Stewart have been found to relate to the quality of mother-infant interaction quality, perhaps the application of the dialogic model to a behavioral observation system similar to Clarke-Stewart's would provide a closer compromise between the macroanalytic and microanalytic methods. Such measures then would be specific in terms of the behaviors used (i.e., be microanalytic), yet be concerned with the more global style or quality of the interaction (i.e., be macroanalytic).

2. THE SYSTEMS MODEL

In addition to the efforts of researchers to measure the range of mother-infant interaction quality, investigators have tried to identify variables that may

affect the position of mother-infant interactions along the continuum of quality. The choice of study variables, however, has been guided by the conceptual model used. Recently Peterson and Rollins (in press) reviewed the various models used for understanding parent-child interactions. According to this review, four major models have dominated the course of study in parent-child interactions.

First the unidirectional parent model was used, emphasizing the impact of parental characteristics on child development. In reaction to this model, the unidirectional child model was launched. In this case, the characteristics of the child were emphasized as important in influencing parental behavior. Next the bidirectional parent-child model was developed. This model not only included the influence of parental characteristics on the child, but also emphasized the influence of child characteristics on the parent.

The last major model discussed by Peterson and Rollins (in press) was the systems model. Although several systems theories have been proposed (e.g., Bronfenbrenner, 1979; Wahler & Hann, 1986), the basic framework used by each is quite similar. The systemic framework begins with the bidirectional influence of parent and child, such that characteristics of both the parent and child are viewed as important influences in their interactions. This basic

bidirectional model then is expanded to include more general levels of the social system that also may influence parent-child interactions (Peterson & Rollins, in press). Rather than influence the parent and child interactions directly, the more general levels of the social system influence interactions by (1) directly influencing characteristics of just one member of the dyad, or (2) influencing the social environmental conditions in which the dyad functions.

In addition to the levels of the systemic environment affecting parent-child interactions, their interactions may influence the different levels of the environment. Specifically, parent-child interactions may influence directly characteristics of the parent, child, or both. Parent-child interactions also may affect the more general levels of the systemic environment along the same indirect paths of influence noted previously. From a systems perspective then, parent-child interactions are viewed as an embedded hub within an interrelated system of environmental conditions and levels.

In terms of understanding the quality of mother-infant interactions, the use of a systems approach would require an examination of variables both directly and indirectly related to the interaction. Specifically, characteristics of the infant and characteristics of the mother would require consideration since both may directly influence the

interaction. Next to be considered are conditions that may influence mother-infant interactions in an indirect manner. Conditions viewed typically as sources of indirect influence have been aspects of the social network and the broader social environment that surround mother-infant interactions (Belsky, 1984; Wahler & Hann, 1986).

In the pages that follow is a review of the literature that pertains to the systemic conceptualization of mother-infant interaction quality. More specifically, research relevant to the quality of mother-infant interactions will be reviewed in order to discuss key characteristics of the infant and the mother, the social network and the broader social environment.

Characteristics Of The Infant

In relation to affecting interactions with others, the most comprehensive infant characteristic is the child's temperament. Originally studied by Thomas, Chess, Birch, Hertzig, and Korn (1963) in a longitudinal project, infant temperament was defined as the general behavioral style exhibited by the infant. The composition of this general behavioral style involved nine behavioral dimensions: (1) activity level, (2) rhythmicity, (3) approach, (4) adaptation, (5) threshold of responsiveness, (6) intensity of reaction,

(7) quality of mood, (8) distractibility, and (9) persistence.

Studying the variation in patterns of behavior across these dimensions, Thomas et al. (1963) devised three main temperament constellations. The first constellation, easy temperament, was characterized by biological regularity, high adaptability and generally positive mood. Opposite this was the difficult temperament, characterized by biological irregularity, non adaptability and intense, frequently negative mood. The last major constellation was known as the slow-to-warm-up temperament. Infants displaying this form of temperament tended to exhibit slow adaptation to novel experiences coupled with irregularity and mildly intense reactions.

By studying these temperament constellations across developmental periods, Thomas and colleagues were able to describe the impact of infant and child temperament on parent-infant and child interactions. During infancy, the easy infant was often associated with higher levels of parental stimulation and subsequent developmental growth since these infants adapted quickly to schedules and family living patterns. On the other hand, the intense and irregular style of the difficult infant was associated frequently with parental feelings of inadequacy and resentment. During later childhood, children displaying

difficult temperament were more frequently associated with child behavior disorders. Reviewing these findings, Thomas and Chess (1977) suggested that infants displaying difficult temperament may place special hardships on parent-child interactions.

Since the pioneering work of Thomas and colleagues, investigators have continued to study the influence of infant temperament on mother-infant interactions. Klein (1984) studied the relationship between mother-infant interaction variables and maternal ratings of infant temperament. All 40 middle-class mother-infant pairs were visited in the home when the infants were 6 and 12 months old in order to obtain everyday interaction information. Correlations between the maternal ratings of infant temperament and the observational data indicated that easier infants received higher levels of sensory and social stimulation in contrast to more difficult infants.

Focusing more on the correlates of difficult temperament, Milliones (1978) studied a sample of 24 inner-city black mothers and their infants. After several visits to a family clinic, mothers were asked to complete a temperament questionnaire. During this same visit, family specialists familiar with the mother and infant completed rating scales concerning the quality of mother-infant interactions. Results indicated that more difficult infant

temperament, as rated by the mother, was associated with less responsive mother-infant interactions, as rated by the family specialists.

In a similar study, Campbell (1979) examined the relationship between maternal ratings of infant temperament and in-home behavioral observations of everyday mother-infant interactions. These results basically complimented the findings of Milliones in that infants rated as highly difficult were associated with less responsive mother-infant interactions. Campbell concluded from this research that difficult infant temperament "may set the stage for the development of less responsive and sensitive mothering in some mother-infant dyads" (p.75).

Further support for the hardships placed on mother-infant interactions by difficult infant temperament has come from work in child maltreatment. Both Egeland and Brunnequell (1979) and Vietze, Falsey, Sandler, O'Connor, and Altemier (1980) followed a large sample of low-income mothers and infants from several months prior to birth through one year postpartum. Each study found that a combination of measures including maternal personality, low mother-infant interaction quality and difficult infant temperament best predicted an outcome of early maltreatment. While not indicated as the most predictive variable in either study, the results of Egeland and Brunnequell (1979) and Vietze et al. (1980)

support the idea that infant temperament, particularly difficult temperament, may influence the quality of mother-infant interactions.

The most common method used for measuring infant temperament has been maternal questionnaires that ask mothers to rate the ease involved in caring for the infant (Hubert, Wachs, Peters-Martin, and Gandour, 1982). Although this is a relatively quick and easy way of collecting information, maternal subjectivity and bias also are more likely. Indeed, Bates (1980) has suggested that use of maternal questionnaires provides one more with a measure of the mother's perception of infant temperament rather than with a measure of unique infant temperament. This position, however, is not without controversy. Some investigators have argued that maternal ratings are accurate measures of unique temperament (e.g., Thomas, Chess & Korn, 1983), while others suggest that maternal ratings of infant temperament reflect the interactive system that exists between mother and infant (e.g., Rothbart, 1982). Although controversy surrounds the accuracy of maternal ratings, Hubert et al. (1982) concluded in their review of temperament measures that maternal ratings remain the method of choice when examining the relationship between infant temperament and mother-infant interaction.

In summary, infant temperament has been found related to the quality of mother-infant interactions. Infants who are rated by their mothers as easy have been associated with higher levels of sensory and social stimulation, while infants rated as difficult have been associated with lower levels of maternal responsiveness and care. Therefore, including a measure of infant temperament in a systemic examination of mother-infant interaction quality appears warranted.

Characteristics Of The Mother

By virtue of having greater influence in the relationship, as well as more control in determining environmental factors, the behaviors and characteristics of the parents play a central role in developing parent-child interaction patterns. One of the earliest investigations of the impact of maternal personal characteristics on early childrearing was conducted by Shereshefsky and Yarrow (1973). The basic focus of this study was to determine if maternal personality characteristics were related to early mother-infant adaptation. Fifty-seven middle-class couples were interviewed and observed repeatedly from early pregnancy to 6 months postpartum. Based on the interview data collected, prenatal maternal characteristics were correlated

with postnatal mother and infant adaptation. Two major maternal variables were found to relate to the level of maternal adaptation: (1) ego strength, tapping cognitive and emotional maturity; (2) nurturance, reflecting responsive and giving qualities. Mothers displaying higher levels of both ego strength and nurturance were associated with more acceptance, confidence and responsiveness in dealing with their infants. In turn, these highly adaptive mothers were found to have highly adaptive infants. Basically then, Shereshefsky and Yarrow (1973) found that maternal personal characteristics were related to the quality of early mother-infant interaction. Of particular relevance to adaptive mother-infant interaction were the characteristics of ego strength and nurturance.

A more recent study by Heinicke, Diskin, Ramsey-Klee, and Given (1983) found results similar to Shereshefsky and Yarrow (1973). In the Heinicke et al. study, 46 families were interviewed and observed repeatedly from pregnancy through 12 months postpartum. Factor analysis of the numerous measures collected resulted in a major factor predictive of both infant development and maternal responsiveness at 12 months. This adaptive-competence factor, composed mainly of the maternal personal characteristics of ego strength, basic trust and persecutory ideas, was interpreted

by the investigators as an index of efficient, non anxious and flexible approaches to problem-solving.

Taken together, the Shereshefsky and Yarrow (1973) and Heinicke et al. (1983) studies suggest that maternal characteristics may influence the adaptation of mother-infant interactions. More specifically, a general maternal characteristic reflecting the overall ability to cope and meet the demands of the environment was suggested by both studies as important in influencing the quality of mother-infant interactions.

Complementing and extending the research on the influence of maternal characteristics is the work conducted by B. Egeland and colleagues (Egeland & Brunquell, 1979; Egeland, Breitenbucher & Rosenberg, 1980; Brunquell, Crichton & Egeland, 1981; Egeland & Faber, 1984). This body of literature was based on a large longitudinal project studying a variety of factors related to the quality of infant care. A total of 267 primiparous, inner-city, low-income mothers and their infants were studied repeatedly from 36 weeks of pregnancy to 1-2 years postpartum. The battery of tests, administered to mothers both at 36 weeks pre- and 3 months postpartum included measures of the following personal characteristics: aggression, defedence, impulsivity, succorance, social desirability, anxiety, locus of control, maternal perceptions of pregnancy, and attitudes about

parenting. Home observations of mother-infant interactions were conducted at 3 and 6 months, while measures of infant characteristics and development were conducted at birth, 6, 9, 12, and 18 months. During the investigation, four groups of quality of maternal care were identified based on ratings of the amount of violence and neglect present in the home environment: (1) excellent care, (2) adequate care, (3) inadequate care, and (4) abusive care. Similar to the previously reported studies, Egeland and Brunquell (1979), Egeland et al. (1980) and Brunquell et al. (1981) reported that mothers providing excellent or adequate care were found to score higher on a psychological complexity factor (reflecting integrity of ego functioning and ability to deal with life experiences), have a greater understanding of children and parenting, and score lower on measures of aggression and suspicion when compared to mothers providing inadequate or abusive care.

In addition to the relationship between these maternal personal characteristics and the quality of maternal care, Egeland and Brunquell (1979) and Egeland and Faber (1984) found that both maternal characteristics and an understanding of the psychological complexity of the infant were related to the quality of the mother-infant relationship. Specifically, Egeland and Faber (1984) reported that mothers capable of integrating the positive and negative aspects of

childrearing tended to have infants who both formed and maintained secure attachment relationships. Where as, mothers scoring higher in aggression and suspicion were associated with infants who developed insecure attachment relationships at some time during the first two years of life.

The results of the Egeland studies are supported further by findings in the child abuse literature. In comparison to non-abusive mothers, abusive mothers have been found to score in the following manner on measures of maternal personal characteristics: higher aggression, lower impulse control, lower self-esteem, and less positive feelings about children (Spinetta, 1978; Friedrich & Wheeler, 1982; Watkins & Bradbard, 1982). In an extensive review of the literature relating parental characteristics to abuse, however, Wolfe (1985) cautions that such characteristics may not be indicative of abuse only. Rather, these personal characteristics may relate to general problems in parenting. In either case, this abuse literature suggests that maternal personal characteristics, such as aggression and anxiety, may be related to lower quality mother-infant interactions.

In addition to the maternal characteristics associated with abusive care, the relationship between maternal depression and the quality of maternal care recently has received attention. Sameroff, Seifer, and Zax (1982) conducted a

large longitudinal study of the impact of maternal mental illness on the quality of infant care and development. Over 300 women were recruited for the project which ran from the prenatal period through 30 months postpartum. During this time mothers were assessed for the presence, type and severity of psychopathology. Also, assessed were mother-infant interactions observed in the home at 4 and 12 months and infant development at 12 and 30 months. Results indicated that severity, chronicity and type of psychopathology were related to the quality of mother-infant interactions and infant development. Generally the more severe or chronic the mother's pathology, the lower the mother-infant interaction quality (in terms of involvement and positive behavior) and the lower the infant development. Comparisons of psychopathology types indicated that neurotically depressed mothers displayed the least amount of involvement with their infants and had infants achieving the lowest developmental scores. These results led Sameroff et al. (1982) to conclude that "if one were to choose a diagnostic group where children were at risk, it would be neurotic depression..." (p.58).

Not only has clinical depression been found influential, but also more situationally specific forms of depressed maternal behavior have been shown to affect mother-infant interactions. Cohn and Tronick (1983)

conducted an experiment where mothers were asked systematically to vary their facial expressions from normal (i.e., typical behaviors) to depressed (i.e., slow speech and reduced movement). Results indicated that infants tended to play and emit positive behaviors during the normal phases. During the depressed phases, however, infants emitted few positive behaviors and spent half of the time in protest or wary conditions. Based on these findings, Cohn and Tronick (1983) speculated that early environments where infants were confronted continually with depressed maternal behavior would place the infant at risk for social development.

Overall, previous research has suggested that maternal personal characteristics may influence the quality of mother-infant interactions. Mothers who are able to cope with their life situations as well as understand the complexity and ambivalence that goes with parenting have been associated with higher quality mother-infant interactions. On the other hand, mothers who do not display such high levels of coping or who tend to feel anxious, suspicious, or depressed have been associated with lower quality mother-infant interactions.

In addition previous research has indicated that the most common method for measuring this range of maternal personal characteristics is factor analysis of extensive test batteries (e.g., Egeland et al., 1980). Although capable of

including a variety of personal attributes, factor analytic methods tend to be expensive, both in time and in money. A recently developed measure, however, may provide a relatively efficient assessment of the characteristics relevant to the quality of mother-infant interactions. The Child Abuse Potential Inventory (CAP) (Milner, 1980) is a 160 item questionnaire concerning personal and parental opinions. Research to date has found scores on the CAP to relate to measures of self esteem, ego strength, anxiety, and depression (Milner, 1986). Also, CAP scores have been shown to vary with the quality of caretaking with nurturing parents receiving low CAP scores, at-risk for problems in parenting parents receiving higher scores and abusive parents receiving the highest set of scores. Similarly, the CAP scores have been used to discriminate successfully between groups of low at-risk, at-risk, high at-risk, and abusive parents (Milner & Wimberly, 1979; Milner & Ayoub, 1980; Milner, 1986). While the initial validity information on the CAP appears promising, no information to date is available on the relationship between the CAP and the quality of mother-infant interactions. Such information, however, would be very important for future intervention and prevention programs.

The Social Network

The social network refers to interactions and relationships with a spouse, relatives, friends, neighbors and other acquaintances (Unger & Powell, 1980; Crnic, Greenberg, Rugozin, Robinson, & Busham, 1983). Examining the importance of the social network for family functioning typically has involved an appraisal of the amount of support provided by the network to the parents. Specifically, Crockenberg (1981) studied the relationship between maternal self reports of network support to later measures of the quality of infant attachment. Results indicated that maternal social support was related to the quality of attachment with high social support associated with secure infant attachment. In addition to attachment, Powell (1980) reported that maternal social support also may relate to mother-infant interaction quality. Using the frequency of contact with friends per week and the provision of child care as an index of network support, Powell found that mother-infant interactions rated as responsive were more likely with mothers reporting higher levels of social network support.

In conjunction with this research, an association between social network support and child maltreatment has been

suggested. Polansky, Chalmers, Bittenwieser, and Williams (1979) conducted interviews with both normal and neglectful parents in regard to the frequency and variety of social network contact. Ratings of the interview data indicated that 86 percent of the normal families were considered to experience social support, while over one-fifth of the neglectful parents were found to report no support from or contact with a social network.

Similar results were reported by Salzinger, Kaplan and Artemyeff (1983) when comparing the degree of social support experienced by abusive versus normal parents. A structured interview designed to elicit a list of all members of the maternal social network plus the estimated frequency of contact with each member over the past year was used to measure the degree of social support. Results indicated that abusive parents had smaller social networks and had less contact with network members than normal parents; abusive parents were found to be more socially isolated.

This entire area of research has led several investigators to conclude that the level of support received from the social network is an important variable to consider when trying to understand the quality of mother-infant or mother-child interactions (Garbarino & Sherman, 1980; Unger & Powell, 1980; Cicchetti & Rizley, 1981; Belsky, 1984). Previous research has indicated that higher levels of social

support are associated with more adaptive family interactions while lower social support or social isolation correlates with maladaptive parenting.

Noting that support from the social network may influence the quality of family functioning, several investigators have tried to determine which members of the social network provide the most influence in relation to mother-infant interactions. In the previously discussed study by Shereshefsky and Yarrow (1973) concerning maternal adaptation during the infant's first year, interviews with the young parents also tapped into the quality of their marital relationships. This information revealed that marital adjustment during the postnatal period correlated directly with maternal adaptation.

Examining the influence of husband-wife interactions on mother-infant interactions was the specific purpose of the Pedersen (1982) study. Thirty-nine middle-class families were studied during the first few months of the postnatal period. Ratings of mother-infant interaction quality were made during a feeding at approximately 4 weeks, while the quality of husband-wife interactions were based on psychiatric interviews with the fathers at 4-5 weeks. Similar to Shereshefsky and Yarrow (1973), Pedersen (1982) found the quality of mother-infant interactions to correlate with the quality of marital relations. Mothers rated as

effective in feeding their infants were associated with husbands who evaluated positively their wife's skills in mothering. Conversely, mothers rated as inept in feeding their infants were associated with husbands who reported marital tension.

In addition to the spouse, other members of the maternal social network have been correlated with the quality of mother-infant interaction. Crnic et al. (1983) measured general life satisfaction, satisfaction with parenting and ratings of mother-infant interaction quality with satisfaction with three different levels of the social network: (1) intimate (spouse/partner), (2) friendships, and (3) neighborhood/community. In addition to finding intimate support related to all measured forms of satisfaction and interaction quality, friendship support was found to correlate with satisfaction with parenting.

In a related study, Wandersman, Wandersman and Kahn (1980) related support from spouse and other members of the social network to indices of general, marital and parental adjustment in couples with young infants. Their results indicated that support from family and friends, rather than the spouse, had the strongest relationship with maternal adjustment.

Research to date has suggested then that several different aspects of the social network may influence the

quality of mother-infant interactions. Members of the social network which have been indicated as important are the spouse, family and friends.

While researchers tend to agree on who provides influential social support, deciding exactly what and how such support is to be measured is not clear. In terms of the what, questions concerning whether social support should reflect the quantity or quality of network associations have been raised. As indicated earlier, research with neglectful and abusive families indicated that the frequency of network contact was the critical dimension (e.g., Polansky et al., 1979). Other researchers, however, have found that the quality of social network interactions is more influential to family functioning. Belle (1982) reported in a study concerning the lives of women and children living in poverty that neither the size or frequency of contact with the social network was associated with adaptive maternal health. Instead, the quality of their relations, from helpful to stressful, was related to measures of maternal mental and physical health.

Similarly, Crittenden (1985) assessed the quality of maternal social networks and related this information to the quality of maternal care. One hundred and twenty-one mothers and their infants were classified into five maternal care groups: abusive, abusive/neglectful, neglectful, marginal

maltreatment, and adequate care. In the interviews designed to gather social support information each mother was asked to list the five people she knew best and describe the length, nature of and her satisfaction with each relationship. Results indicated that all quality of care groups reported frequent contact with their social network, but adequate care mothers reported longer association and greater satisfaction with social network contacts.

Essentially, both quantity and quality of social network contact have been indicated by research as important aspects to include in measures of social support. However, little consensus exists as to how this information should be collected. In terms of how this information should be collected, research to date has relied on maternal interview procedures. Many of these interviews, however, have required the mothers to recollect the frequency or satisfaction with network contacts over lengthy or indefinite periods of time (e.g., Crnic et al., 1983; Salzinger et al., 1983). Although measures of social support do require some respondent subjectivity, methods that involve such global recollections may be subject to unduly high levels of distortion. Methods that focus on shorter or more specific time periods, therefore, may provide less biased maternal social support information.

The Broader Social Environment

In the social sciences, an individual's position in the broader social environment has come to be known as one's socio-economic status (SES). SES includes then an array of societal conditions such as income, education, occupation, housing and community safety among others (Belle, 1982). Both Tulkin and Kagen (1972) and Kibride, Johnson and Streissguth (1977) studied the influence of SES on mother-infant interactions by comparing middle to low SES dyads with behavioral observations made in the home. In both studies, middle SES mothers were found to spend more time vocalizing to their infants. Such SES differences were not found in comparisons of maternal tactile behavior or infant behavior measures.

Similar results were reported by Field and Pawlby (1980) in a study examining the effects of SES on mother-infant interactions in a laboratory situation. In this case, middle-class mothers and their infants were both found to vocalize more frequently than lower-class mother-infant pairs. Both Tulkin and Kagen (1972) and Field and Pawlby (1980), however, suggested that the observed SES differences in maternal behavior may have been due to a sub group of

highly vocal middle-class mothers rather than lower-class deprivation.

In terms of specific interactive behavior, previous research has suggested that SES may influence mother-infant interactions particularly with regard to the frequency of maternal vocal behavior. Moving to more molar measures of mother-infant interaction quality has produced less clear results. Lewis and Wilson (1972) studied the effects of SES on mother-infant interactions in a sample of 32 mothers and their 3 month old infants. Using a behavioral observation system, an index of maternal contingent responsiveness to infant signals was measured for each pair. Although the probability of mother vocalization following infant vocalization was higher for middle-class dyads, no SES differences were noted on a measure of maternal responsiveness that included responding to both vocal and physical infant signals.

Farren and Ramey (1980) studied mother-infant interactions at two developmental time periods in order to determine both if and when SES became an influential factor. Mothers and their infants were observed in a semi-naturalistic situation first when the infants were 6 months old and again when the infants were 20 months old. Factor analysis of the observation data revealed a dyadic involvement factor, composed of maternal vocalization and

involvement, at both 6 and 20 months. At 6 months the proportion of middle and low SES dyads falling in the favorable range of this dyadic involvement factor was essentially the same. The distribution of the 20 month scores, however, indicated that a higher proportion of middle SES dyads were now falling in the favorable range. In light of these results, Farran and Ramey (1980) suggested that the effect of SES on the quality of mother-infant interactions does not become noticeable until between the period of 6 to 20 months.

Lastly, Field (1980) reported on a study assessing the influence of SES on mother-infant interaction when infants were 4 months old. In this case, ratings of mother-infant behavior were conducted while watching a filmed feeding and face-to-face interaction. These results indicated definite differences in interactive behaviors as a function of SES, with low SES mothers vocalizing less and behaving in a less responsive manner. Unfortunately, Field (1980) did not specify whether this measure of maternal responsiveness included maternal responding to both vocal and physical infant signals.

In general, the research relating mother-infant interaction quality to SES has indicated that lower-class mothers may be less vocal with their infants. The relationship between SES and other interaction qualities, such as

responsiveness, has been less distinct. If responsiveness is limited to vocal behaviors, then lower SES dyads may appear to have lower quality interactions. Similarly, if observations are conducted during the latter part of the infancy period, then lower SES dyads may appear to be less responsive. Lastly, the location of the observation may influence the effect of SES with laboratory observations revealing stronger SES differences than home observation.

Although research on mother-infant interaction quality as related to SES has not been conclusive, more epidemiological measures have been cited to suggest the importance of SES on the quality of family life. Lower SES has been associated with poorer cognitive and socio-emotional child development (e.g., Elmer, 1977; Farran & Ramey, 1980), higher levels of adult psychopathology and higher incidence rates of child maltreatment (e.g. Steinberg, Catalano & Dooley, 1981; Sameroff et al., 1982). From a longitudinal project of abused and normal children, Elmer (1977) concluded that low SES was more devastating for child development than early child maltreatment. Not surprisingly then, investigators frequently target lower SES populations as at risk for problems in adaptive family functioning and child development (Egeland & Brunquell, 1979; Cicchetti & Rizley, 1981). Taking this epidemiological information together with the previous mother-infant interaction quality research

suggests that SES may be an important variable to consider in studies of the mother-infant interactive system.

As for measuring SES, researchers have used a diversity of indices. Across the reviewed research, some studies used a measure of paternal occupation (Tulkin & Kagen, 1972; Crockenberg, 1981), some relied on an index of income and/or maternal education (Elmer, 1977; Kilbride et al., 1977; Farrer and Ramey, 1980), while another did not report the measures used to determine SES (Field & Pawlby, 1980). Mueller and Parcel (1981) reviewed the methods used by developmental researchers in measuring SES and concluded that inconsistency of measurement was more the rule rather than the exception. Although several formats for computing SES were discussed, Mueller and Parcel (1981) emphasized the variables of income, education and occupation as three of the most salient SES indicators. Thus while little consensus exists presently on how to measure SES, researchers are beginning to agree on the components important to measure.

CHAPTER III

THE PRESENT STUDY

Previous research has indicated that the quality of mother-infant interactions may be conceptualized as falling along a continuum from high quality responsive interactions, to less sensitive interactions, all the way to low quality abusive interactions (Main & Goldwyn, 1985). As such, an important task for both basic and applied research is the identification of factors that influence the direction of interaction quality. More specifically, identifying the factors that influence interaction quality not only will provide important information concerning the course of development, but also indicate possible ways to promote adaptive child development.

Research of potential factors, however, has been and continues to be guided by the conceptual framework used. The systems model, the framework of current choice, conceptualizes mother-infant interactions at the hub of an interrelated system of environmental levels. Some levels of the environment may relate directly to mother-infant interaction patterns (e.g., personal characteristics of the interactants), while other levels may relate less directly by involving only one member of the dyad (e.g., maternal

social interactions) or influencing the environmental conditions in which the interaction takes place (e.g., SES) (Belsky, 1984). Understanding variations in mother-infant interactions from this perspective then requires consideration of each level of the systemic environment. Previous research has indicated the following systemic levels and within level variables as possible influential factors: infant characteristics - infant temperament, maternal characteristics - maternal personal characteristics, the social network - social support, and the broader social environment - SES.

Also noted previously were issues and problems encountered when trying to measure many of these variables. Mentioned first was the unsolved problem in trying to measure mother-infant interaction quality. Some researchers have decided on global rating scales that capture the total flavor of interactions, but lack clear behavioral referents and definitions (e.g., Osofsky & Culp, 1986). Others have used measures of specific behavioral sequences that provide clear definitions, but require tedious and time consuming analysis (e.g., Brazelton et al., 1974). A recent method of analyzing behavioral observation data may provide a compromise between these two measurement extremes. Bakeman and Brown (1977) discussed the use of coding intervals of behavioral data in terms of communicative dyadic states.

Interaction quality then may be measured by examining transitions between these dyadic states.

In addition to measuring interaction quality, researchers have been grappling with measures of maternal personal characteristics. Research that spans the interaction quality continuum has indicated a wide variety of personal characteristics that may relate to mother-infant interaction, e.g., ego strength, anxiety, depression and attitudes about child rearing. Although each of these characteristics can be measured by specific individual inventories, finding a single measure that captures this spectrum of personal characteristics would be both a useful and parsimonious technique. The recently developed CAP inventory appears to be a promising measure of such personal characteristics, but requires further investigation as to its relationship with the quality of mother-infant interactions.

Lastly, research concerning the influence of maternal social support has suggested that the source, quantity and quality of contact with others are all important facets of social support. However, attempts to measure these dimensions of social support have relied often on long-term recall of the respondents. Measures of social support that involve shorter time spans for recall then may involve less potential for memory distortion and bias.

1. PURPOSES AND HYPOTHESES

The present study was designed to examine the continuum of mother-infant interaction quality from a systemic perspective. Specifically, indices of mother-infant interaction quality were related to measures of infant temperament, maternal personal characteristics, social support and SES. Furthermore, relatively new measures of mother-infant interaction quality, maternal personality and social support were selected in an attempt to overcome some of the previously noted problems of measurement in this area.

On the basis of the previously reviewed research, the following hypotheses concerning the relationship between mother-infant interaction quality and the systemic environment were developed for the present study:

Hypothesis One - The quality of mother-infant interactions will be related to (1) infant temperament, with higher quality associated with easier temperament, (2) maternal personal characteristics, with higher quality correlated with more adaptive personality characteristics, (3) social support, with higher quality associated with greater social support, and (4) SES, with higher quality correlated with higher SES. Hypothesis Two - In terms of explaining the

continuum of interaction quality, a combination of variables that involves all four aspects of the systemic framework will be found useful in understanding variation in early mother-infant interaction quality. Hypothesis Three - As a group, mother-infant dyads that display higher quality interactions will have easier infant temperament, more adaptive maternal personality, higher social support and higher SES associated with them than dyads that display lower quality mother-infant interactions.

CHAPTER IV

METHOD

1. SUBJECTS

Forty-four mothers and their 3 to 6 month old infants originally agreed to participate. In order to be eligible for participation the following three criteria had to be met: (1) the family had to live within the Knox County, TN area, (2) mothers could not have full-time employment outside of the home, and (3) infants had to be free of gross malformations or congenital defects. Out of the original 44 dyads, ten dyads were dropped from the study with four moving to different areas, three deciding not to participate, two returning to full-time employment, and one having an infant diagnosed with a congenital defect. In that little or no data were collected for these ten dyads, only the 34 dyads for which complete data existed were used in the following analyses.

During the first visit to the home, basic demographic information was collected from the mother (see Appendix A). Summaries of this information are presented in Tables 1 and 2. The mean age of the sample infants was 140.2 days, or approximately 5 months. A larger proportion of the sample

Table 1. Means, Standard Deviations and Ranges of Several Sample Characteristics

Sample Characteristic	Mean	Standard Deviation	Range
Infant Age (days)	140.2	29.7	100.0 - 212.0
Number of Children	1.8	1.0	1.0 - 4.0
Mother Age (years)	27.5	4.8	18 - 36
Education (years)	13.9	2.3	10 - 18
Income	4.3	2.9	1 - 9

Table 2. Distribution of the Sample Across the Nine Measured Income Brackets

Income Brackets	Proportion of Subjects
Less than \$ 4,999	29.4
\$ 5,000 - \$ 9,999	5.9
\$10,000 - \$14,999	14.7
\$15,000 - \$19,999	2.9
\$20,000 - \$24,999	5.9
\$25,000 - \$29,999	11.8
\$30,000 - \$34,999	11.8
\$40,000 - \$44,999	5.9
\$45,000 and Above	11.8

infants was male, with only 32.4 percent being female ($\chi^2=4.24$, $df=1$, $p \leq .05$). In terms of birth order, however, the sample was more evenly divided with 47.1 percent first born and 52.9 percent second or later born. For sample mothers, the mean age was 27.5 years and the mean years of education was 13.88.

As can be seen in Table 2, income was measured on a nine point scale with 1 representing the lowest income bracket (0 to \$4,999) and 9 representing the highest income bracket (\$45,000 and above). Although the mean income for the sample was 4.3 (S.D.=2.9), or the \$15,000 to \$19,000 bracket, the information presented in Table 2 indicates that subject dyads were distributed across all measured income levels. However, race and marital status were not distributed across the various income levels. The two black dyads and the ten single parent dyads in the sample were all lower income. As Belle (1982) has indicated, however, both minority status and female head of household tend to be correlates of lower income. The confounding of both race and marital status with income, therefore, may not be atypical characteristics of the selected sample.

In addition to these basic measures, intercorrelations among the descriptive variables were conducted in order to further investigate qualities of the sample. Table 3 presents several interesting correlational patterns within

Table 3. Intercorrelations Among the Descriptive Variables of the Sample

	Infant Sex	Infant Age	Birth Order	Mother Age	Education
Infant Age	-.39*	_____			
Birth Order	-.02	-.15	_____		
Mother Age	-.33 ^a	.15	.13	_____	
Education	-.06	.17	-.07	.64**	_____
Income	-.33*	.25	.23	.74**	.69**

^aCorrelation approached significance with $p=.06$.

* $p<.05$.

** $p<.001$.

the sample. First, a significant relationship was found between the age and sex of the infants, with older age associated with female infants. Further examination of the mean infant age for each sex revealed that, on the average, female infants in the sample were 3.4 weeks older than the male infants in the sample. Also found was a tendency for infant sex to vary with the age of the mother ($r = -.33$, $p = .06$) and income ($r = -.36$, $p = .05$). Again, female infants tended to be associated with older mothers and higher income in this sample. The relationship between infant sex, mother age and income, however, was affected by the high correlation between mother age and income. When partial correlations were performed between these three variables (see Table 4), infant sex was found to have small and insignificant relationships with both mother age and income. Yet, mother age and income were found to be highly related when infant sex was controlled.

Besides the noted correlation between mother age and income, both variables were found to vary with maternal education. Higher maternal education was associated with both increased maternal age and higher income. The partial correlations for this cluster of variables also are presented in Table 4. The partial correlations indicate that there was only a slight relationship between mother age and education ($r = .27$, $p = .06$). The relationship between income

Table 4. Partial Correlations Between Selected Descriptive Variables of the Sample

Variable Controlled	Variables Correlated	<u>r</u>
Income	Mother Age x Infant Sex	-.13
Income	Mother Age x Grade	.27 ^a
Infant Sex	Mother Age x Income	.69***
Education	Mother Age x Income	.51***
Mother Age	Infant Sex x Income	-.15
Mother Age	Education x Income	.44**

^aCorrelation approached significance with $p=.06$.

** $p \leq .005$.

*** $p \leq .001$.

and education ($r=.44$, $p<.005$) as well as income and mother age ($r=.69$, $p<.001$), however, remained strong when mother age and education were controlled, respectively. The intercorrelations between mother age, education and income are not entirely surprising in that a growing number of women in today's society choose to pursue educational and financial objectives prior to beginning family life.

2. MEASURES

The purpose of this study was to relate indices of mother-infant interaction quality to measured levels of the systemic environment. In this way the usefulness of the systems model for understanding mother-infant interaction quality could be investigated. A behavioral observation system was developed in order to assess everyday mother-infant interaction quality in a manner that was neither as microanalytic as stop-frame filmed analysis or as macroanalytic as rating scales. The following four aspects of the systemic environment then were measured and related to the developed indices of interaction quality: infant characteristics (infant temperament), maternal personal characteristics, the social context (social support), and the broader social environment (SES).

The Behavioral Observation System

The recently derived Mother-Infant Behavioral Observation System (MIBOS) (Appendix B) reflected previous observation formats for observing mother-infant/child interaction (e.g., Clarke-Stewart, 1973; Dunn, Barker and Wahler, 1981). The MIBOS is a 15 second continuous time-sampling procedure that includes 18 mother and 13 infant behavioral categories (see Appendix B for a complete listing of the 31 behavioral categories). Behavioral categories were selected both on the basis of utility in previous research and usefulness in describing mother-infant interactions observed by the investigator.

Two forms of time-sampling schemes were used with the MIBOS: momentary time-sampling and partial interval time sampling (Saudargas & Lentz, 1986). Momentary time sampling was used during the first few seconds of each 15 second observation interval and involved categories descriptive of the behavioral setting, e.g., toy play, feeding and caretaking. Partial interval time sampling then was used for the remainder of each 15 second interval. During this time the remaining behavioral categories, those more descriptive of the specific components of mother-infant interaction, were scored on the basis of occurrence. Examples of these

more specific categories were mother vocalizes to infant, infant vocalizes to mother, mother displays affection towards the infant, and infant smiles at mother.

Infant Temperament

The Revised Infant Temperament Questionnaire (RITQ) (Carey & McDevitt, 1978), a parent-answered instrument, was selected to assess the nine areas of infant temperament: activity level, rhythmicity, approach, adaptation, threshold of responsiveness, intensity of reaction, quality of mood, distractibility, and persistence (Appendix C). The RITQ is one of the more psychometrically sound caregiver-answered infant temperament questionnaires. The standardization sample consisted of 203 4 to 8 month old infant-mother pairs of middle class background (Carey & Mc Devitt, 1978). From this sample adequate measures of internal consistency were found for each of the nine subscales ($\underline{r}=.49$ to $.71$) and for the total test ($\underline{r}=.83$).

Each of the 95 items on the questionnaire asks respondents to rate the frequency of specific infant behavioral events from one (almost never) to six (almost always). These ratings were compiled to yield subscale scores for each of the nine areas, with higher scores indicative of more difficult temperament characteristics

(Beberian & Snyder, 1982). The subscale scores for the five areas of temperament indicated by Thomas and Chess (1977) as important in defining difficult and easy infants then were added to form a difficult temperament index. Specifically the subscale scores of rhythmicity, approach, adaptation, intensity and mood were summed, with high scores indicative of more difficult temperament and lower scores indicative of easier temperament. Although the remaining four areas of temperament were not included in the definition of difficult-easy temperament, each area was a defined aspect of infant temperament according to Thomas and Chess. The individual subscale scores for activity, persistence, distractibility and threshold, therefore, were included as measures of infant temperament. Again, higher subscale scores for each area reflected more difficult aspects of infant temperament.

Maternal Personal Characteristics

A 160 item self-administered inventory, known as the Child Abuse Potential inventory was selected to measure maternal personal characteristics (Milner, 1980). Since this study was not concerned with assessing individual abuse potential, the alternate title of this inventory, Questionnaire IV (QIV), will be used (Appendix D). The QIV

asks respondents to either agree or disagree with personal and parental opinions. Out of the total items, 77 items have been found to discriminate significantly between known abusers and comparison subjects. These 77 items subsequently have been factor analyzed revealing seven principal factors: distress, rigidity, child with problems, problems from family and others, unhappiness, loneliness, and negative concept of child and self (Milner & Wimberly, 1979). Based on a large sample of control, at-risk, neglectful and abusive groups ($N > 2,000$), measures of internal consistency for these 77 items have been computed and found to range from $\underline{r}=.87$ to .99. Since development, the QIV has been given to nurturing, low-risk for parenting problems, high-risk for parenting problems, abusive and neglectful parents. By examining the mean scores for these groups in Milner (1986), a tendency was noted for scores to vary with the quality of care such that nurturing parents had the lowest scores and abusive parents had the highest. On the basis of this information, the QIV was selected as the measure of maternal personal characteristics, with higher scores indicative of more problematic personal characteristics.

Social Support

The Community Interaction Checklist (CIC) is an interviewer administered checklist concerning a respondent's social contacts over the previous 24 hour period (Wahler, Leske, & Rogers, 1978) (Appendix E). Relevant categories of the checklist include the identity of the social contact (e.g., friend, kin, spouse) and the valence of the contact for the respondent (from -3 = very negative through 0 = neutral to +3 = very positive).

In terms of measuring social support then, the CIC allows for both quantity and quality measures of social support to be computed. The measure of social support quantity was the frequency of contact with friend, kin and spouse that was rated positively. Rather than a frequency based measure, a proportional measure was used to tap the quality of the social network. Specifically, out of all contacts with spouse, friend and kin the proportion that was rated positively was used as the measure of social support quality. This latter measure was thought to provide more qualitative information since an indication of all positive contact with the social network would be experienced as more supportive than only a portion of positive contact with the social network.

SES

Since income and education have both been indicated as important aspects of SES, both variables were used to form a composite SES index. Simple addition of the two scores to form a composite was not possible due to the different scales of measurement used for each variable. In order to correct for this, each subject was rank ordered in terms of income and education. The sum of the ranks for each subject then became the composite SES score, with higher values representing higher SES.

3. PROCEDURES

Seven 1 hour video tapes of in-home mother-infant interaction were collected by the investigator. Four of these tapes were marked-off into a series of 15 second intervals by dubbing the word "observe" at each 15 second mark. These tapes then were scored via the Mother-Infant Behavioral Observation System (MIBOS) by the investigator and an assistant in order to create four master tapes for observer training.

Originally, seven junior/senior status female undergraduates at the University of Tennessee were recruited for training. Training involved memorization of the

behavioral codes used on the data sheets (see Appendix B), followed by two to three hours per week practice scoring of portions of the master tapes. During the practice scoring sessions, observers were encouraged to discuss disagreements between themselves, the investigator or the assistant. Supplementary written tests of the behavioral categories were issued also, but on a monthly basis.

Completion of training involved reaching an overall percent agreement of 75 percent or above for a 10 minute section of a pre-scored test tape. Overall percent agreement referred to the number of agreements per interval divided by the number of agreements plus disagreements per interval over all behavioral categories. Agreements for a category did not include intervals where both the observer and test tape observed no occurrence of the behavior. Three observers passed this criterion: observer A scoring 75 percent, observer B scoring 76 percent and observer C scoring 81 percent. Due to the small number of eligible observers, the investigator decided to performed some data collection in addition to field reliability checks.

In addition to the training on the use of Mother-Infant Behavioral Observation System (MIBOS), the observers were instructed in the collection and administration of the basic demographic information, the Revised Infant Temperament Questionnaire (RITQ) and the Community Interaction Checklist

(CIC). This instruction involved familiarization with the items on each measure and practice presentation of each instrument with a fellow observer.

Initial contact with prospective subjects was conducted by staff at social service agencies and pediatric offices, as well as by personal associates of the investigator. This contact involved presenting mothers with a letter descriptive of the project (Appendix F). Mothers completing the bottom portion of the parent letter were later contacted by the investigator, given a brief description of the study goals and procedures, and asked to sign an informed consent form (Appendix G).

Following informed consent, five 1 hour home visits were arranged between the mothers and an observer. Times for the visits varied depending upon mothers' estimates of infant awake periods, but all visits were scheduled during daylight hours. On the first visit, the observer spent some time developing rapport with the mother, obtained the basic demographic information, and asked the mother to complete the Revised Infant Temperament Questionnaire (RITQ). The second, third and fourth visits each entailed a 25 minute observation of mother-infant interaction with the Mother-Infant Behavioral Observation System (MIBOS). Mothers were instructed to continue their "everyday" patterns of interaction during each observation period and to ignore the

presence of the observer as much as possible. In order to obtain some consistency in settings across subjects, each mother was asked to schedule one observation at a feeding time. For the other two observations, mothers were instructed to schedule observations convenient for seeing her and her infant awake and together. Following each observation, observers interviewed the mothers to obtain the Community Interaction Checklist (CIC) information. On the fifth visit, mothers completed Questionnaire IV (QIV), were offered a short project debriefing (Appendix H) and were thanked for their participation. Since this visit was the final visit and involved the project debriefing, all fifth visits were conducted by the investigator.

Of the 34 subjects, observer A collected data on nine, observer B collected data on eleven, observer C collected data on nine and the investigator collected the data on five subject families. Inter-observer agreement was checked for 35 percent of the observation visits with the investigator serving as the reliability checker for the three observers. Each of the observers served as reliability checker for the investigator at some time. Overall percent agreement for the MIBOS varied from 69 to 86 percent with a mean of 79 percent over all reliability sessions.

4. DATA REDUCTION AND ANALYSES

Indices of Interaction Quality

The behavioral codes indicated on the Mother-Infant Behavioral Observation System (MIBOS) represent a relatively molecular approach towards understanding mother-infant interaction. One of the major goals of this study, however, was to use indices of interaction quality that were neither molecular nor molar in focus. Basically, a method of assessing interaction quality that involved discrete behavioral definitions but still considered the style or quality of the mother-infant interactions was used in the present study with the discrete behavioral definitions supplied by the MIBOS.

By modifying the observation-based measures of mother-infant interaction quality developed by Clarke-Stewart (1973), a class of behavior referring to infant social cues was determined for the MIBOS. The infant social cue class of behaviors involved the following: infant smile, affection, give, take and vocalization. Similarly, an appropriate mother social behavior class was developed involving the categories of mother pick-up, smile, affection, give, take, vocalization and positive vocalization. These classes of behavior were considered more informative for understanding

mother-infant social responsiveness since infants and mothers both can emit and respond in any number of socially relevant behaviors. Use of these behavioral classes also moved the level of analysis away from discrete molecular behavior chains to a more molar level of analysis, yet still provided precise definitions of the behavioral components.

Mother-infant interaction that involved the infant social cue class and the mother appropriate social behavior class then was assessed by the application of the behavioral dialogic model (Bakeman & Brown, 1977). With this approach, each class of behavior was viewed as a communicative act. Communicative acts served as components of a 'behavioral dialogue' between the mother and the infant. The following dyadic states were defined for the present study: (1) mother alone (M) - only the mother appropriate social behavior class was indicated in an interval; (2) infant alone (I) - only the infant social cue behavior class was indicated in an interval; (3) coaction (C) - both mother appropriate social behavior and infant social cue behavior classes were indicated in an interval; (4) quiescent (Q) - neither mother nor infant emitted any interactive behavior in an interval. Aversive behavior for both the mother and infant were omitted from the dyadic state definitions in light of previous research emphasizing the importance of mutually

satisfying mother-infant interactions (Clarke-Stewart, 1973; Brazelton et al., 1974).

Indices of mother-infant interaction quality using these dyadic states involved examining the probability that a given dyadic state followed another. Bakeman and Brown (1977) suggested that responsiveness could be indexed in terms of two dyadic state probabilities: (1) the probability that the infant state was followed by the coaction state (C/I) and (2) the probability that the infant state was followed by the infant state (I/I). The first index, (C/I- the probability of mother joining the infant), indicated the degree to which the mother responds to the cues of her infant. The second index, (I/I- the probability of the infant continuing alone), then indicated the degree to which mother does not respond to infant cues. According to Bakeman and Brown, responsiveness was reflected when mother joining (C/I) was high and infant continues alone (I/I) was low.

These two aspects of responsiveness were combined in the present study to form an index of mother-infant social responsiveness. More specifically, the probability of infant continues alone was subtracted from the probability that the mother joins the infant (C/I - I/I). With this index, if the probability of mother joining (C/I) was high and the probability of infant continues alone (I/I) was low, the pair received a high positive score on the mother-infant

social responsiveness index. On the other hand, if the probability of mother joins (C/I) was low and the probability of infant continues alone (I/I) was high, then the pair received a low negative score on the mother-infant social responsiveness index. Those dyads that reflected more equal probabilities of C/I and I/I, had mother-infant social responsiveness scores at or near zero. Constructed in this manner, the mother-infant social responsiveness index (C/I - I/I) represented higher quality interactions with higher positive values, lower quality with higher negative values and more average quality with values at or near zero.

By focusing on the probability of mother joining versus not joining the infant, the mother-infant social responsiveness index provides information regarding the likelihood of mutually satisfying interaction beginning. Another possible index of interaction quality, however, would be the continuation of mutually satisfying interaction. An index that reflected this aspect of mother-infant interaction was the probability of coaction following coaction, i.e., the index of social continuation (C/C). In this case, a higher index of social continuation (C/C) indicated more likely continuation of mutually satisfying interaction. Hence, a higher score on the social continuation index reflected higher mother-infant interaction quality.

Inter-Observer Agreement on the Dyadic States

Inter-observer agreement for each dyadic state was computed for each of the 36 reliability checks. In their review of measures of reliability and inter-observer agreement, Tinsley and Weiss (1975) suggested that for nominal scale data the Kappa statistic is the method of choice. Kappa refers to $K = \frac{P_o - P_c}{1 - P_c}$ where P_o = the proportion of observed agreement and P_c = the proportion of agreement due to chance. By including the amount of agreement due to chance, the Kappa statistic reflects a more stringent estimate of the degree of agreement between observers.

Table 5 presents the range, mean value and proportion of significant Kappa statistics computed for each dyadic state. Values below .40 represent poor agreement beyond chance, values between .40 and .75 represent fair to good agreement beyond chance and values above .75 represent excellent agreement beyond chance (Fleiss, 1981). Although the present values ranged from poor to excellent, all of the mean values for Kappa fell in the fair to good range. These mean values together with the proportion of significant Kappas indicate a sound level of observed agreement beyond that expected by chance for each of the dyadic state.

Table 5. The Range and Mean Values of Kappa for Each Dyadic State

	Range	Mean	Proportion Significant ^a
Mother	.31 - .88	.59	95
Infant	.00 - 1.00	.62	77
Coaction	.29 - .82	.64	92
Quiescent	-.03 - .89	.67	94

^aSignificance defined as $p \leq .05$.

Stability of Measures and Indices

Prior to analyzing the hypotheses, stability of the interaction quality indices and social support measures was examined. As indicated in Table 6, the social responsiveness index, the support quantity and the social support quality measures were found to be stable across the three observation periods. Means across the three observation visits were computed then for each of these variables and used in the subsequent analyses to indicate the measures. These mean values, as well as values on the other measures, are presented in Table 7.

The social continuation index (C/C), however, was not found to be stable across the three observations; the social continuation index was significantly lower on observation two than observation one and three (see Table 8). Due to this, the mean across observations one and three (C/C_{13}) and the observation two scores (C/C_2) were examined separately in the following analyses. Specifically, two scores for the social continuation index (C/C_{13} and C/C_2) were investigated in the subsequent analyses since the social continuation index was not found to be stable across observations.

Table 6. Stability of Repeated Measures

Measure	<u>MS</u> (error term)	<u>F</u> (2,66) ^a
Social Responsiveness	0.062 (0.212)	0.293
Social Continuation	0.111 (0.020)	5.666*
Social Support		
Quantity	8.422 (4.007)	2.101
Quality	0.038 (0.049)	0.777

^aCalculated using one-way ANOVA with repeated measures.

*p = .01.

Table 7. Means, Standard Deviations and Ranges for Each Index and Measure

Measure	Mean	S.D.	Range	
Social Responsiveness	0.030 ^a	0.224	-0.455 -	0.375
Social Continuation:				
Day 1 & 3	0.540	0.145	0.230 -	0.791
Day 2	0.442	0.218	0.000 -	0.816
Infant:				
Difficulty	13.615	1.884	9.420 -	18.383
Activity	4.138	0.749	1.769 -	5.615
Persistence	3.028	0.824	1.286 -	5.125
Distractible	2.379	0.589	1.000 -	3.333
Threshold	4.124	0.874	2.333 -	6.000
Mother:				
Personal Charactersitics	81.970	59.707	12.000 -	282.000
Social Support:				
Quantity	3.696 ^a	1.450	1.667 -	6.000
Quality	0.828 ^a	0.176	0.333 -	1.000
SES	35.000	18.068	8.000 -	65.500

^aCollapsed over visits two, three and four.

Table 8. Specific Comparisons of Daily Social Continuation Probabilities

Comparison ^a	Difference Between Means
Day 1 vs. Day 2	0.106*
Day 1 vs. Day 3	0.017
Day 2 vs. Day 3	0.089*

^aBased on Scheffe's Test when $F=3.15$ (2,60)
with a critical difference of 0.085.

* $p=.05$.

Analyses Used to Test the Hypotheses

Several forms of statistical analyses were selected to test the three hypotheses. The first hypothesis concerned the set of individual relationships between the indices of interaction quality and the measures of the systemic environment. As such, the first hypothesis was examined with Pearson product-moment correlations. Due to the focus of prediction with multiple variables of the systemic environment, forms of multivariate analysis were used to test both hypotheses two and three. Specifically, hypothesis two was analyzed with multiple regression analyses, while hypothesis three was analyzed with canonical discriminate analyses.

CHAPTER V

RESULTS

Before examining the study hypotheses, correlations between the study variables and the sample descriptive information were investigated for possible sample specific relationships. As indicated in Table 9, only four of the possible 48 correlation coefficients were found to be significant at or beyond the $p=.05$ level. None of the indices of interaction quality were found to correlate significantly with any of the descriptive measures. Those relationships found to be significant involved infant distractibility and threshold, mother personal characteristic scores (QIV) and SES. Infant distractibility was correlated with birth order such that infants considered less distractible were of second or later born status. Infant threshold then was related to infant age with younger ages associated with lower threshold of responsiveness. Both the QIV and SES measures were associated with age of mother. Higher QIV scores (indicative of more problematic personal characteristics) were associated with younger mothers, while higher SES was associated with increased age of mother. This latter relationship between SES and age of mother is not

Table 9. Correlations Between Study Variables and Sample Descriptive Information

Study Variable	Infant Sex	Infant Age	Birth Order	Mother Age
Social Responsiveness	.13	-.10	-.04	.26
Social Continuation:				
Day 1 & 3	-.11	.05	-.17	.29
Day 2	-.05	-.07	-.26	.15
Infant:				
Difficulty	-.11	-.26	-.03	-.29
Activity	.03	.14	-.12	.06
Persistence	.06	.16	-.05	-.27
Distractible	.17	.15	.36*	.04
Threshold	.00	-.35*	.10	-.21
Mother:				
Personal Characteristics	.01	-.23	-.01	-.53**
Social Support:				
Quantity	.16	-.11	-.08	.03
Quality	.01	-.06	-.24	.04
SES	-.21	.24	.09	.74**

* $p \leq .05$.

** $p \leq .001$.

surprising given the previously noted intercorrelations between the components of SES and age of mother.

1. HYPOTHESIS ONE

The first hypothesis concerned the individual relationships between the indices of interaction quality and the measured levels of the systemic environment. Specifically, higher interaction quality should be associated with (1) less difficult infant temperament (2) less problematic maternal personal characteristics, (3) higher social support, and (4) higher SES. Table 10 shows the intercorrelations among the dependent and independent variables.

Examining first the intercorrelations among the dependent indices of interaction quality, all three pairs were found to correlate significantly. Most interesting are the moderate correlations between the social responsiveness index (SRI) and the two social continuation indices (SCI: Day 1&3 and Day 2) ($r=.52$ and $.46$, $p<.01$). These correlations suggest that while related, the indices of social responsiveness and social continuation also reflect distinct aspects of the mother-infant interaction. The distinction between the two indices of social continuation,

Table 10. Intercorrelations Among the Study Variables

	<u>Interaction</u>		<u>Infant</u>		<u>Mother</u>		<u>Environment</u>	
	SRI	SIC: Day 1&3 Day 2	Dif- ficulty	Act- ivity	Persis- tence	Distrac- tible	Thresh- old	Soc Sup: Quantity Quality
<u>SCI:</u>								
Day 1&3	.52**							
Day 2	.46*	.62***						
<u>Infant</u>								
Dif- ficulty	-.03	.14	.13					
Activity	.40*	.40*	.34*					
Persis- tence	-.04	.15	.18	.23				
Distrac- tible	-.10	-.02	.03	-.13	.34*			
Thresh- old	.24	.25	.23	.06	-.20	-.24		
<u>Mother</u>								
QIV	-.04	-.04	.23	.34*	-.21	-.29	.27	
<u>Environment</u>								
Soc Sup: Quantity	.11	-.05	-.01	-.16	-.22	-.05	-.12	-.03
Quality	.40*	.01	.08	-.25	.03	-.28	-.07	-.08
SFS	.25	.06	.15	-.31	.13	-.17	-.22	-.56***
							.13	.03

*p < .05
 **p < .01
 ***p < .001

however, is less clear due to the moderately high correlation of $\underline{r}=.62$ ($\underline{p}<.001$).

Correlations between the social responsiveness index and the measures of the systemic environment were mixed. The activity score of infant temperament was found to relate significantly with the social responsiveness index ($\underline{r}=.40$, $\underline{p}<.05$), however, the direction of the correlation was not in the expected direction. Higher probabilities of social responsiveness were related to higher (i.e. more difficult) infant activity while lower probabilities of social responsiveness were associated with lower (i.e., easier) infant activity. That infant activity scores were reflective of more difficult temperament was supported by the positive correlation between infant activity and difficult infant scores, $\underline{r}=.34$ ($\underline{p}<.05$).

The other measure found to correlate with the social responsiveness index beyond that expected by chance was the measure of social support quality (Soc. Sup. Quality). As hypothesized, mother-infant social responsiveness was found to vary positively with social support quality such that higher probabilities of social responsiveness were related to higher social support quality ($\underline{r}=.40$, $\underline{p}<.05$). Besides the infant activity and social support quality scores, no other measures of the systemic environment were found to relate significantly to the social responsiveness index.

Levels of the systemic environment were correlated also with the two indices of social continuation. Interestingly, both the social continuation (Days 1 & 3) and the social continuation (Day 2) indices were found to vary positively with infant activity scores, $r=.40$ and $.34$ ($p<.05$), respectively. Again, the direction of these correlations was counter to that hypothesized since the findings indicate that higher probabilities of social continuation were associated with higher and more difficult infant activity. The remaining measures of the systemic environment were not found to correlate at a level beyond that expected by chance with either index of social continuation.

2. HYPOTHESIS TWO

The second hypothesis concerned the effectiveness in predicting the indices of mother-infant interaction quality from the set of systemic independent variables. Specifically hypothesized was that a multivariate model that included all four systemic levels would account for a significant portion of explained mother-infant interaction quality variance.

The full regression model using the social responsiveness index as the criterion and the measures of difficult temperament, activity, persistence, distractibility, threshold, maternal personal

characteristics, social support quantity, social support quality and SES as predictor variables was examined first. The results presented in Table 11 indicate that a significant portion of variance in the social responsiveness index ($R^2=.47$) was accounted for by the nine combined measures of the systemic environment. The 20 percent discrepancy between the R^2 and adjusted R^2 values, however, suggested that the amount of variance explained by this model may be due in part to the number of variables entered since the addition of each new variable increases the chance of explaining criterion variance (Cohen & Cohen, 1983). More specifically, this discrepancy suggested that the full model was not the best fitting model for explaining variance in the social responsiveness index.

In light of this finding, a stepwise multiple regression procedure was performed. This regression procedure systematically enters predictor variables that account for the most explained variance in the order of highest to lowest (Hull & Nie, 1981). The criteria for entering variables into the model was fixed at $p=.05$ so as to exclude variables that accounted for variance at chance level. Results of the stepwise procedure (see Table 11) indicated that only two of the original nine predictor variables, infant activity and social support quality, contributed significantly to explain 30 percent of the

Table 11. Results of the Multiple Regression Analyses Using the Social Responsiveness Index as the Criterion

Model	R	R ²	Adjusted R ²	df	F
Full	.68	.47	.27	9,24	2.34*
Stepwise	.55	.30	.26	2,31	6.78**

*p < .05.

**p < .005.

variance in the criterion. Examination of the partial correlations for infant activity and social support quality in the stepwise model indicated that each variable contributed 15 percent of explained variance.

Comparing the R^2 values of the nine variable full model to the two variable stepwise model indicates that approximately 17 percent of the variance accounted for by the full model was not explained by the stepwise model. This suggested that the seven remaining predictor variables in total contributed 17 percent of the variance in the social responsiveness index. As the stepwise procedure indicated, however, none of these remaining variables individually accounted for variance in the criterion beyond that expected by chance. Thus, the model using infant activity and social support quality as predictors was found to be the best fitting model in explaining social responsiveness variance.

Although regression analysis of the full model for social responsiveness indicated support of hypothesis two, subsequent analyses revealed that only two levels of the systemic environment contributed significantly to explaining variance in the social responsiveness index. Hypothesis two, therefore, was rejected for the case involving social responsiveness as the index of interaction quality.

In a similar manner, the full model with nine predictor

variables using each index of social continuation as the criterion was examined. As indicated in Table 12, the results for the social continuation index (Days 1 and 3) and the social continuation index (Day 2) again were the same: The full model did not account for a significant portion of variance in the social continuation index when either the mean for day 1 and 3 or the scores for day 2 were used as the criterion. Although further analyses involving the stepwise procedure were completed for both social continuation indices, no multivariate model was found that accounted for a significant portion of variance in either social continuation (Days 1 and 3) or social continuation (Day 2). Thus, hypothesis two was rejected also when social continuation was used as the index of interaction quality.

3. HYPOTHESIS THREE

The test of the third hypothesis involved comparing groups of higher versus lower quality mother-infant interaction. As a group, mother-infant dyads displaying higher quality interactions were hypothesized to have easier infant temperament, more adaptive maternal personal characteristics, higher social support, and higher SES when compared to the group of dyads displaying lower quality interactions.

Table 12. Results of the Multiple Regression Analyses Using Each Index of Social Continuation as the Criterion

Criterion	R	R ²	Adjusted R ²	<u>F</u> (9,24)
Day 1 & 3	.50	.25	-.03	0.88
Day 2	.59	.35	.11	1.44

Mother-infant interaction quality groups were defined for all three indices of interaction quality. The range of scores for each index was divided into high, low and average groups with high referring to the top 33 percent of scores, low to the bottom 33 percent and average referring to the remaining mid range of the score distributions.

A multivariate procedure, canonical discriminate analysis, was selected to examine differences between the three groups of interaction quality. With canonical discriminate analysis, linear combinations of the predictor variables are derived which best capture the between-group variance. The first canonical combination will account for the most between group variance, while the second combination will account for the most between-group variance that is orthogonal to the first. In this way each canonical combination is distinct. The number of solutions derived depends on the number of criterion groups and the number of predictor variables used. Specifically, the number of canonical combinations will equal either the number of groups minus one or the number of predictor variables, whichever is lower (Sarle, 1982). Hence, the maximum number of derived canonical combinations for the present study is two, i.e., the number of groups minus one.

Differences between the high, average and low groups of mother-infant interaction quality based on the social

responsiveness index were examined first using the full model with nine dependent variables. Neither of the resulting canonical combinations was found to produce a significant degree of separation between the three groups with Wilks' Lambda=1.28 (18,46), $p=n.s.$ for canonical combination one and Wilks' Lambda=0.75 (8,24), $p=n.s.$ for canonical combination two.

Next the two variable model of social responsiveness that was indicated in the previous section was subjected to canonical discriminate analysis. According to some authors, the two variable stepwise model may have been the only correct model to test since determination of the best fitting regression model is the first step in deciding what variables to include in a discriminant analysis (Slate, 1985). Using infant activity and social support quality as the only two dependent measures, a significant degree of group separation was found for the first canonical combination (Wilks' Lambda=3.54, $df=18,46$, $p=.01$), but not for the second canonical combination (Wilks' Lambda=0.13, $df=8,24$, $p=n.s.$). The standardized canonical coefficients, i.e., the relative weight of each variable in differentiating between the groups, was .83 for infant activity and .84 for social support quality. Since these weights are relatively high, both infant activity and social support quality appear to contribute to the significant

differentiation between the groups. The similarity of the standardized canonical coefficients suggested further that the relative contribution of each in differentiating between the groups is basically equal.

Where the groups differed on the canonical combination was tested with a multiple regression procedure that allows examination of multivariate comparisons between groups (Sall, 1982). Results of the specific group comparisons showed that the high group was significantly different from the low group ($F=6.92$, $df=2,30$, $p=.005$) and the average group was significantly different from the low group ($F=4.41$, $df=2,30$, $p=.02$) when tested on the canonical combination. The difference between the high and average groups, however, was found to be non significant ($F=0.334$, $df=2,30$, $p=n.s.$). Hence as a group, mothers and infants displaying either high or average probabilities of social responsiveness had higher infant activity and social support quality scores when compared to mothers and infants displaying low probabilities of social responsiveness. No significant differences involving infant activity and social support quality were found between the groups displaying high and average probabilities of social support. These results indicate then that only two of the four systemic levels hypothesized as important were found to differentiate the groups. Hypothesis three, therefore, was

rejected when the probability of social responsiveness was used as the index of interaction quality.

Group differences based on the indices of social continuation also were examined with canonical discriminate analysis. Examining the social continuation index (Day 1 and 3) first, the full model with nine dependent variables was tested and resulted in no significant degree of separation between the groups. A Wilks' Lambda of 1.03 ($df=18,46$, $p=n.s.$) was found for the first canonical combination while a Wilks' Lambda of 0.55 ($df=8,24$, $p=n.s.$) was found for the second.

The full model with nine dependent variables was used in another canonical discriminate analysis using groups based on the social continuation (Day 2) values. As in the case of the social continuation (Day 1 and 3) groups, no significant degree of separation between the groups was found (Wilks' Lambda=1.00, $df=18,46$, $p=n.s.$ for canonical combination one, Wilks' Lambda=0.835, $df=8,24$, $p=n.s.$ for canonical combination two).

In that the previous stepwise analyses revealed no other multivariate model to explain variance in the social continuation indices, no further multivariate analyses were conducted on groups based on either social continuation (Day 1 and 3) or social continuation (Day 2) indices. Univariate analyses using infant activity as the dependent variable

(the one variable that correlated with the social continuation indices), however, were performed with groups based on each index. One-way analysis of variance was conducted to detect differences between the high, average and low groups based on social continuation, but no significant differences were found for either Day 1 and three scores ($F=1.80$, $df=2,31$, $p=n.s.$) or Day 2 scores ($F=1.70$, $df=2,31$, $p=n.s.$). Hence, hypothesis three was rejected when using social continuation to index mother-infant interaction quality.

CHAPTER VI

DISCUSSION

The purpose of the present study was to examine the relationship between measures of mother-infant interaction quality and specific aspects of the systemic environment. Two indices of interaction quality, social responsiveness and social continuation, were selected on the basis of findings from previous research. The following aspects of the systemic environment were measured and related to the interaction quality indices: infant characteristics (temperament), maternal personal characteristics, the social network (social support), and the broader social environment (SES). According to a systemic framework, each of these environmental aspects should be useful in understanding variations in interaction quality. Specifically, each environmental aspect should be related to interaction quality while the combination of all four aspects should successfully predict and differentiate the variations in mother-infant interaction quality.

Results of the present study, indicated that not all four measured aspects of the systemic environment were useful for understanding interaction quality. Rather than all four, only two environmental aspects were found to

reliably predict and differentiate variations in interaction quality. When interaction quality was measured by the social responsiveness index both the infant activity measure of the infant characteristics level and the social support quality measure of the social network level were found to have individual relationships with, as well as have combined effects in, predicting and differentiating variations.

As for the other index of interaction quality, social continuation, only one aspect of the systemic environment was found to be useful. Interestingly, the infant activity measure of the infant characteristics level again was found to be related. Although related, the infant activity measure was not found to differentiate successfully between high and low groups of the social continuation index. The lack of significant differentiation suggests that the significant correlation between the social continuation index and the infant scores was related to the presence of some extreme scores in the distribution rather than a steady linear relationship. The usefulness of the infant activity measure for understanding variations in the social continuation index, therefore, appears questionable.

1. THE UTILITY OF THE SYSTEMIC FRAMEWORK

After reviewing the results of the present study, the question of the utility of the systemic framework for understanding the variations in mother-infant interaction quality requires attention. The present results indicated that a four-level systemic model (i.e., consisting of infant characteristics, maternal characteristics, the social network and the broader social environment) did not contribute to the understanding of mother-infant interaction quality. Although the four-level model was found to significantly predict variation in the social responsiveness index, further regression analyses indicated that this was not the best fitting model. Indeed, the canonical discriminate analyses lent further support when the four-level model was found not to discriminate successfully between the groups based on the social responsiveness index. Similarly, the four-level systemic model was not found to successfully predict or discriminate when the social continuation index was used.

The social responsiveness index, however, was found to have 30 percent of its variance explained reliably by two measured aspects of the systemic environment. These same two measures were found to discriminate significantly between high and low groups on the social responsiveness

index. Interestingly, each measured aspect represented a different level of the systemic environment. Specifically, the infant activity measure represented the infant characteristics level while the social support quality measure reflected the social network level. The index of social responsiveness, therefore, was explained by a two-level model.

This two-level model may be interpreted as a more general conceptualization of the systems model. Previously, it was mentioned that a systemic perspective involves viewing parent-child interactions at the hub of an interrelated system of environmental levels and conditions. Two general systemic levels of influence then were discussed, the level of direct influence and the level of indirect influence. The two measures found to significantly explain the social responsiveness index in the present study represented aspects of these two general systemic levels of influence. More specifically, infant activity (i.e., infant characteristics) represented the direct level of influence due to direct involvement in the interaction. Social support quality (i.e., the social network) represented the indirect level of influence since this aspect affects directly only one member of the dyad, or affects the surrounding social environment, or both.

Deciding on the utility of the systemic framework for understanding mother-infant interaction quality on the basis of the present results depends on the interpretation of the systemic framework. If the systemic framework is translated into a four-level model involving aspects of the infant, mother, social network and the broader social environment, then the present results are not supportive of the systems framework. If the systemic framework is translated into a general two-level model of direct and indirect levels of influence, however, then part of the present results are supportive of the systemic framework.

The present findings did indicate that mother-infant interactions were related to multiple aspects of the environment. Finding a conceptual framework that can include and organize these multiple relationships would be useful. In that the more general systemic framework provides an organization of the present research findings, the general systemic framework appears to provide a useful conceptualization of interaction-environment relationships.

2. INDICES OF INTERACTION QUALITY

Although two indices of interaction quality were selected for the present study, the results indicated significant differences between the two measures. Initially

noted was the difference in stability between the two measures. The social responsiveness index was found to be stable across the three observation sessions while the continued social interaction index was found to be significantly lower on observation two. This difference in stability indicated from the beginning of data analysis that the two indices were not related in the same way to aspects of the environment. Some similarity between the indices was noted in the intercorrelations. The index of social responsiveness and indices of social continuation were found to have 20 to 27 percent common variance. While indicating a similarity between the two indices, this low amount of common variance suggested also that each index was measuring unique aspects of the mother-infant interaction. This similar but unique relationship between the two indices was noted again when the two indices were related to the aspects of the systemic environment. Both the social responsiveness index and the indices of social continuation related positively to the infant activity measure, but only the social responsiveness index related to the social support quality measure as well.

These noted similarities and dissimilarities suggest that the two indices were in part measuring a shared construct and in part measuring separate phenomena. Although it is possible that the shared construct

represented an extraneous and unmeasured phenomenon, a more likely interpretation would be that the shared construct was mother-infant interaction quality since each measure was related to other aspects of this construct (i.e., infant activity). The differences between the results of the two indices, therefore, may be due to the multi-dimensional nature of the interaction-quality construct. More specifically, if each index represented a separate dimension of the interaction quality construct, then each may be related to common and different sets of environmental events. Further research examining the relationship between the two indices and other environmental events, however, is needed to conclude that the social responsiveness index and the social continuation index are both measuring dimensions of interaction quality.

3. INTERACTION QUALITY AND INFANT ACTIVITY

As indicated in the previous section, the two indices of interaction quality did have a common relationship with one of the measures, infant activity. According to Thomas and Chess (1977), variations in the infant activity measure should vary with the difficulty of the infant such that higher infant activity scores relate to higher and more difficult temperament. Indeed, the present results

indicated that the infant activity scores did vary with the difficulty scores in that a significant correlation was noted.

The direction of the present relationship between the interaction quality indices and the infant activity measure goes counter to the hypothesized direction of effects. In the present study, higher interaction quality scores were associated with higher infant activity scores. Interpreting these findings suggests that more responsive forms of interaction were associated with more demanding and difficult infants.

Most reports relating infant temperament to mother-infant interaction quality have found more difficult temperament associated with less responsive care (e.g., Campbell, 1977; Milliones, 1978; Vietze et al., 1980). A recent study by Martin (1981) with 10 to 22 month old infants, however, has suggested that demanding behavior in infants was associated with more responsive care and higher levels of later social competence. Possibly then, the direction of effect between infant temperament and interaction quality for the present study may represent the counter hypothesis that more difficult temperament is associated with more responsive care.

An alternate interpretation, however, is also possible. In the present study the relationship between the measures

of infant activity and difficulty was significant, but accounted for only 12 percent of the variance. This small amount of common variance, suggests that the infant activity measure was indexing qualities other than difficulty. A possible other characteristics may have been infant responsiveness. Specifically, Osofsky and Danzger (1974) found that a measure of infant activity correlated positively with an infant responsiveness measure. Subsequently, infant responsiveness was found to vary positively with maternal responsiveness. Thus, the present positive relationship between infant activity and interaction quality may indicate the relationship between infant responsiveness and interaction quality more so than the relationship between infant difficulty and interaction quality.

4. LIMITATIONS

The Sample

The selected sample for the present study may not have fully represented the continuum of interaction quality. Due to the methods used for subject recruitment, it is possible that only the middle to high range of interaction quality was represented. Those dyads that reflected more inadequate

forms of interaction may not have volunteered to participate in such a study as this. Absence of subject dyads displaying the lower range of interaction quality then may help to explain the lack of significant findings. Specifically, the measures of infant difficulty, maternal personal characteristics, social support quantity, and SES may have been more sensitive in detecting extreme differences in interaction quality.

Although sample restriction of the criterion indices and study measures was possible, it should be noted that the present study did include a variety of dyads and a variety of interaction patterns (which can be seen in the range of scores). The possibility that some of the subject dyads did represent the lower range of the continuum, therefore, cannot be ruled out. Thus the present sample, while limited, did reflect a wide range of dyadic interaction quality.

Related to this issue of sample representation is the concern with sample size. Cohen (1977) has indicated that the ability to detect significant results (i.e., the power of the analysis) is directly related to the size of the sample and the estimated magnitude of the relationship. With very low magnitude relationships, larger sample sizes are required while large magnitude relationships can be detected with relatively small sample sizes. In the present

case, the magnitude of the correlations between the indices of interaction quality and the measures of infant difficulty, maternal personal characteristics, social support quantity and SES fell in the low range (e.g., .01 to .25). The probability of the present sample size being able to detect such low order correlations was low. However, having the resources available to acquire the large sample size needed would be very difficult. Although detecting these relationships was important for supporting the four-level systemic model, the practical implications of detecting such small relationships is questionable since small magnitude relationships account for even smaller portions of explained variance.

Both sample representation and size then contribute to the issue of generalizability. With unrepresentative and small samples, the confidence of generalizing research results to other samples becomes less. The present sample reflected characteristics that may strain the generalizability of the results. Specifically, more male than female infants were included. The female infants also tended to be older than the male infants. This imbalance of infant sex and interaction with infant age may either have obscured or heightened various results. Similarly, the tendency for older mothers to be associated with higher SES as well as the confounding of marital status and race with

SES may limit the present results to samples with similar demographic characteristics. These SES correlations, however, may actually represent the population of mothers with young infants and not be a threat to generalizability (Belle, 1982).

In terms of the sample size, a power analysis was conducted prior to the completion of data collection in order to determine the number of subjects needed to have adequate levels of statistical power (i.e., power of .60 or above). According to this analysis, the present study did include enough subjects to detect moderate order relationships between the variables (Cohen, 1977; Cascio, Valenzi & Silbey, 1978). On the basis of sample size alone then, some confidence can be expressed in making generalizations from the present sample to other samples of mothers and young infants.

The Methods and Design

In addition to sample considerations, aspects of the methodology may have limited the results of the present study. Of first consideration is the infant age range that was chosen. Only infants between 3 to 6 months old were selected for this study. Not only does this limit the results of the present study to this age range, but also

this restriction in infant age may have affected the magnitude of the study relationships. It is possible that some of the measured aspects of the systemic environment influence mother-infant interactions at different points in development. For example, Farran and Ramey (1980) indicated that differing developmental demands of the infant were associated with differential affects of SES on mother-infant interaction quality. At 6 months of age, no significant differences were noted in interaction quality when low and high SES groups were compared. At 20 months, however, interaction quality was found to differ as a function of SES. Hence, had the present study included a wider infant age range, perhaps other measured aspects of the systemic environment would have been detected.

The indices and measures used in the present study to reflect aspects of interaction quality and the systemic environment also may have limited the results. Although originally chosen due to their apparent reliability and validity, the indices of interaction quality and measures of the systemic environment may not have reflected accurately the present constructs of interest. Given that each of the present constructs has been controversial in terms of both definition and measurement, that the selected measures may be subject to large errors of measurement must be considered. Each of the measures used, however, did

represent the current state-of-the-art forms of measuring the selected constructs.

The design of the present study limits the results in a most fundamental way. All reported results are based on correlational findings. As such, causality of the reported relationships cannot be determined. Also the flow of influence, in terms of does the interaction influence the environment or does the environment influence the interactions, cannot be determined. The present results, however, do indicate the presence or absence of relationships between variables which is useful information for beginning to understand the variations in mother-infant interaction quality.

The Procedures

The major limitation posed by the procedures of the present study was in the affect of the observer on mother-infant behavior. Previous research examining the influence of the observer on mother infant behavior has indicated that the behavior of the mother could be altered by such procedures which then would alter the interactions with the infant (Randall, 1981). Although every attempt was made to make the mother feel comfortable during the present observations, the presence of the observer may have altered

the degree of 'typical' interactions viewed. While not a perfect form for collecting observational informations, past research has indicated that the presence of mechanical observation techniques also distorts mother-infant interactive behavior (Field & Ignatoff, 1981). Given that some type of observational equipment was required in the present study, the use of human observers was considered a more cost effective choice.

5. FUTURE RESEARCH

The present findings then have suggested several areas for future research. Most notably is the continued investigation of the multiple variables that may influence the quality of mother-infant interactions. Although a reliable amount of variance in one of the present indices of interaction quality was accounted for by two measures of the systemic environment, a large proportion of variance was left unexplained. This proportion of unexplained variance indicates that other variables, perhaps unmeasured in the present study, may still be detected that relate to the quality of mother-infant interactions.

In addition to suggesting the need to search for other related variables, the present findings have suggested that a general systemic framework may be useful in

conceptualizing early mother-infant interactions. As such, future research that tries to identify other factors that influence mother-infant interactions may want to use the general systems model as a guide for selecting and interpreting research results. Research of this nature, that is interested in the more accurate prediction of interaction quality and the validation of the systemic conceptual model, then would satisfy both basic and applied interests within Developmental Psychology.

In conjunction with this type of research, the need for further research in measuring the construct of mother-infant interaction quality has been demonstrated by the present findings. Presently, two measures were developed to operationalize previously noted aspects of interaction quality. The different patterns of relationships found for each index suggested that the construct of interaction quality may be multi-dimensional. As such, testing and comparing other operational measures of interaction quality in relation both to each other and to aspects of the environment may provide further information concerning the varied dimensions and boundaries of the mother-infant interaction quality construct.

Further construct related research was indicated by the present findings in regards to measuring aspects of the systemic environment. Highlighted by the set of results was

the need for clarifying the construct being measured by an index of infant activity. Specifically, is the infant activity measure used in the present study an aspect of difficult or responsive infant style? Another construct deserving attention is that of maternal personal characteristics. The measure used in the present study attempted to index a wide variety of personal characteristics. Future research, therefore, may want to continue to focus on measures of specific characteristics so as to determine more fully what maternal personal qualities relate to the quality of mother-infant interaction.

In addition to the issues of construct validation and measurement, future research comparing the relationship between interaction quality and the systemic environment at different points in development may provide useful information. A longitudinal project examining such interaction-environment relationships possibly could indicate that different aspects of the systemic environment are important at different developmental time periods. Information of this nature could then greatly increase our understanding of child development.

6. IMPLICATIONS

The findings of the present study indicated that multiple environmental factors were related to the continuum of mother-infant interaction quality. As such, understanding early mother-infant interactions involves viewing the dyad in relation to a mutli-faceted environment. A framework for conceptualizing these multiple relationships, a systemic framework, also was suggested by the present findings. A four level model of this framework, one that has typically been suggested in the literature (e.g., Belsky, 1984), however, was not supported. Rather, a two-level model where the first level involves sources of direct influence and the second level sources of indirect influence was found to be useful in interpreting the present findings. Perhaps with future and more sophisticated forms of measurement, the detailed four-level model of the systemic environment would be found to provide an accurate conceptualization. Until then, the more general systemic framework represented by the two-level model may provide a useful conceptualization of the factors that influence the continuum of interaction quality.

In addition to this basic conceptual consideration, the present findings have implications for more applied endeavors. As indicated earlier, the promotion of high

quality and responsive mother-infant interactions may be one of the major ways to enhance the likelihood of adaptive child development. The present study has identified two aspects of the environment related to the quality of mother-infant interactions which then could be used to design more effective primary interventions. Specifically suggested by the present findings was the importance of infant characteristics and the social network for understanding early mother-infant interactions. Perhaps then, primary prevention efforts that focused on these two aspects may increase the probability of effectiveness. Prior to making firm clinical recommendations, however, further research is needed to more fully clarify the constructs and relationships between aspects of the systemic environment and the continuum of mother-infant interaction quality.

LIST OF REFERENCES

- Ainsworth, M. D. S. (1980). Attachment and child abuse. In G. Garbner, C. J. Ross & E. Zigler (Eds.), Child abuse, and agenda for action (pp. 35-47). New York: Oxford University Press.
- Ainsworth, M. D. S. & Bell, S. M. (1970). Attachment, exploration, and separation: Illustrated by the behavior of one-year-olds in a strange situation. Child Development, 41, 49-67.
- Ainsworth, M. D., Blehar, M. C., Waters, E., and Walls, S. (1978). Patterns of Attachment. Hillsdale, N.J.: Erlbaum.
- Ainsworth, M. D. & Wittig, B. (1969). Attachment and exploratory behavior of one-year-olds in a strange situation. In B. Foss (Ed.), Determinants of Infant Behavior Vol. 4. New York: Barnes & Noble.
- Bakeman, R. & Brown, J. V. (1977). Behavioral dialogues: An approach to the assessment of mother-infant interaction. Child Development, 48, 195-203.
- Bakeman, R. & Brown, J. V. (1980). Early interaction: Consequences for social and mutual development at three years. Child Development, 51, 437-447.
- Bates, J. E. (1980). The concept of difficult temperament. Merrill-Palmer Quarterly, 26, 299-319.
- Belle, D. (Ed.). (1982). Lives in stress. Beverly Hills, CA: Sage.
- Belsky, J. (1984). The determinants of parenting: A process model. Child Development, 55, 83-96.
- Berberian, K. E., & Snyder, S. S. (1982). The relationship of temperament and stranger reaction for younger and older infants. Merrill-Palmer Quarterly, 28, 79-94.
- Blehar, M. C., Lieberman, A. F., & Ainsworth, M. D. S. (1977). Early face-to-face interaction and its relation to later infant-mother attachment. Child Development, 48, 182-194.
- Brazelton, T. B., Koslowski, B., & Main, M. (1974). The origins of reciprocity: The early mother-infant interaction. In M. Lewis and L. A. Rosenblum (Eds.), The effect of the infant on it's caregiver (pp. 49-76). New York: John Wiley & Sons.

- Bronfenbrenner, U. (1979). The ecology of human development. Cambridge, MA: Harvard University Press.
- Brunnquell, D., Crichton, L. & Egeland, B. (1981). Maternal personality and attitude in disturbances of child rearing. American Journal of Orthopsychiatry, 51, 680-691.
- Campbell, S. B. G. (1979). Mother-infant interaction as a function of maternal ratings of temperament. Child Psychiatry and Human Development, 10, 67-76.
- Carey, W. B., & McDevitt, S. C. (1978). Revision of the Infant Temperament Questionnaire. Pediatrics, 61, 735-739.
- Cascio, W. F., Valenzi, E. R. & Silbey, V. (1978). Validation and statistical power: Implications for applied research. Journal of Applied Psychology, 63, 589-595.
- Clarke-Stewart, K. A. (1973). Interactions between mothers and their young children: Characteristics and consequences. Monographs of the Society for Research in Child Development, 30, (6-7, Serial No. 153).
- Cicchetti, D. & Rizley, R. (1981). Developmental perspectives on the etiology, intrergenerational transmission, and sequelae of child maltreatment. In R. Rizley & D. Cicchetti (Eds.), New directions for child development (pp. 32-56). San Francisco: Jossey-Bass.
- Cohen, J. (1977). Statistical power analysis for the behavioral sciences (rev. ed.). New York: Academic Press.
- Cohen, J., & Cohen, P. (1983). Applied multiple regression/correlation analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Cohn, J. F. & Tronick, E. Z. (1983). Three month-old infants reaction to simulated maternal depression. Child Development, 54, 185-193.
- Crnic, K. A., Greenberg, M. T., Ragozin, A. S. Robinson, N. W. & Basham, R. B. (1983). Effects of stress and social support on mothers and premature and full-term infants. Child Development, 54, 209-217.

- Crockenberg, S. B. (1981). Infant irritability, mother responsiveness, and social support influences on the security of infant-mother attachment. Child Development, 52, 857-865.
- Crittenden, P. M. (1985). Social networks, quality of child rearing and child development. Child Development, 56, 1299-1313.
- Dunn, E., Barker, M., & Wahler, R. (1981). Standardized observation codes: Revised version. Unpublished training manual, University of Tennessee, Child Behavior Institute, Knoxville.
- Egeland, B., Breitenbucher, M., & Rosenberg, D. (1980). Prospective study of the significance of life stress in the etiology of child abuse. Journal of Consulting & Clinical Psychology, 48, 195-205.
- Egeland, B. & Brunnequell, D. (1979). An at-risk approach to the study of child abuse: Some preliminary findings. Journal of the American Academy of Child Psychiatry, 18, 219-235.
- Egeland, B., & Faber, E. A. (1984). Infant-Mother attachment: Factors related to its development and changes over time. Child Development, 55, 753-771.
- Egeland, B., & Sroufe, L. A. (1981). Attachment and early maltreatment: Child Development, 52, 44-52.
- Elmer, E. (1977). Fragile families, troubled children. Pittsburg: University of Pittsburg Press.
- Erikson, E. H. (1963). Childhood and Society. (2nd ed.). New York: W.W. Norton.
- Farran, D. C. & Ramey, C. T. (1980). Social class difference in dyadic involvement during infancy. Child Development, 51, 254-257.
- Field, T. M. (1980). Interactions of preterm and term infants with their lower- and middle-class teenage and adult mothers. In T. M. Field, S. Goldberg, D. Stern, & A. M. Sostek (Eds.). High risk infants and children: Adult and peer interactions (pp. 113-132). New York: Academic Press.

- Field, T., & Ignatoff, E. (1981). Videotaping effects on the behavior of low income mothers and their infants during floor-play interactions. Journal of Applied Developmental Psychology, 2, 227-235.
- Field, T. & Pawlby, S. (1980). Early face-to-face interactions of British and American Working and middle-class mother-infant dyads. Child Development, 51, 250-253.
- Fleiss, J. L. (1981). Statistical methods for rates and proportions. New York: Wiley.
- Freud, S. (1953). Three essays on the theory of sexuality. In J. Strachey (Ed. and Trans.), The standard edition of the complete psychological works of Sigmund Freud (Vol. 7). London: Hogarth Press.
- Friedrich, W. N. & Wheeler, K. K. (1982). The abusing parent revisited: A decade of psychological research. The Journal of Nervous and Mental Disease, 170, 577-587.
- Garbarino, J. & Sherman, D. (1980). High-risk neighborhoods and high-risk families: The human ecology of child maltreatment. Child Development, 51, 188-198.
- George, C., & Main, M. (1979). Social interactions of young abused children: Approach, avoidance, and aggression. Child Development, 50, 306-318.
- Goodnight, J. H. (1982). Stepwise. In A. A. Ray (Ed.), SAS user's guide: Statistics, 1982 edition (pp. 101-112). Cary, NC: SAS Institute.
- Heinicke, C. M., Diskin, S. D., Ramsey-Klu, D. M. & Given, K. (1983). Prebirth parent characteristics and family development in the first year of life. Child Development, 54, 194-208.
- Hubert, N. C., Wachs, T. D., Peters-Martin, P., & Gandour, M. J. (1982). The study of early temperament: measurement and conceptual issues. Child Development, 53, 571-600.
- Hull, H. C. & Nie, N. H. (1981). SPSS update 7-9: New procedures and facilities for releases 7-9. New York: McGraw Hill.

- Kaye, K., & Fogel, A. (1980). The temporal structure of face-to face communication between mothers and infants. Developmental Psychology, 16, 454-464.
- Kilbride, H. W., Johnson, D. L., & Streissguth, A. P. (1977). Social class, birth order, and new experience. Child Development, 48, 1686-1688.
- Klein, P. S. (1984). Behavior of Israeli mother's toward infants in relation to infants perceived temperament. Child Development, 55, 1212-1218.
- Lamb, M. E. (1978). Influence of the child on marital quality and family interaction during the prenatal, perinatal and infancy periods. In R. Lerner & G. Spanier (Eds.), Child influences on marital and family interaction: A life span perspective (pp. 137-163). New York: Academic Press.
- Lewis, M. & Wilson, C. D. (1972). Infant development in lower-class American families. Human Development, 15, 112-127.
- Lorion, R. P. (1984). Research issues in the design and evaluation of preventive interventions. In J. P. Bowken (Ed.), Education for primary prevention in social work (pp. 7-23). New York: Council on Social Work Education.
- Martin, J. A. (1981). A longitudinal study of the consequence of mother-infant interaction: A micro-analytic approach. Monographs of the Society for Research in Child Development, 46, (3, Serial No. 190).
- Matas, L. Arend, R. A., & Sroufe, L. A. (1978). Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. Child Development, 49, 547-556.
- Main, M., & Goldwyn, R. (1984). Predicting rejection of her infant from mother's representation of her own experience: Implications for the abused-abusing intergenerational cycle. Child Abuse and Neglect, 8, 203-217.
- Milliones, J. (1978). Relationship between perceived child temperament and maternal behaviors. Child Development, 49, 1255-1257.
- Milner, J. S. (1980). The Child Abuse Potential Inventory: Manual. Webster, NC: Psytec.

- Milner, J. S. (1986). The Child Abuse Potential Inventory: Manual (2nd ed.). Webster, NC: Psytec.
- Milner, J. S. & Ayoub, L. (1980). Evaluation of "At Risk" parents using the Child Abuse Potential Inventory. Journal of Clinical Psychology, 36, 945-948.
- Milner, J. S. & Wimberley, R. C. (1980). Prediction and explanation of child abuse. Journal of Clinical Psychology, 36, 875-884.
- Mueller, C. W. & Parcel, T. L. (1981). Measures of socioeconomic status: Alternatives and recommendations. Child Development, 52, 13-30.
- Osofsky, J. D. (1976). Neonatal characteristics and mother-infant interaction in two observational situations. Child Development, 47, 1138-1147.
- Osofsky, J. D., & Culp, A. M. (1986). Emotional availability scale: 6 to 30 months. Unpublished manuscript, Menninger Foundation, Menninger Infant Project, Topeka.
- Osofsky, J. D. & Danzger, B. T. (1974). Relationships between neonatal characteristics and mother-infant interactions. Developmental Psychology, 10, 124-130.
- Pedersen, F. A. (1982). Mother, father, and infant as an interactive system. In J. Belsky (Ed.), In the beginning: Readings on infancy (pp. 216-226). New York: Columbia University Press.
- Peterson, G. W., & Rollins, B. C. (in press). Parent-child socialization: A review of research and application of symbolic interaction concepts. In M. B. Sussman and S. R. Steinmetz (Eds.), Handbook of marriage and the family.
- Polansky, N. A., Chalmers, M. A., Bittenweiser, E., & Williams, D. P. (1979). Isolation of the neglectful family. American Journal of Orthopsychiatry, 49, 149-152.
- Powell, D. R. (1980). Personal social networks as a focus for primary prevention of child maltreatment. Infant Mental Health Journal, 1, 232-239.

- Randall, T. M. (1981). Effect of an observer's presence on the behavior of middle- and working class mothers. The Journal of Social Psychology, 113, 193-199.
- Rothbart, M. K. (1982). The concept of difficult temperament: A critical analysis of Thomas, Chess, & Korn. Merrill-Palmer Quarterly, 28, 35-40.
- Sall, J. P. (1982). Reg. In A. A. Ray (Ed.), SAS user's guide: Statistics 1982 edition. Cary, NC: SAS Institute.
- Salzinger, S., Kaplan, S., & Artemyeff, C. (1983). Mother's personal social networks and child maltreatment. Journal of Abnormal Psychology, 92, 68-76.
- Sameroff, A. J. & Chandler, M. J. (1975). Reproductive risk and the continuum of caretaking causality. In F. D. Horowitz (Ed.), Review of Child Development Research, Vol. 4 (pp. 187-244). Chicago: University of Chicago Press.
- Sameroff, A. J., Seifer, R. & Zax, M. (1982). Early development of children at risk for emotional disorders. Monographs of the Society for Research in Child Development, 47, (7, Serial No. 199).
- Sarle, W. S. (1982). Candisc. In A. A. Ray (Ed.), SAS user's guide statistics 1982 edition (pp. 379-380). Cary, NC: SAS Institute.
- Saudargas, R. A. & Lentz, F. E. (1986). Estimating percent of time and rate via direct observation: A suggested observational procedure and format. School Psychology Review, 15, 36-48.
- Schneider-Rosen, K., Braunwald, R. G., Carlson, V. & Cicchetti, D. (1985). Current perspectives in attachment theory: Illustrations from the study of maltreated infants. In I. Bretherton & E. Waters (Eds.), Growing points of attachment theory and research: Monographs of the Society for Research in Child Development (pp. 194-210), 50 (1-2, Serial No. 209).
- Shereshefsky, P. M., & Yarrow, L. J. (1973). Psychological aspects of a first pregnancy and early postnatal adaptation. New York: Raven Press.

- Slate, J. R. (1985). An analysis of the classroom behaviors of learning disabled, seriously emotionally disturbed, and average children (assessment data, observation system, behavior patterns). (Doctoral dissertation, University of Tennessee, 1984). Dissertation Abstracts International, 45, 1903B.
- Spinetta, J. J. (1978). Parental personality factors in child abuse. Journal of Consulting and Clinical Psychology, 46, 1409-1414.
- Steinberg, L. D., Catalano, R., & Dooley, D. (1981). Economic antecedents of child abuse and neglect. Child Development, 52, 975-985.
- Thomas, A., & Chess, S. (1977). Temperament and development. New York: Bruner/Mazel.
- Thomas A., Chess, S., Birch, H. G., Hertzog, M. E., & Korn, S. (1963). Behavioral individuality in early childhood. New York: New York University Press.
- Thomas A., Chess, S. & Korn, S. J. (1982). The reality of difficult temperament. Merrill-Palmer Quarterly, 28, 1-20.
- Tinsley, H. E. A. & Weiss, D. J. (1975). Interrater reliability and agreement of subjective judgements. Journal of Counseling Psychology, 22, 358-376.
- Tulkin, S. R. & Kagan, J. (1972). Mother-child interaction in the first year of life. Child Development, 43, 31-41.
- Unger, D. G. & Powell, D. R. (1980). Supporting families under stress: The role of social networks. Family Relations, 29, 566-574.
- Vietze, P., Falsey, S., Sandler, H., O'Connor, S., & Altemier, W. A. (1980). Transactional approach to prediction of child maltreatment. Infant Mental Health Journal, 1, 248-261.
- Wahler, R. G., & Hann, D. M. (1986). A behavioral systems perspective of childhood psychopathology: Expanding the the three-term operant contingency. In N. A. Krasnegor, J. D. Arasteh, and M. F. Cataldo (Eds.), Child health behavior: A behavioral pediatrics perspective (pp. 146-167). New York: John Wiley & Sons.

- Wahler, R. G., Leske, G., & Rogers, E. S. (1978). The insular family: A deviance support system for oppositional children. In L. Hamerlynck (Ed.), Behavioral systems for the developmentally disabled: Vol. 1. School and family environments (pp. 102-127). New York: Brunner/Mazel.
- Wandersman, L., Wandersman, A., & Kahn, S. (1980). Social support in the transition to parenthood. Journal of Community Psychology, 8, 332-342.
- Waters, E., Wippman, J., & Sroufe, L. A. (1979). Attachment, positive affect, and competence in the peer group: Two studies in construct validation. Child Development, 50, 821-829.
- Watkins, H. D. & Bradbard, M. R. (1982). Child maltreatment: An overview with suggestions for intervention and research. Family Relations, 31, 323-333.
- White, R. W. (1959). Motivation reconsidered: The concept of competence. Psychological Review, 66, 297-333.
- Wolfe, D. A. (1985). Child abusive parents: An empirical review and analysis. Psychological Bulletin, 97, 462-482.

APPENDIXES

APPENDIX A

BASIC DEMOGRAPHIC INFORMATION

Code # _____

Listed below are some general questions concerning you and your family. The answers you provide will be information useful for this research project. Please complete the questions in the space provided. If you would like not to answer some of these questions, just leave the space blank.

1. Your birthday: _____
 month day year
2. Infant's birthday: _____
 month day year
3. Marital status: _____
4. Race or ethnic origin: _____
5. Highest grade completed or degree earned in school:

6. Yearly family income:
 (check one)

less than \$ 4,999	_____	\$20,000 - \$24,999	_____
\$ 5,000 - \$ 9,999	_____	\$25,000 - \$29,999	_____
\$10,000 - \$14,999	_____	\$30,000 - \$39,999	_____
\$15,000 - \$19,999	_____	\$40,000 - \$44,999	_____
		above - \$45,000	_____
7. How many children currently live in your home? _____
8. Was your pregnancy with this infant your first pregnancy? _____
9. If not, how many times have you been pregnant before?

APPENDIX B

MOTHER-INFANT BEHAVIORAL OBSERVATION SYSTEM

Infant Behaviors

State Behaviors

TOY - play behaviors.

A. Definition: Infant plays, manipulates (with hands or feet), sucks, bounces, bangs, examines any object (e.g., hands, clothing, toys) at the beginning of an interval. Nearly mouthing or sucking an object while accomplishing a caretaking task (e.g., sucking on a pacifier) is excluded. Also, touching or holding an object while pursuing another activity (e.g., moving a blanket away to get a bottle) would not be included in TOY.

B. Scorable Instances:

1. Infant mouths a set of plastic keys.
2. Infant manipulates own fingers in front of face.
3. Infant grasps mother's fingers and moves them around (also score TAK and mother TOY).

C. Non-scorable Instances:

1. Infant grabs mother's hair while feeding (score infant TAK, EAT, not EAT, TOY).

EAT - feeding behaviors.

A. Definition: Infant is eating or drinking food, milk, water, etc. from a cup, spoon, bottle. Scored as long as food, etc. is within reach of the infant.

B. Scorable instances:

Infant is sucking on a bottle on mother's lap (also score HLD for mother).

C. Non-scorable instances:

1. Mother has placed the bottle on a nearby table and wipes the infant's mouth (score i - MNT and m - ATT).
2. Mother dangles bottle in front of infant, but does not put it within the infant's reach (not scorable as EAT since the infant cannot reach the food).

MNT - maintenance/caretaking activities.

A. Definition: Infant is involved in a caretaking activity other than feeding, e.g., changing, bathing/cleaning, grooming, etc.

- B. Scorable instances:
1. Infant is having diaper changed.
 2. Infant is having face and hands wiped after feeding.
 3. Infant is having finger nails cut.
 4. Infant is being powdered.
- C. Non-scorable instances:
1. Infant is lying on back waiting to be changed (not scorable since changing is not occurring).
 2. Infant is holding a wash cloth and waving it around (score TOY since infant her/himself is not being washed).

NI - non-interaction.

- A. Definition: This category is scored when the infant is not interacting with people or objects at the beginning of the interval. If the child is attending to the surroundings (e.g., looking at a toy, watching mother), NI can not be scored.
- B. Scorable instances
1. Infant closes eyes and appears asleep while in mother's lap (also score m - HLD).
 2. Infant sitting in play seat and staring up at the ceiling.
- C. Non-scorable instances:
1. Infant looking at and mouthing own fingers (infant is playing with own body parts - score TOY).
 2. Infant is lying in the crib and staring at the mobile (infant attending to an object, NI cannot be scored).

HLD - hold.

- A. Definition: Holding refers to sustained and active physical contact on the part of the infant to the mother. HLD then can be scored in intervals immediately following an infant TAK of some physical feature of mother. The only times in which HLD is scored in the same interval with TAK is: (1) the infant is HLDing in the beginning of an interval, releases the mother and TAKes her again, or (2) the infant continues to HLD mother and TAKes another object.

- B. Scorable instances:
1. In the previous interval, the infant grabbed mother's hair (i - TAK). At the beginning of the next interval, the infant is still holding mother's hair (i - HLD).
 2. In the previous interval, the infant grasped mother's shirt (i - TAK). At the beginning of the next interval, the infant is still holding mother's shirt (i - HLD).
- C. Non-scorable instances:
1. Near the end of the interval, the infant grabs mother's finger (score i - TAK, not HLD).
 2. In the previous interval, the infant has grasped mother's finger (i - TAK). At the beginning of the next interval, the infant lets go of the mother's finger and then grasps her shirt (score i - TAK, not HLD).

Event Behaviors

SM - smile.

- A. Definition: Refers to those instances in which the infant smiles at the mother.
- B. Scorable instances:
1. Infant smiles at mother while being changed (score i - MNT and SM; m - ATT).
- C. Non-scorable instances:
1. Infant is alone and playing with a toy. The infant then smiles at the toy (score i - TOY only, no SM since not smiling at mother).

AFC - affection.

- A. Definition: Refers to those instances in which the infant kisses and/or cuddles, the mother.
- B. Scorable instances:
1. Infant nestles head on the mother's shoulder while being held (score i - AFC; m - HLD).
 2. While playing with mother, the infant kisses the mother's nose (score i - TOY and AFC; m - TOY).

- C. Non-scorable instances:
1. Infant is sitting on the mother's lap, but maintains a stiff posture (score m - HLD).
 2. While engaging in solitary play, the infant smiles and laughs (score i - TOY, VOC, and SM no AFC since not in contact with the mother).

GIV - infant gives.

- A. Definition: Infant gives/offers and object (e.g., toy) or gives/offers her/himself to the mother. In this latter case, the infant does not have to obtain a response from mother in order to score this category.
- B. Scorable instances:
1. Infant extends arm and holds a toy in front of mother.
 2. Infant extends arms toward mother as she approaches.
- C. Non-scorable instances:
1. Infant is mouthing a plastic ball and mother takes the ball away from the child (GIV not scored since the infant did not offer the toy to the mother, score m - TAK).
 2. Infant is sitting in a car seat and mother picks him up (GIV not scored since infant did not reach towards mother).

TAK - infant take.

- A. Definition: Infant takes an object, toy, food offered by mother OR grasps a part of mother's person while mother is in proximity. In the cases of TAKing an object, the mother must first GIV. TAK does not apply to those instances where the infant grabs an object on her/his own accord.
- B. Scorable instances:
1. Mother places nipple near infant's mouth, infant grasps bottle with mother and begins to suck (score i - EAT and TAK, m-FED and GIV).
 2. Mother waves toy in front of infant and the infant grabs the toy (score i - TOY and TAK, m - TOY and GIV).
 3. Infant grasps onto mother's finger while being fed (score i - EAT and TAK, m - FED).

- C. Non-scorable instances:
1. Mother moves a wash cloth towards infant's face, but infant turns head away (score i - MNT and NP; m - ATT).
 2. Mother waves toy in front of infant and the infant smiles and bounces (score i - TOY and AFC; m - TOY and GIV).
 3. Infant picks a toy up off the floor (score i - TOY not TAK since the toy was not offered by m).

NTAK - infant does not take offered object.

- A. Definition: Infant refuses an object or action offered by mother. Must be an active refusal not just ignore. Since NP refers to an active refusal by the infant, it must be preceded by an M GIV.
- B. Scorable instances:
1. Infant pulls away when mother offers to pick/her up (score i - NTAK, m - GIV).
 2. Infant pushes mother's hand away when mother waves a toy in front of infant (score i - TOY and NTAK; m - TOY and GIV).
 3. Mother lowers nipple to infant, but the infant screams and turns its head away (score i - NTAK and VC-; m - FED and GIV).
- C. Non-scorable
1. Infant begins to cry while sitting in infant seat (score VC-).
 2. Mother watching infant play and the infant pushes his/her toy away and turns head away from mother (score i - TOY, no NTAK can be scored since the mother did not offer an object prior to the infant's pushing and head turn).
 3. Mother is clipping the infant's nails and the infant begins to wiggle and make vocalizations (score i - MNT, VOC, and NP; m - ATT, not an NTAK since mother not giving an object to the child).

VOC - infant vocalizations.

- A. Definition: This category includes all vocal sounds made by the infant not classified as a VC-. This includes those vocalizations which are clearly positive (e.g., coos, squeals, laughs) as well as those ambiguous to the distress - nondistress quality. This does not include coughs, burps or sneezes.

VC - negative vocalization.

A. Definition: Infant vocalizations which by their quality and/or the infant's facial expressions clearly indicates distress, protest or a complaint. This includes fretting, whimpering, fussing and crying. Vocalizations which are ambiguous as to the distress - nondistress quality are not scorable as VC- (see VOC).

NP - negative physical behavior of the infant.

A. Definition: This category refers to any physical or non-verbal complaint made by the infant. A physical complaint may involve banging the head on the floor, kicking legs, and/or waving arms during a period of distress. Often NP will accompany VC-.

B. Scorable instances:

1. Infant is crying and kicking legs while in the playpen (score VC- and NP).
2. Mother has been holding the infant and the infant begins to kick and squirm in her arms (score i - NP; m - HLD).
3. Infant pushes against mother with legs while mother attempts to clip the infant's finger nails (score i - MNT and NP: - ATT).

C. Non-scorable instances:

1. Mother offers a spoon of food to the infant and the infant pushes mother's hand away (score NTAK not NP).
2. Infant and mother are playing and the infant begins to kick her/his legs and laugh (score i - TOY and VC+; m - TOY since the body activity was involved in a pleasant interaction not a period of distress).

Mother Behaviors

State Behaviors

TOY - play behaviors of the mother.

A. Definition: Any instance in which the mother appears to manipulate objects (e.g., toys, books, fingers) in a way to capture the infant's attention, typically for enjoyment. TOY is scored for mother's getting out, demonstrating, playing with and putting away any object used in the above manner.

B. Scorable instances:

1. Mother wiggles her fingers in front of the infant (score m - TOY and i - TOY).
2. Mother places a stuffed animal next to the infant, then walks away (score m - TOY if this occurred at the beginning of an interval).
3. Mother winds a music box while the infant is crying and places the music box near the infant (score m - TOY; i - VC-).

C. Non-scorable instances:

1. Infant has picked-up a cigarette butt and mother quickly removes the object from the child (not TOY since mother just removing the object; score m - TAK, i - TOY).
2. Infant is mouthing a toy ball while mother sits and watches TV (m doesn't get a score of TOY since she is not involved with the infant and toy at this time (score i - TOY)).

FED - feeding behaviors.

A. Definition: Mother is attempting to feed the infant via a bottle, breast, or spoon. This includes initiation and continuation of feeding.

B. Scorable instances:

1. Mother is positioning the bottle near the infant's mouth at the beginning of the interval (score m - FED, i - EAT).
2. Mother is dipping the spoon into the babyfood for a return trip to the infant's mouth (score m - FED, i - EAT).
3. Mother is holding and looking at her infant while the infant sucks on the bottle (score m - FED and HLD; i - EAT).

C. Non-scorable instances:

1. Mother is sitting away from the infant while the infant drinks her/his bottle in the playpen (score i - EAT but not m - FED since mother is not involved in the feeding).
2. At the beginning of the interval, the mother takes away the bottle and starts to wipe the infant's mouth (score m - ATT and TAK, not FED since mother is no longer feeding the infant).
3. Mother dangles bottle out of infant's reach and says: "You don't really want this, do ya?" (score m NGIV and VOC, not FED).

ATT - Mother attending to the infant's needs.

A. Definition: Attend applies to those instances in which mother is attending to the physical need of the infant (e.g., diapering, bathing/washing, grooming) not included in the FED category.

B. Scorable instances:

1. Mother has just put the infant on his/her back and pulled out a fresh diaper (score n - ATT and PUT; i - MNT).
2. Mother is trying to tie a bow on her little girl's head (score m - ATT since tying a bow is included in grooming).
3. Mother wipes her infant's face with a wash cloth (score m - ATT).

C. Non-scorable instances:

1. Mother is holding her infant and is placing a bottle near the infant's mouth (score m - FED and HLD, not ATT and HLD since involved in a feeding).
2. Mother is rocking her crying infant (score m - HLD, not ATT).
3. The phone rings and mother walks away from changing her infant at the beginning of an interval (no longer score ATT since mother no longer engaged in the task).

MP - Mother is present, i.e., is in the same room with the infant.

M-O - Mother-other interaction.

A. Definition: This category is scored when the mother is verbally or behaviorally interacting with individuals other than the target infant (e.g., father, siblings of the infant, etc.). In addition to marking the category, the observer is to determine the emotional tone of the interaction and indicate this in the checked category. Those interactions judged as aversive, e.g., mother is yelling, hitting and/or grimacing at the other party) are given a (-) sign. Neutral interactions are given a (0), while pleasant interactions (e.g., mother is smiling, laughing and/or demonstrating affection to the other party) are given a (+).

B. Scorable instances:

1. Mother is chatting with father while feeding the baby (score m - FED and M-O (0); i - EAT).
2. Mother is yelling at her two year old while the

- infant is in the room (score m - M-0 (-)).
- 3. Mother is chatting with a girlfriend on the phone while the infant is present (score m - M-0 (0)).
- 4. Father kisses mother while infant is present (score m - M-0 (+)).

C. Non-scorable instances:

- 1. The 4 yr. old sibling enters the room while mother is changing the infant (M-0 cannot be scored since no verbal or behavioral interaction has occurred between the mother and the 4 yr. old).
- 2. Mother answers the phone 10 sec. into the interval (M-0 cannot be scored since the interaction did not occur during the first 5 sec of the interval).

HLD - hold.

A. Definition: Hold refers to instances of sustained physical contact in which the mother holds/touches some part of the infant and/or carries the infant. Hence, just a touch or a brief grasp cannot be scored as HLD.

B. Scorable instances:

- 1. Mother is holding infant on her lap while feeding (score m -FED and HLD; i - EAT).
- 2. Mother carries the infant with her when going to answer the phone.

C. Non-scorable instances:

- 1. Mother picks-up infant and immediately places him/her on another part of the couch (score PUT and UP not HLD).
- 2. Ten seconds into the interval, mother grasps infant's hand for a couple of seconds in order to wash her/his face (not scorable as HLD since occurred later in the interval).
- 3. Near the end of the interval, mother holds infant by his/her feet for a few seconds while playing (not scorable since occurred late in the interval).

Event Behaviors

PUT

A. Definition: Instances in which mother physically moves the infant to a new location or changes the position of the infant at a particular location. This category does not

apply to instances in which the mother puts the infant on her lap/shoulder (see HLD).

B. Scorable instances:

1. Mother picks infant up off the couch and puts her on the floor (score PUT and UP).
2. Mother is holding infant on her lap and then puts the infant down on the floor (score HLD for the initial part of the interval and PUT for the placement of the infant on the floor).
3. Mother gently pushes the infant to a different location on the floor.

C. Non-scorable instances:

1. Mother picks-up the infant from the floor and puts him on her lap (score UP and HLD not PUT).
2. The infant has rolled-over to a new location on the floor (not PUT since the infant has accomplished the move on her own).

UP - pick-up.

A. Definition: Up refers to those situations in which the mother picks-up the infant to move the infant to a new location. To be scored as an UP, the infant's feed/body must be lifted from the floor.

B. Scorable instances:

1. The infant is crying and mother reaches down to pick her/him up (score m - STH and UP; i - VC-).
2. Mother reaches out to the infant, says "You want to sit with me?", then picks-up the child (score m - GIV, VOC, and UP).
3. Mother picks the infant up off the floor and puts her/him in the playpen (score m - UP and PUT).

C. Non-scorable instances:

1. Mother adjusts the infant's position on the couch (score m - PUT not UP since the infant's body did not leave the couch).
2. Mother raises the infant to a standing position with the infant's feet on the floor (score m - PUT not UP since the infant's feed did not leave the floor).

SM - smile.

A. Definition: Refers to those instances in which the mother smiles at the infant.

B. Scorable instances:

1. Mother smiles at the infant while engaged in feeding (score m - FED and SM;;i - EAT).

C. Non-scorable instances:

1. Mother smiles at a picture in a magazine (no score since mother not interacting with the infant).

GIV - give.

A. Definition: Mother give involves those situations in which the mother offers/gives an object (e.g., toy, food, herself) to the infant. The infant does not have to accept the object in order to score mother GIV. This category may be scored during any of the maternal state behaviors but must apply to specific instances of giving. When giving herself, the mother must first make some offering gesture to the infant in order to score GIV. If not (i.e., if the mother picks-up infant with no behavioral gesture) then GIV cannot be scored (see UP).

B. Scorable instances:

1. Mother sits on the floor in front of the infant and holds her arms out as a gesture to pick-up the infant (score m - GIV since mother offers herself to the infant).
2. Mother moves a toy in front of and in reach of the infant (score m -TOY and GIV; i - TOY).
3. Mother inserts a pacifier into a crying infant's mouth (score m - STH and GIV; i - VC- and TAK).

C. Non-scorable instances:

1. Mother is holding the infant and the infant grasps mother's shirt (score m - HLD; i - TAK not m - GIV since she did not offer the shirt to the infant).
2. Mother is holding a ball in her hands while watching TV. The infant reaches for the ball (score i -TOY, not m - GIV).
3. Infant is playing on the floor quietly when the mother picks him up and puts him in the play pen (score m PUT and UP not GIV since mother made no behavioral gesture indicating she was going to pick-up the infant).

TAK - take.

A. Definition: This refers to instances in which mother removes an object (e.g., toy, food) from the infant. This

may or may not follow an infant GIV. The infant must have contact with the object when the mother removes it.

B. Scorable instances:

1. Infant is waving a toy in the direction of the mother and mother takes the toy (score m - TOY and TAK; i - TOY and GIV).
2. Mother removes the bottle from the infant's mouth (score m - FED and TAK; i - FED).
3. Infant is holding onto the mother's hair and mother pulls her hair free from the infant (score m - TAK; i - HLD).

C. Non-scorable instances:

1. Infant has dropped a toy and mother picks it up (score m - TOY, not TAK since mother is not removing the object from the infant).
2. Mother quickly moved an ash tray out of her infant's reach (score m - NGIV, not m - TAK since the object was not in contact with the infant).

NGIV - not give an object.

A. Definition: Instances in which mother deliberately refuses to give an object to the infant. The infant has not gained contact with the object in the case of NGIV.

B. Scorable instances:

1. Infant is reaching towards a pair of scissors and mother moves them out of the child's reach (score m - NGIV; i - TOY).
2. Infant reaches for a toy and the mother quickly moves the toy out of the infant's reach (score m - TOY and NGIV; i - TOY).

C. Non-scorable instances:

1. Infant has picked-up a cigarette butt and mother takes the cigarette from the infant's fingers (score m - TAK; i - TOY, not NGIV since the mother is taking the object from the child).
2. Mother removes the pacifier from the child's mouth and puts the object on the table (score m - TAK or NGIV since mother is taking the object from the child).

IMIT - imitate, verbal.

A. Definition: Mother imitates the infant's vocalization either VOC or VC- immediately following the infant's vocalization.

VOC - vocalize, neutral.

A. Definition: Those instances in which the mother is speaking to the child, but the statement is judged neither positive or negative (see VC+ and VC-).

VC + - vocalize, positive.

A. Definition: This category is scored whenever the mother directs laughter, affectionate words and/or an affectionate tone of voice (e.g., baby talk) towards the infant. This includes those instances in which the mother "speaks for the infant."

B. Scorable instances:

1. Mother is trying to feed the infant and says: "Here's the little baby's chow chow" (score m - FED and VC +; i - EAT).
2. Mother picks-up crying infant and says: "Now, now sweetie, it's OK" (score m - UP and VC +; i - VC-).
3. Mother is holding the infant and says: "I know I'm a good little baby, yes I do" (score m - HLD and VD+).
4. Mother laughs at the infant's position on the floor (score m - VC+).

C. Non-scorable instances:

1. Mother is speaking to the father and says: "Honey, would you get me more tea" (score M-0 + not VC +).
2. Mother says: "OK baby, what do you want to do now?" (score m - VOC since not clear if this is positive or neutral).

VC- - vocalize, aversive.

A. Definition: Refers to vocalizations from the mother judged aversive due to the content and/or vocal quality of the mother.

B. General Uses:

1. Aversive because of content.

a. The statement contains a threat of punishment or unpleasant consequences to the infant (Example: "Stop it or I'll smack you!").

b. The statement contains ridicule (Example: "You little brat, quit dropping your toys!").

2. Aversive because of vocal quality.

a. The statement is spoken loudly or shouted.

b. The statement is spoken in a "threatening" tone of voice, which may be high or low pitched and measured as if the speaker is exercising control.

C. Non-scorable instances:

1. If the observer judges any of the above criteria as mock or playful, the instance is not considered aversive.

AC - aversive physical contact.

A. Definition: Maternal behavior judged as aversive due to abruptness or harshness of the act, e.g., grabbing, jerking, striking.

B. Scorable instances:

1. Mother slaps the infant's hand as he grabs mother's hair (score m - FED, TAK and AC; 1 - EAT).

C. Non-scorable instances:

1. If the observer judges any of the above behaviors as mock or playful, the instance is not considered aversive.

APPENDIX C

REVISED INFANT TEMPERAMENT QUESTIONNAIRE

CODE # _____

The purpose of this questionnaire is to determine the general pattern of your infant's reactions to his/her environment.

The questionnaire consists of several pages of statements about your infant. Please circle the number indicating the frequency with which you think the statement is true for your infant. Although some of the statements seem to be similar, they are not the same and should be rated independently. If any item cannot be answered or does not apply to your infant, just draw a line through it. If your infant has changed with respect to any of the areas covered, use the response that best describes the recently established pattern. There are no good and bad or right and wrong answers, only descriptions of what your infant does. When you have completed the questionnaire, which will take about 25-30 minutes, you may make any additional comments at the end.

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USING THE FOLLOWING SCALE, PLEASE CIRCLE THE NUMBER THAT INDICATES HOW OFTEN THE INFANT'S RECENT AND CURRENT BEHAVIOR HAS BEEN LIKE THAT DESCRIBED BY EACH ITEM.

	Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5	Almost always 6
1. The infant eats about the same amount of solid food (within 1 oz) from day to day.	almost never				1 2 3 4 5 6	almost always
2. The infant is fussy on waking up and going to sleep (frowns, cries)	almost never				1 2 3 4 5 6	almost always
3. The infant plays with a toy for under a minute and then looks for another toy or activity.	almost never				1 2 3 4 5 6	almost always
4. The infant sits still while watching TV or other nearby activity.	almost never				1 2 3 4 5 6	almost always
5. The infant accepts right away any change in place or position of feeding or person giving it.	almost never				1 2 3 4 5 6	almost always
6. The infant accepts nail cutting without protest.	almost never				1 2 3 4 5 6	almost always
7. The infant's hunger cry can be stopped for over a minute by picking up, pacifier, putting on bib, etc.	almost never				1 2 3 4 5 6	almost always
8. The infant plays continuously for more than 10 min. at a time with a favorite toy.	almost never				1 2 3 4 5 6	almost always
9. The infant accepts his/her bath any time of the day without resisting it.	almost never				1 2 3 4 5 6	almost always
10. The infant takes feedings quietly with mild expression of likes and dislikes.	almost never				1 2 3 4 5 6	almost always
11. The infant indicates discomfort (fusses or squirms) when diaper is soiled with bowel movement.	almost never				1 2 3 4 5 6	almost always
12. The infant lies quietly in the bath.	almost never				1 2 3 4 5 6	almost always
13. The infant wants and takes milk feedings at about the same times (within one hour) from day to day.	almost never				1 2 3 4 5 6	almost always
14. The infant is shy (turns away or clings to mother) on meeting another child for the first time.	almost never				1 2 3 4 5 6	almost always

2.

Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5	Almost always 6
15. The infant continues to fuss during diaper change in spite of efforts to distract him/her with game, toy or singing, etc.			almost never	1 2 3 4 5 6	almost always
16. The infant amuses self for $\frac{1}{2}$ hour or more in crib or playpen (looking at mobile, playing with toy).			almost never	1 2 3 4 5 6	almost always
17. The infant moves about much (kicks, grabs, squirms) during diapering and dressing.			almost never	1 2 3 4 5 6	almost always
18. The infant vigorously resists additional food or milk when full (spits out, clamps mouth closed, bats at spoon, etc.)			almost never	1 2 3 4 5 6	almost always
19. The infant resists changes in feeding schedule (1 hour or more) even after two tries.			almost never	1 2 3 4 5 6	almost always
20. The infant's bowel movements come at different times from day to day (over one hour difference).			almost never	1 2 3 4 5 6	almost always
21. The infant stops play and watches when someone walks by.			almost never	1 2 3 4 5 6	almost always
22. The infant ignores voices or other ordinary sounds when playing with a favorite toy.			almost never	1 2 3 4 5 6	almost always
23. The infant makes happy sounds (coos, smiles, laughs) when being diapered or dressed.			almost never	1 2 3 4 5 6	almost always
24. The infant accepts new foods right away, swallowing them promptly.			almost never	1 2 3 4 5 6	almost always
25. The infant watches other children playing for under a minute and then looks elsewhere.			almost never	1 2 3 4 5 6	almost always
26. The infant reacts mildly (just blinks or startles briefly) to bright light such as flash bulb or letting sunlight in by pulling up shade.			almost never	1 2 3 4 5 6	almost always
27. The infant is pleasant (smiles, laughs) when first arriving in unfamiliar places (friend's house, store).			almost never	1 2 3 4 5 6	almost always
28. The infant gets sleepy at about the same time each evening (within $\frac{1}{2}$ hr.)			almost never	1 2 3 4 5 6	almost always
29. The infant accepts regular procedures (hair brushing, face washing, etc.) at any time without protest.			almost never	1 2 3 4 5 6	almost always

3.

Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5					Almost always 6
30. The infant sits still (little squirming) while traveling in car seat or stroller.			Almost never	1	2	3	4	5	6 almost always
31. The infant's initial reaction to a new baby sitter is rejection (crying, clinging to mother, etc.)			almost never	1	2	3	4	5	6 almost always
32. The infant keeps at it for many minutes when working on a new skill (rolling over, picking up object, etc.)			almost never	1	2	3	4	5	6 almost always
33. The infant moves much (squirms, bounces, kicks) while lying awake in crib.			almost never	1	2	3	4	5	6 almost always
34. The infant objects to being bathed in a different place or by a different person even after 2 or 3 tries.			almost never	1	2	3	4	5	6 almost always
35. The amount of milk the infant takes at feedings is quite unpredictable (over 2 oz. difference) from feeding to feeding.			almost never	1	2	3	4	5	6 almost always
36. For the first few minutes in a new place or situation (new store or home) the infant is fretful.			almost never	1	2	3	4	5	6 almost always
37. The infant notices (looks carefully at) changes in the appearance or dress (hairdo, unfamiliar clothing) of the mother.			almost never	1	2	3	4	5	6 almost always
38. The infant reacts strongly to foods, whether positively (smacks lips, laughs, squeals) or negatively (cries).			almost never	1	2	3	4	5	6 almost always
39. The infant is pleasant (coos, smiles etc.) during procedures like hair brushing or face washing.			almost never	1	2	3	4	5	6 almost always
40. The infant continues to cry in spite of several minutes of soothing.			almost never	1	2	3	4	5	6 almost always
41. The infant keeps trying to get a desired toy, which is out of reach, for 2 min. or more.			almost never	1	2	3	4	5	6 almost always
42. The infant greets a new toy with a loud voice and much expression of feeling (whether positive or negative)			almost never	1	2	3	4	5	6 almost always
43. The infant plays actively with parents-much movement of arms, legs, body.			almost never	1	2	3	4	5	6 almost always

4.

	Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5						Almost always 6	
44. The infant watches another toy when offered even though already holding one.				almost never	1	2	3	4	5	6		almost always
45. The infant's initial reaction at home to approach by strangers is acceptance.				almost never	1	2	3	4	5	6		almost always
46. The infant wants daytime naps at differing times (over 1 hour difference) from day to day.				almost never	1	2	3	4	5	6		almost always
47. The infant continues eating solid foods without reacting to differences in taste or consistency.				almost never	1	2	3	4	5	6		almost always
48. The infant cries when left to play alone.				almost never	1	2	3	4	5	6		almost always
49. The infant adjusts within 10 min. to new surroundings (home, store, play area).				almost never	1	2	3	4	5	6		almost always
50. The infant's daytime naps are about the same length from day to day (under one half hour difference).				almost never	1	2	3	4	5	6		almost always
51. The infant moves about much during feedings (squirms, kicks, grabs).				almost never	1	2	3	4	5	6		almost always
52. The infant reacts (stares or startles) to sudden changes in lighting (flash bulbs, turning on light).				almost never	1	2	3	4	5	6		almost always
53. The infant can be soothed by talking or games when sleepy.				almost never	1	2	3	4	5	6		almost always
54. The infant displays much feeling (vigorous laugh or cry) during diapering or dressing.				almost never	1	2	3	4	5	6		almost always
55. The infant lies still when asleep and wakes up in the same place.				almost never	1	2	3	4	5	6		almost always
56. The infant adjusts easily and sleeps well within 1 or 2 days with changes of time or place.				almost never	1	2	3	4	5	6		almost always
57. The infant reacts to changes in temperature or type of milk or substitution of juice.				almost never	1	2	3	4	5	6		almost always
58. The infant watches television for more than 5 minutes at a time.				almost never	1	2	3	4	5	6		almost always
59. The infant can be calmed for a few minutes by being picked up, played with, T.V., if fussing about soiled diaper.				almost never	1	2	3	4	5	6		almost always
60. The infant wants and takes solid food feedings at about the same time (within 1 hour) from day to day.				almost never	1	2	3	4	5	6		almost always

5.

Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5	Almost always 6	
61. The infant is content (smiles, coos) during interruptions of milk or solid feeding.			almost never	1 2 3 4 5 6	almost always	
62. The infant accepts within a few minutes a change in place of bath or person giving it.			almost never	1 2 3 4 5 6	almost always	
63. The infant cries for less than one minute when given an injection.			almost never	1 2 3 4 5 6	almost always	
64. The infant shows much bodily movement (kicks, waves arms) when crying.			almost never	1 2 3 4 5 6	almost always	
65. The infant continues to react to a loud noise (hammering, barking dog, etc.) heard several times in the same day.			almost never	1 2 3 4 5 6	almost always	
66. The infant's initial reaction is withdrawal (turns head, spits out) when consistency, flavor or temperature of solid foods is changed.			almost never	1 2 3 4 5 6	almost always	
67. The infant's time of waking in the morning varies greatly (by 1 hour or more) from day to day.			almost never	1 2 3 4 5 6	almost always	
68. The infant continues to reject disliked food or medicine in spite of parents' efforts to distract with games or tricks.			almost never	1 2 3 4 5 6	almost always	
69. The infant reacts even to a gentle touch (startle, wriggle, laugh, cry).			almost never	1 2 3 4 5 6	almost always	
70. The infant reacts strongly to strangers: laughing or crying.			almost never	1 2 3 4 5 6	almost always	
71. The infant actively grasps or touches objects within his/her reach (hair, spoon, glasses, etc.).			almost never	1 2 3 4 5 6	almost always	
72. The infant will take any food offered without seeming to notice the difference.			almost never	1 2 3 4 5 6	almost always	
73. The infant's period of greatest physical activity comes at same time of day.			almost never	1 2 3 4 5 6	almost always	
74. The infant appears bothered (cries, squirms) when first put down in a different sleeping place.			almost never	1 2 3 4 5 6	almost always	
75. The infant reacts mildly to meeting familiar people (quiet smiles or no response).			almost never	1 2 3 4 5 6	almost always	

6.

Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5	Almost always 6	
76. The infant is fussy or moody throughout a cold or an intestinal virus.			almost never	1 2 3	4 5 6	almost always
77. The infant wants an extra feeding at a different time each day (over one hour difference).			almost never	1 2 3	4 5 6	almost always
78. The infant is still wary or frightened of strangers after 15 minutes.			almost never	1 2 3	4 5 6	almost always
79. The infant lies still and moves little while playing with toys.			almost never	1 2 3	4 5 6	almost always
80. The infant can be distracted from fussing or squirming during a procedure (nail cutting, hair brushing, etc.) by a game, singing, TV, etc.			almost never	1 2 3	4 5 6	almost always
81. The infant remains pleasant or calm with minor injuries (bumps, pinches).			almost never	1 2 3	4 5 6	almost always
82. The infant's initial reaction to seeing doctor is acceptance (smiles, coos).			almost never	1 2 3	4 5 6	almost always
83. The infant reacts to a disliked food even if it is mixed with a preferred one.			almost never	1 2 3	4 5 6	almost always
84. The infant plays quietly and calmly with toys (little vocalization or other noise).			almost never	1 2 3	4 5 6	almost always
85. The infant's fussy period occurs at about the same time of day (morning, afternoon or evening.)			almost never	1 2 3	4 5 6	almost always
86. The infant lies still during procedures like hair brushing or nail cutting.			almost never	1 2 3	4 5 6	almost always
87. The infant stops sucking and looks when he/she hears an unusual noise (telephone, door bell) when drinking milk.			almost never	1 2 3	4 5 6	almost always
88. The infant pays attention to game with parent for only a minute or so.			almost never	1 2 3	4 5 6	almost always
89. The infant is calm in the bath. Like or dislike is mildly expressed (smiles or frowns).			almost never	1 2 3	4 5 6	almost always
90. The infant requires introduction of a new food on 3 or more occasions before he/she will accept (swallow) it.			almost never	1 2 3	4 5 6	almost always

7.

Almost never 1	Rarely 2	Variable usually does not 3	Variable usually does 4	Frequently 5	Almost always 6	
91. The infant's first reaction to any new procedure (first haircut, new medicine, etc.) is objection.				almost never	1 2 3 4 5 6	almost always
92. The infant acts the same when the diaper is wet as when it is dry. (no reaction)				almost never	1 2 3 4 5 6	almost always
93. The infant is fussy or cries during the physical examination by the doctor.				almost never	1 2 3 4 5 6	almost always
94. The infant accepts changes in solid food feedings (type, amount, timing) within 1 or 2 tries.				almost never	1 2 3 4 5 6	almost always
95. The infant moves much and for several minutes or more when playing by self (kicking, waving arms and bouncing).				almost never	1 2 3 4 5 6	almost always

Additional Comments

APPENDIX D

QUESTIONNAIRE IV

CODE # _____

INSTRUCTIONS: The following questionnaire includes a series of statements which may be applied to yourself. Read each of the statements and determine if you **AGREE** or **DISAGREE** with the statement. If you agree with a statement, circle **A** for agree. If you disagree with a statement, circle **DA** for disagree. Remember to read each statement; it is important not to skip any statement.

●○○○

- | | | |
|--|---|----|
| 1. I like to be alone | A | DA |
| 2. I enjoy having pets | A | DA |
| 3. I have always been strong and healthy | A | DA |
| 4. The church is responsible for teaching a child right from wrong | A | DA |
| 5. I am a confused person | A | DA |
| | | |
| 6. I do not trust most people | A | DA |
| 7. People expect too much from me | A | DA |
| 8. Children should never be bad | A | DA |
| 9. I am often mixed up | A | DA |
| 10. Spanking that only bruises a child is okay | A | DA |
| | | |
| 11. My family has emotional problems | A | DA |
| 12. I sometimes act without thinking | A | DA |
| 13. You cannot depend on others | A | DA |
| 14. I am a happy person | A | DA |
| 15. Other people have caused me to be unhappy | A | DA |
| | | |
| 16. Teenage girls need to be protected | A | DA |
| 17. I am often angry inside | A | DA |
| 18. Sometimes I feel all alone in the world | A | DA |
| 19. Everything in a home should always be in its place | A | DA |
| 20. I sometimes worry that I cannot meet the needs of a child | A | DA |
| | | |
| 21. I always know what is right and wrong | A | DA |
| 22. I often feel rejected | A | DA |
| 23. I am often lonely inside | A | DA |
| 24. Little boys should never learn sissy games | A | DA |
| 25. I often feel very frustrated | A | DA |

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|--|---|----|
| 26. Children should never disobey | A | DA |
| 27. I love all children | A | DA |
| 28. Sometimes I fear that I will lose control of myself | A | DA |
| 29. I sometimes wish that my father would have loved me more | A | DA |
| 30. I have a child who is clumsy | A | DA |
| 31. I am not very attractive | A | DA |
| 32. My telephone number is unlisted | A | DA |
| 33. The birth of a child will usually cause problems in a marriage | A | DA |
| 34. I am always a good person | A | DA |
| 35. I never worry about my health | A | DA |
| 36. I sometimes worry that I will not have enough to eat | A | DA |
| 37. I have never wanted to hurt someone else | A | DA |
| 38. I am an unlucky person | A | DA |
| 39. I am usually a quiet person | A | DA |
| 40. Children should never be spoiled | A | DA |
| 41. Things have usually gone against me in life | A | DA |
| 42. Picking up a baby whenever he cries spoils him | A | DA |
| 43. My parents did not really love me | A | DA |
| 44. I never lose my temper | A | DA |
| 45. I have a child who is bad | A | DA |
| 46. I always think of others first | A | DA |
| 47. I sometimes feel worthless | A | DA |
| 48. My parents did not really care about me | A | DA |
| 49. I am sometimes very sad | A | DA |
| 50. Children are really little adults | A | DA |
| 51. I have a child who breaks things | A | DA |
| 52. I often feel worried | A | DA |
| 53. It is okay to let a child stay in dirty diapers for a while | A | DA |
| 54. A child should never talk back | A | DA |
| 55. Sometimes my behavior is childish | A | DA |
| 56. I am often easily upset | A | DA |
| 57. Sometimes I have bad thoughts | A | DA |
| 58. People sometimes mix me up | A | DA |
| 59. A crying child will never be happy | A | DA |
| 60. I have never hated another person | A | DA |
| 61. People must not spoil children | A | DA |
| 62. I always do what is right | A | DA |
| 63. I am often worried inside | A | DA |
| 64. I have a child who is sick a lot | A | DA |
| 65. Sometimes I do not like the way I act | A | DA |
| 66. I keep all of my promises | A | DA |
| 67. People have caused me a lot of pain | A | DA |
| 68. Children should stay clean | A | DA |
| 69. I have a child who gets into trouble a lot | A | DA |
| 70. I never get mad at others | A | DA |

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|--|---|----|
| 71. I always get along with others | A | DA |
| 72. It is sometimes frightening to be responsible for the development of a child | A | DA |
| 73. I find it hard to relax | A | DA |
| 74. These days a person doesn't really know on whom one can count | A | DA |
| 75. My life is happy | A | DA |
| 76. I have a physical handicap | A | DA |
| 77. Children should have play clothes and good clothes | A | DA |
| 78. Other people do not understand how I feel | A | DA |
| 79. A five year old who wets his bed is bad | A | DA |
| 80. Children should be quiet and listen | A | DA |
| 81. I have several close friends in my neighborhood | A | DA |
| 82. The school is primarily responsible for educating the child | A | DA |
| 83. My family fights a lot | A | DA |
| 84. I have headaches | A | DA |
| 85. As a child I was abused | A | DA |
| 86. Spanking is the best punishment | A | DA |
| 87. I do not like to be touched by others | A | DA |
| 88. People who ask for help are weak | A | DA |
| 89. Children should be washed before bed | A | DA |
| 90. I do not laugh very much | A | DA |
| 91. Sometimes I behave like a child | A | DA |
| 92. People should take care of their own needs | A | DA |
| 93. I have fears no one knows about | A | DA |
| 94. My family has problems getting along | A | DA |
| 95. Life often seems useless to me | A | DA |
| 96. A child should be potty trained by the time he's one year old | A | DA |
| 97. A child in a mud puddle is a happy sight | A | DA |
| 98. People do not understand me | A | DA |
| 99. I often feel worthless | A | DA |
| 100. Other people have made my life unhappy | A | DA |
| 101. I am always a kind person | A | DA |
| 102. Sometimes I do not know why I act as I do | A | DA |
| 103. I have many personal problems | A | DA |
| 104. I have a child who often hurts himself | A | DA |
| 105. I often feel very upset | A | DA |
| 106. People never take advantage of me | A | DA |
| 107. My life is good | A | DA |
| 108. A home should be spotless | A | DA |
| 109. I am easily upset by my problems | A | DA |
| 110. I never listen to gossip | A | DA |
| 111. My parents did not understand me | A | DA |
| 112. Many things in life make me angry | A | DA |
| 113. My child has special problems | A | DA |
| 114. I like all children | A | DA |
| 115. Children should be seen and not heard | A | DA |

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116.	Most children are alike	A	DA
117.	Children should not cry	A	DA
118.	I am often depressed	A	DA
119.	Children should be thoughtful of their parents	A	DA
120.	I am often upset	A	DA
121.	Few people have as many problems as I do	A	DA
122.	A good child keeps his toys and clothes neat and orderly	A	DA
123.	Children should always make their parents happy	A	DA
124.	It is natural for a child to sometimes talk back	A	DA
125.	I am never unfair to others	A	DA
126.	Occasionally, I enjoy not having to take care of my child	A	DA
127.	Children should always be neat	A	DA
128.	I have a child who is slow	A	DA
129.	A parent must use punishment if he wants to control a child's behavior	A	DA
130.	Children should never cause trouble	A	DA
131.	It is normal for a child to sometimes disobey	A	DA
132.	A child needs very strict rules	A	DA
133.	Children should never go against their parents' orders	A	DA
134.	I often feel better than others	A	DA
135.	Children sometimes get on my nerves	A	DA
136.	As a child I was often afraid	A	DA
137.	Children should always be quiet and polite	A	DA
138.	I am often upset and do not know why	A	DA
139.	I sometimes fear that I may spoil my child	A	DA
140.	I sometimes fear that my children will not love me	A	DA
141.	I have a good sex life	A	DA
142.	I have read articles and books on child rearing	A	DA
143.	I often feel very alone	A	DA
144.	People should not show anger	A	DA
145.	I often feel alone	A	DA
146.	I never say bad words	A	DA
147.	Right now, I am deeply in love	A	DA
148.	My family has many problems	A	DA
149.	I never do anything that is bad for my health	A	DA
150.	I am always happy with what I have	A	DA
151.	Other people have made my life hard	A	DA
152.	I laugh some almost every day	A	DA
153.	I sometimes worry that my needs will not be met	A	DA
154.	I often feel afraid	A	DA
155.	I never act silly	A	DA
156.	A person should keep his business to himself	A	DA
157.	I never raise my voice in anger	A	DA
158.	As a child I was knocked around by my parents	A	DA
159.	I sometimes think of myself before others	A	DA
160.	I always tell the truth	A	DA

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APPENDIX E

COMMUNITY INTERACTION CHECKLIST

SE INTERACTION CHECKLIST

Counting the time spent sleeping at night.
 How many hours did you and your spouse spend together:
 yesterday after _____?
 today before _____?
 I in blank with time of observation)

NATURE OF INTERACTION

Did any of the following activities occur? talked about:	were you critically?	was other critically?	rate the interaction
1. the way I raise the kids			
2. the children at school			
3. a problem with the kids			
4. my work around the house			
5. finances or money			
6. borrowing something			
7. the people I associate with			
8. how much time we spend together			
9. my work on the job			
10. how we relax together			
11. other people's problems			
12. miscellaneous			
13.			
14. no data			

good +3
 +2
 +1
 neutral 0
 -1
 -2
 bad -3

APPENDIX F

PARENT LETTER

CHILD & ADOLESCENT DEVELOPMENT INSTITUTE



DEPARTMENT OF PSYCHOLOGY THE UNIVERSITY OF TENNESSEE
KNOXVILLE TENNESSEE 37996-0900

Dear Parents,

Being a parent of a young infant in today's world is not always an easy job. While realizing this, social and mental health professionals need to know more about the conditions and events which may affect the ease of parenting. We are trying to learn how we can best help and meet the needs of parents with young children. With this in mind, _____ is helping with a research project concerned with Maternal Care During Early Infancy.

This project will involve arranging five separate visits to the home. During several of these visits, a trained staff member will ask the participating mothers to fill-out short questionnaires. The other visits will involve observations of mother-infant interaction, followed by a short interview. Each visit will involve approximately one hour. Therefore, participation in this study would involve no more than five hours.

If you would like to know more about this project and find out how you can be involved, please check the YES box below and leave information (name, phone number, and address) where you can be reached. Then, return this form to _____. I will be contacting you in the next few days to discuss the project and invite you to participate. I know that your time is very valuable, but your involvement could be extremely helpful to other parents in the future. In addition your involvement in this study could be an interesting and enjoyable experience for you as well.

Sincerely,

Della M. Hann, B.A.
Doctoral Candidate in
Experimental Psychology
University of Tennessee

YES I would like to find out more about this project and the possibility of participating.

NAME _____

PHONE _____

ADDRESS _____

EDUCATION • RESEARCH • SERVICE

RAYMOND P. LORION

ANNE McINTYRE

RICHARD A. SAUDARGAS

ROBERT G. WAHLER

APPENDIX G

INFORMED CONSENT

INFORMED CONSENT

We are conducting a study concerning the day-to-day experiences of mothers and their young infants. The goal of this research is to increase understanding about how maternal opinions of themselves, their baby, and their daily contacts with others may relate to mother-infant behavior. Your participation in this research, should you decide to be involved, would help researchers better understand the factors involved in the development of the mother-infant relationship.

Participation in this study would involve allowing one or two trained observer-interviewers to visit you and your infant in your home on five occasions. The time for each visit will be arranged between you and an observer for times you think are best for seeing interaction between you and your baby. On the first visit, you will be asked to fill-out a form with questions concerning how you think your baby usually behaves. Also on this visit, you will be asked to complete a general information form concerning your history and background. The second, third, and fourth visits each will involve a 25 minute observation followed by a short interview. During one of these observations, we would like to see you feed your baby. The other two observations will involve you simply interacting and caring for your infant as you normally would. To help with this, the observers have been instructed not to talk with you or your baby during the 25 minutes of the observation. Following each observation, the observer will conduct a short interview concerning your feelings about recent interactions with other people. On the fifth and final visit, you again will be asked to fill-out a form. This form consists of personal and parental opinions with which you are either to agree or disagree.

The observer-interviewers in this study have been trained in the observation and interview skills used in this project. However, these staff members are not child-care specialists. Thus, they are not qualified to answer child-care questions.

All information obtained will be held in the strictest confidence. All recordings from the observations, forms, and interviews will be coded by number and will be identified only through a master list. We are the only persons who will have access to this list. The master list will be kept in a locked cabinet by the researchers and will be destroyed after all visits are completed. From that point on, the information will be identified by number only. Of course, your confidentiality does not apply if we become aware of physical abuse suffered by your children. In this case, the law requires that such information be reported to the Knox County Department of Human Services.

Please understand that your decision for participating in this research in no way relates to or influences the services you are receiving at _____. Also, if you agree to take part in this research, please understand you are free to withdraw at any time without penalty. All you need to do is tell one of the researchers or one of the observers you no longer want to be involved. Although this study may have no direct benefit for your family, your participation may be extremely helpful to other parents in the future. Hopefully, you will find participation in this research to be interesting and enjoyable.

If you have any questions at this point, or at any point later in this study, please do not hesitate to ask. You will be given a copy of this informed consent to keep, should you wish to contact us at any time about this research project.

Della M. Hann, Doctoral Student in Psychology

Robert G. Wahler, Ph.D., Clinical Psychology

Address: Psychology Department
University of Tennessee
Knoxville, Tennessee 37916
Telephone: 974-6846

I have read the above informed consent and agree to take part in this project.

Signature _____ Date _____

I agree to allow my infant _____
(a minor child) to take part in this research project.

APPENDIX H

PROJECT DEBRIEFING

After answering questions the subjects may ask concerning the study, the investigator explained the following general goals and methods of the study to the subject mothers.

In general, we are looking at things or events which may affect the way mothers and babies get along with each other. We are doing this in order to have a better understanding of the needs of parents and be better able to help make parenting easier for future parents. In doing this, we have considered the following as important influences: (1) the everyday behavior of the baby and the mother (our observations); (2) mother's opinions of their baby (the first questionnaire); (3) mother's opinions of themselves and their role as a parent (the last questionnaire); (4) the way mother's feel about their social interactions with other adults (the interviews after the observations). Because of our experience with infants and mothers, our guess is that all of these things will be important for making parenting easier or harder to do. For example, parenting may be easier when the baby is in a good mood. Also, parenting may be more difficult if you don't feel well or are in a bad mood. What do you think about these ideas?

If any mother showed signs of concern over the topics involved in the study, the investigator had a listing of psychological clinics where the mothers could talk to someone about their concerns. Also, subjects were informed as to how they could find out the general results of this study. Each mother was told that in 3 to 5 months, all information would be collected and analyzed. If they would like to know the general conclusions of the study, they may then telephone the investigator at the number listed at the end of the informed consent form.

VITA

Della M. Hann was born in Gettysburg, Pennsylvania on November 14, 1959. She attended both elementary and high school in that town and graduated from the Gettysburg Area High School in June 1977. The following September she entered Catawba College in Salisbury, North Carolina. In May 1981 she received a Bachelor of Arts degree from Catawba College, graduating Summa Cum Laude and with honors. In the fall of 1981 she entered the graduate program at the University of Tennessee, Knoxville specializing in Experimental Psychology. Her graduate school career culminated in being awarded the Doctor of Philosophy Degree in Psychology.

The author is currently employed as a Research Associate by the Department of Pediatrics at the Louisiana State University Medical Center, New Orleans. Her plans are to continue research in the area of mother-infant interactions in an effort to understand adaptive versus maladaptive forms of psychological development.