AN ABSTRACT OF THE THESIS OF

Sylvia McSkimming for the degree of Doctor of Philosophy in Human Development and Family Studies presented on June 3, 1988.

Title: The Relationship of Maternal and Infant Variables to Maternal Sensitivity and Responsiveness During Feedings of the Hospitalized Neonate

Abstract approved: Redacted for Privacy

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Attachment, as described by Bowlby (1969), is an emotional bond between two people. It is an invisible internal characteristic which is assumed to exist because of behaviors exhibited by the attached individual. These proximity seeking behaviors are critical for survival of the infant. Sensitivity of the mother to the infant's behavior cues may lead the mother to respond contingently and appropriately to her infant and is one of the indicators of an attached mother-infant relationship (Ainsworth, 1977). However, there may be barriers to the process of attachment for the mother and her infant if the infant is ill or preterm. Because of the interactive nature of attachment, it is important to assess both maternal and infant characteristics in order to increase knowledge about those barriers. The purpose of the present study was to examine the relationships of the infant's illness state, maternal contact with her infant, and the mother's perception of her infant to the mother's sensitivity and responsiveness to her infant's behavior during feeding

interactions while the infant was hosptialized. Fifty-three mother-infant dyads participated in the study. Data were collected by auditing the infant's chart, evaluating questionnaires completed by the mother, and coding of videotapes of feeding interactions the first time the mother fed the infant and a feeding interaction within 24 hours prior to the infants' discharge from the hospital. The Nursing Child Assessment Feeding Scale (NCAFS) was used to record sensitivity and responsiveness during feeding interactions.

Hypothesized relationships were only partially supported by the findings of this study. Infant illness was significantly positively correlated to maternal sensitivity and responsivenss during the feeding interactions in spite of the finding of no relationship between infant illness and infant behaviors. Also, the mothers of the sicker infants rated their infants as having more difficulty with the infant behaviors assessed on the "Your Baby" form of the Neonatal Perception Inventory (NPI). Therefore, the sicker the infant, the more sensitive and responsive the mother was to her infant and the more the mother stated that her infant had difficulty with spitting up, eating, sleeping, predictability in schedule, and with bowel movements. These findings were robust regardless of the gestational age of the infant. Maternal contact and maternal perceptions of her infant compared to the average infant (NPI) were not correlated to maternal sensitivity and responsiveness during feeding interactions.

These findings lead to the conclusion that mothers of ill infants may not be at such a risk for difficulty in maternal-infant interaction difficulty due to unrealistic expectations of infant behaviors, poorly organized infant behaviors, and/or limited contact with their infants.

The Relationship of Maternal and Infant Variables to Maternal Sensitivity and Responsiveness During Feedings of the Hospitalized Neonate

by

Sylvia McSkimming

A Thesis
submitted to
Oregon State University

in partial fulfillment of
the requirements for the
degree of

Doctor of Philosophy

Completed June 3, 1988

Commencement June 1989

APPROVED:

Redacted for Privacy

Associate Professor of Human Development and Family Studies in charge of major

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Date thesis is presented June 3, 1988

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ACKNOWLEDGEMENT

I wish to specifically acknowledge the guidance and encouragement of Dr. David W. Andrews without whose help this thesis would never have been completed. Also, I wish to acknowledge the encouragement of Dr. Clara C Pratt, especially during the early stages of my thesis.

Other people critical to the completion of this thesis were the nurses, physicians, and families who were part of the Neonatal Intensive Care Unit and Intermediate Care Nursery at Oregon Health Sciences University Hospital. Specifically, I wish to thank Jenine Wright, RN, MSN and Sharon Stapleton, RN, BSN for their hours spent coding the videotapes and for their encouragement during the process. I also wish to thank Terry Woo, RN, BSN and Terry Stone, RN, BSN for their assistance in data collection. Finally, I thank Jan Marty RN, BSN, Jan Roberts RN, BSN and other members of the nursing staff of the NICU and INC for their encouragement and unfailing good humor during the project.

To my peers and friends at work, I acknowledge gratefully their encouragement, advice, and asistance.

A very special acknowledgement for the love, support, assistance, and patience which they showed me to David, Sandy, Kristi, Jean and Jim McSkimming and Hazel and Stanley Stevens---My Family.

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Chapter I

INTRODUCTION

Attachment, as described by Bowlby (1969), is an emotional bond between two people. It is an invisible internal characteristic which is assumed to exist because of behaviors exhibited by the attached individual and because of the individual's report of emotional ties to the other person. Bee (1985) states that attachment behaviors help the child or adult achieve and maintain proximity to the person to whom the individual is attached. Bowlby (1969) states that proximity maintaining behaviors between the infant and its caregiver are critical for survival of the infant. Therefore, understanding the interactive nature of the relationship between the infant's proximity maintaining behaviors and the caregiver's attachment behaviors is important. Only then can effective actions can be taken to assist infants and caregivers who are having difficulty developing an attached relationship.

Harris (1979) states that seeing the infant as part of the parent, the infant's physical attractiveness, the infant's dependence and helplessness, and wanting to soothe a distressed infant are factors which influence a parent's desire to provide care to the infant. Infants, who respond to parents' care by being soothed, smiling, or babbling, tend to contingently

reinforce the parent's cargiving and make them feel like competent caretakers. Ainsworth (1977) proposes that the infant provides the stimulus for the caregiving response and reinforces the response. The infant engages in signaling behaviors with the goal of bringing the caregiver into proximity. The appropriate and contingent response of the caregiver, however, is dependent on the sensitivity of the caregiver to the infant's cues and is one of the indicators of the attachment process. Goldberg, Perrotta, Minde, and Corter (1986) define the sensitivity in mother-infant interaction as the mother's ability to perceive, interpret, and respond to her baby's signals. The infant, who experiences sensitive maternal behavior, learns that its actions lead to predictable responses. This allows the infant to develop a sense of personal efficacy which is important as the infant explores and learns about its environment. This reciprocity of interaction between the infant's behavior and the caregiver's response has been described as necessary for assuring the survival of the infant (Damon, 1983). When sensitive interaction and parental attachment does not occur, the parent may neglect or abuse the infant. Also, the poorly attached child may fail to thrive in spite of adequate nutrition and may be developmentally handicapped.

When the newborn infant is premature or ill requiring hospitalization, the maternal-infant attachment process may be affected (Dillard, Auerbach, & Showalter, 1980). The mother may experience grief over the loss of the anticipated full term

child, fear of the possible death of the ill infant, fear of the long term outcomes if the infant lives, and experience physical separateness imposed by the needs of the ill infant (Johnson, 1979 and Kennell & Klaus, 1976). All of these factors may have an impact on the mother's ability to engage in caregiving behaviors and thus on her attachment to her infant.

In addition, the ill or preterm infant behaves differently than a full term or well infant and may have poorly organized behavioral cues which are difficult for the parent to interpret (Klein, 1971). Assessing the impact of specific variables on the attachment of the mother to an ill or premature infant is important. Understanding the influence of both the maternal and infant variables on maternal sensitivity will enable professionals to plan appropriate intervention programs for those mothers of ill or premature infants who exhibit difficulty in the attachment process.

The literature suggests that the significant variables for this population may be: 1) the illness state of the infant and the baby's ability to behaviorally communicate (Klein, 1971), 2) the mother's ability to visit the infant (Zeskind & Iacino, 1984), 3) the mother's perception of the infant (Johnson, 1979), and 4) the mother's ability to engage in interactions with the infant (Barnett, 1970). Previous researchers have either assessed the impact of one of these variables on the maternal-infant attachment process or have designed intervention studies to change the impact of one of the variables on the attachment

process (Brown, LaRossa, Aylward, Davis, Rutherford, & Bakeman, 1980). However, none of the studies to date have assessed the impact of the multiple variables on the maternal-infant attachment process during the period of the infant's hospitalization.

Researchers have studied the process of forming an attachment with a new infant using a variety of methodologies. Using self report data, researchers predicted that the parents who reported positive feelings toward their infant, and feelings of anticipatory grief when considering separation from their infant were attached to their infant (Robson & Moss, 1970). Other researchers asked parents to rate their infant compared to the average infant on degree of bother in caring for their infant and on specific behaviors which parents reported as troublesome (Broussard & Hartner, 1970). Their hypothesis was that the attached parents would rate their child above average because of positive interactions and the pride felt in their infants. While this hypothesis was not verified, their work did suggest that children rated as "less than average" by the mother were more likely to have emotional problems at four years and at seven or eight years of age (Broussard & Hartner, 1971).

One problem with these earlier attachment studies has been that researchers have not investigated the relationship between the self report data and observed attachment behaviors. Addressing this deficit in studies relying on self report data, behaviorists sought to identify behaviors which were typically

displayed by mothers and fathers as they interacted with their infants in a loving and attached manner (Klaus & Kennell, 1970, and deChateau, 1976). The assumptions underlying the behavioral studies were that the behaviors which the parent displayed were a reliable representation of the emotional relationship between the parent and infant. These behavioral studies did not address the sensitivity of the mother to her infant's cues, and were not designed to overtly observe the interactive nature of the attachment process. The behaviors identified as indicators of attachment were, however, interactive in nature and measured the mother's ability to interact socially with her infant. Specifically, behaviors of enfolding, stroking, and "en face" positions were exhibited by parents who reported positive feelings toward their infants. "En Face", by definition, requires that mother and infant are placed so that the mother's and infant's eyes can meet fully in the same vertical plane (Barnard, 1978). The above studies and assumptions did not account for the role which the infant had played in facilitating or supporting the attachment process.

Assuming that the attachment process is interactive, investigators have sought to determine what other variables might impact on the contribution of both parents and infants to the attachment process. Harris (1979) reported that parenting behaviors were influenced by past experiences, education, socio-economic status, expectations, and role perceptions. Roberts (1983) reported that the infant's contribution was

influenced by neurologic maturity, emitting of clear cues, and response of caregiver to infant actions.

Infants Characteristics and Behavior

Johnson (1979) identified additional variables which adversely affected the attachment process for parents of premature or ill infants. In addition to the infant's inability to emit clear cues and contribute to the relationship as described above, the infant did not resemble the expected infant, and therefore the parent grieved the loss of the expected child (Johnson, 1979). The parent also experienced anticipatory grief because of the fear of death of the infant, and experienced guilty feelings because of the prematurity or illness (Klaus & Kennell, 1976). The ill or premature infant was often weak, underdeveloped, and lacked the ability to organize behaviors. These physical characteristics contributed to the infant's lack of responsiveness to its parent and therefore contributed to a maladaptive relationship (Klein, 1971). Finally, the infant emits cues which are different than the expected signaling behaviors of the newborn and are difficult for the parent to interpret and respond to (Klein, 1971).

Environmental Influence

When infants were ill or preterm, environmental constraints were also reported to affect parents' ability to assume the caregiver role and begin the attachment process. These infants required a high level of technological care which is provided in regional neonatal intensive care units often located some

distance from the parent's home. The parents frequently reported barriers to visitation because of the distance and because of the limited caregiving which they could provide their ill infant (Johnson, 1979). Parents reported that the limited contact with their infant and the limited caretaking which they were able to give contributed to feelings of being less competent to parent and to feelings of estrangement from the infant (Richards, 1979). Thus, the combination of difficulty in interpreting infant behaviors, limited practice in caregiving activities, limited time spent with the infant, and fear of forming a relationship with the infant may account for the frustrations reported by some of the parents of preterm or ill infants during the first few weeks after hospital discharge (Hunter, 1978).

For preterm infants who were hospitalized on the neonatal intensive care unit, Zeskind and Iacino (1984) studied the relationship of the frequency of maternal contact and various outcomes including length of hospital stay, positive perception of her infant, and perception of prognosis for the future. Mothers who participated in the experimental group received assistance with transportation and other services as needed. The excperimental group mothers visited their infants significantly more often, were more positive about their infants' prognoses, and rated their infants' behaviors as "more difficult" as compared to the average infant than did the control mothers. Thus the frequency of contact alone seemed to impact on the mothers' perceptions about their infants. The

researchers concluded that perhaps the experimental group mothers were more realistic about rating their infants' behaviors than were the control group mothers. They did not, however, assess the relationship of the mothers' perceptions and attachment to their infants.

In another study of the impact of the infant's illness or prematurity on the parent-infant attachment process, Minde, Whitlow, Brown, and Fitzhardinge (1983) observed the parents during early visits to their infants. They reported a relationship between the infant's illness and the observed interaction of mother and infant. Mothers of ill infants touched them less, looked "EnFace" less, and smiled at them less than did mothers of well infants. However, these investigators did not assess the frequency of the maternal interaction with the infant, nor did they describe the specifics of the ongoing interaction except at the time of the specific visits.

In order to increase knowledge about the process of attachment for the mother and her ill or preterm infant, it is important to assess both maternal and infant characteristics. By increasing understanding of the relationship between variables which affect a mother's sensitivity to her infant's behaviors, knowledge about the process of attachment may also increase. Professionals may be able to focus interventions on variables which relate to a mother's sensitivity to her infant's behavior and thus facilitate the attachment process. The present study will examine the relationship of the infant's illness state; the

frequency and amount of maternal contact; and the mother's perception of her infant's behaviors to the mother's sensitivity and responsiveness to her infant's behavior during feeding while the infant is in the hospital.

CHAPTER II

REVIEW OF THE LITERATURE

Diverse research literature has explored the components of maternal infant attachment. For the purpose of this study, literature on the effects of early and extended maternal-infant contact, maternal sensitivity during interactions, and maternal perceptions on maternal attachment behaviors are presented. Also, issues which are unique to the preterm or ill infant as the mother forms her attached relationship are presented because of the reported importance of the effect of altered infant state upon the maternal attachment behaviors.

Maternal Attachment: Theoretical

Attachment, is described as an emotional bond between two people (Bowlby, 1969). This bond seems to be critical for the survival of the infant (Bowlby, 1969). Although the attachment itself is an emotion, and therefore not observable, attachment behaviors of the mother and child are observable and seem to be exhibited for the purpose of maintaining proximity between the attached dyad (Bee, 1985). Behaviors, identified by Bowlby as infant attachment behaviors are: crying, babbling, smiling, clinging, and nonnutritional sucking. These behaviors have the effect of bringing the dyad closer.

Ainsworth (1979) states that attachment occurs over time and can be described in phases. From birth to about 8-12 weeks the infant can signal caregivers by crying, babbling or smiling,

but does not discriminate between caregivers. Ainsworth call this the "preatttachment phase" (1979). During phase two, the infant can identify its primary caregiver and actively seeks to bring the caregiver closer through increased smiling, babbling, crying, and clinging. This phase lasts until about seven months of age and is called "attachment in the making" (Ainsworth, 1979). The third phase lasts until the second or third year of life and is called "clear cut attachment". The infant maintains closeness to the caregiver by crawling or walking to the caregiver, protesting separation, and clinging (Ainsworth, 1979). Reciprocity in the relationship begins after phase three and is called "goal directed partnership" by Ainsworth.

Behaviors exhibited by the "attached" mother have been defined by Kennell and Klaus (1970). During early phases of the mothers' attachment to their infants, mothers exhibited behaviors which maintained proximity to their infants. Specifically they looked "En Face" at their infants, stroked their infants, and held their infants close to their own bodies. Kennell and Klaus further described attached mothers as those who sought to maintain proximity to their infants, expressed feelings of anxiety when separating from their infants, and picked up their crying infants to soothe them. These behaviors were evident as early as one month of age.

Thus, both mothers and infants exhibit behaviors which an observer may identify as attachment behaviors. The purpose of these behaviors seems to be to maintain proximity between them.

To achieve this goal, however, both partners need to be sensitive and responsive to the behaviors exhibited by the other, and must have the capacity to respond.

Maternal Attachment: Early and Extended Contact

Kennell and Klaus (1970) hypothesized that there was a critical period during which attachment occurred for the human mother and that the period was identifiable. Using an experimental design that controlled for maternal-infant contact periods, Kennell and Klaus measured the outcomes in terms of maternal behaviors. The control group of fourteen primiparous mothers saw their infants shortly after birth. They next saw their infants for a brief period six to twelve hours after birth, followed by twenty to thirty minutes feeding periods every four hours for the remainder of their hospital stay. The experimental group of fourteen primiparous mothers had extended contact periods with their infants in addition to the routine contacts. These mothers had their infants with them for one hour during the first three hours of life, and for five extra hours each afternoon during the three days of their hospital stay.

At a one month follow-up interview and examination, mothers were rated on their answers to the following questions: "When the baby cries and has been fed, and the diapers are dry, what do you do?" and "Have you been out since the baby was born, and how did you feel?" (Kennell & Klaus, 1974, p. 174). Mothers who answered "always picked up and soothed" and "didn't want to leave the infant" were given a "3" for each answer. Mothers who

answered that they "always let the baby cry it out" and "felt good while out" were given scores of "0" for each answer. All answers to questions were given a rating score to "0" to "3". The mothers were also observed during a routine examination of their babies and were rated on their proximity to the infants as well as on their soothing behaviors when the baby cried. The mothers were again rated on a scale (0 to 3). In both the observational ratings and ratings of maternal answers to the interview questions, three was considered to be optimum score. Combining the interview and observation scores, the extended contact group scored in the range of 7-12, while the control group scored between 2-10 ($p < .02$). Thus, the extended contact mothers scored significantly higher on the rated behaviors than did the control mothers.

Kennell and Klaus also found that differences in the maternal attitude and behaviors of the two groups continued to be evident at one year. Observations of the maternal-infant dyads and interviews with the mothers showed that the extended contact mothers spent more time soothing their infants during a physical examination and focused more of their interest and comments on their infants than did the control mothers. This was true even of the mothers who had returned to school or work. The statistical analysis of the data was not reported. Finally, Kennell and Klaus (1974) looked at the Bayley Mean Developmental Indices to assess differences in infant development between the two groups of infant at one year. The extended contact group

scored 98 compared to a the control group's score of 93 ($p.<.05$).

Attempting to determine the existance of a critical period during which attachment occurs, deChateau (1976) studied mothers and their infants to determine if differences in the type and duration of maternal-infant contact altered maternal attachment behaviors. His investigation focused on the immediate post-partum period of forty-two primiparous mothers. Twenty mothers and infants experienced routine post-partum procedures. Immediately after birth, the infant had its mouth and upper airway cleared, its body dried with a towel, and its umbilical cord clamped. These infants were then briefly shown to their mothers and were taken to be weighed, measured, examined, and dressed. Approximately thirty minutes later, the fully clothed infants were placed in basinettes beside the mothers so that the mothers could see and touch them.

Twenty-two mothers and infants were allowed to experience an extra skin-to-skin contact period after delivery. Immediately after birth, the extra contact infant had its mouth and upper airway cleared, its body dried with a towel, and its umbilical cord clamped. This procedure took about ten minutes. Ten minutes post-partum the naked infant was placed on the mother's abdomen. After five minutes, or fifteen minutes post-partum, the infant was moved to the mother's chest and allowed to nurse. When the infant was twenty-five to thirty minutes old, the rest of the usual post-partum routine was initiated. Thus, the extra contact period lasted approximately ten to fifteen minutes. Both

groups of infants were then brought to their mothers for feedings every four hours. Most of the time during the day and night the infants stayed in a separate infant nursery.

When the infants were thirty-six hours old, trained observers recorded thirty-five behaviors during a fifteen minute breast feeding observation period. Mother-infant pairs were randomly assigned to one of two observers. Only one observer recorded behaviors for each pair. The observer did not know the group to which pairs were assigned. Using a time sampling method, the observations were recorded for thirty seconds during twenty time periods. During the feeding, the extra contact mothers sat up significantly more frequently than did the control mothers. They also held their infants more and exhibited more "encompassing behaviors" than did the control mothers. These behaviors were reported to be significantly different for the groups, however, signficance levels were not reported. deChateau defined encompassing behavior as occuring when the mother's upper arm, lower arm, and hand was around the infant's body. The extra contact mothers also looked at their infants "EN FACE" two times as often as the control mothers, although this behavior was not significantly different between the groups. "EN FACE" position has been defined as occuring when the mother's face is turned in such a way that her eyes meet her infant's eyes in the same vertical plane (Robson, 1967).

deChateau conducted a follow-up observation in the home when the infants were three months old. Sixty-one behaviors were

rated during a time sample ten minute observation period. Nineteen control mothers and infants, and twenty-one extra contact mothers and infants were observed during free play. The extra contact mothers showed more kissing, looking EN Face and less cleaning of their infants than did the control mothers. Also, the extra contact infants showed more smiling or laughing and less crying than did the routine contact infants. The mean frequency of these behaviors were significantly different for the two groups, however, the significance level was not repoted. Based on this data, deChateau concluded that there was a critical period for mother and infant during which contact enhanced the attachment process.

Another group of researchers, Svejda, Campos, and Emde (1980), also studied the relationship of early and extended contact to the maternal attachment behavior. Thirty mother-infant pairs were randomly assigned to the extra contact group or the routine care group. To control for the possiblity of group interaction, data was collected on only one study mother in the hospital at a time. Mothers in the routine care group were able to see their infants in the delivery room and were given their wrapped infants to hold while being taken to their rooms. Infants were then brought to their mothers for breast feeding when the infant was four to six hours old and every four hours thereafter. The feeding lasted approximately 30 minutes after which the infant was returned to the nursery. Mothers in the extra contact group held their infants in the delivery room for

about 15 minutes of skin to skin contact. Their nude infants were also taken to their room with them for an additional 45 minutes of skin to skin contact before being admitted to the nursery. The extra contact infants were brought to the mothers approximately every four hours for breast feeding, but were left in the mothers' room for an additional hour after they had been fed.

Mothers and infants were videotaped during a twenty five minute breast feeding interaction when the infants were about 36 hours old. Interobserver reliability of 88% to 100% was obtained by two raters on twenty eight maternal behavior items. There were no significant group differences on any of the 28 variables (t-test, $p < .10$, two tailed). The investigators suggested that because all the mothers were committed to breast feeding, had attended pre-natal classes, and had husbands available for support during delivery, the early or extended contact was not necessary to enhance commitment to the infant. They further speculated that when the mother was unable to experience early or extended contact because of the prematurity or illness of her infant, concern about early contact might create an unnecessary stressor for the mother.

The three studies, reported during a ten year time span, raise some interesting research questions, but perhaps at this point no clinically relevant questions for mother-infant pairs experiencing an uncomplicated delivery. Current hospital post-partum practice has been modified to allow mothers to have

extended contact with their infants. Also, hospital stays are significantly shorter than the two weeks reported by deChateau and the three days reported by Kennell and Klaus. Therefore, mothers are providing care for their infants at home much sooner. These changes occured in practice in spite of the contradictory findings of the Svejda, Campos, and Emde (1980) study compared to findings reported by Kennell and Klaus (1970 & 1974) and deChateau (1976). The changes were in response to the requests of mothers who had become aware of the early research work and may have been concerned about their interactions with their infants.

For scientific purposes, however, there are several difficulties in comparing the results of the above studies. First of all, Kennell and Klaus and deChateau did not publish the actual statistical analysis of their work. They reported the significance level, but did not report means, ranges, or t-test statistics which makes it difficult to critically analyze their results. Also, the actual demographic data on the mothers, including education level was not reported in the studies where between group differences were found. Although Svejda, Campos, and Emde reported that their mothers were in the lower middle class and had all completed the twelfth grade in school, there is no way of comparing the characteristics of their study subjects with the subjects in the other two studies. Regardless of the ability to compare results, the generalizability of their results is limited. Finally, Kennell

and Klaus and Svejda, Campos, and Emde actually introduced two variables with no method of discriminating which was the critical variable. Not only did their mothers experience early contact with their infants, but also had extended contact periods during the hospital stay. Retrospectively, there is no way of determining which contact variable contributed most to the results. deChateau introduced only the variable of early contact, but did not report on length of time infants spent at their mothers' bedsides during subsequent interactions. In spite of the difficulty interpreting the significance of the results of the experimental studies, these studies provided some of the earliest descriptive data of maternal behaviors which may be labeled "early attachment behaviors."

Maternal Attachment: Perceptions of Her Infant

While maternal-infant attachment may be documented in terms of the behaviors exhibited by the mother toward her infant, how a mother perceives her infant may also be related to her interactions with her infant. Such perceptions may alter the process of the maternal-infant attachment. Broussard and Hartner (1970) hypothesized that the mother provided the environment needed for optimum healthy infant development based on her sensitivity to her infant's needs. That is, the ways that the mothers related to neonates would be modified by perceptions of the infants'appearance and behavior. Reciprocally, the infant's behaviors would be altered by the mother's handling.

The investigators further proposed that there is cultural

bias for people to be "better than average" in the United States. If this assumption is true, a new mother responding to that cultural bias would view her infant as better than the average infant when specific behaviors were compared. Broussard and Hartner (1970) identified the behaviors of crying, spitting, feeding, elimination, sleeping, and predictability as infant behaviors to be rated by a mother for the "Average Baby" and her own infant. The "Average Baby" and "Your Baby" inventories were given to three hundred and eighteen primiparous mothers on their first or second post-partum days and again when the infants were approximately one month of age. Broussard and Hartner named the combined scale the Neonatal Perception Inventory (NPI), and identified the two forms as time I or time II scales. The infants who were rated negatively by their mothers were labeled as high risk for emotional and developmental disturbances. Those who were rated positively in comparison to the average baby by their mothers were classified as low risk for emotional and developmental disturbances.

To test the predictive validity of the instrument, a follow-up study was conducted with one hundred-twenty of the original subjects when the children were between the ages of four years six months, and four years nine months. They were rated by two psychiatrists who did not have access to the children's previously assigned risk rating. Interviews and observations were conducted in the child's home and at the clinic. Of the thirty-six children who at one month of age were categorized as

high risk based on their mother's "negative rating" on the Neonatal Perception Inventory (NPI II), 66 percent were judged to be in need of therapeutic intervention. Of the forty-nine children who were rated as low risk on the NPI II scale, only 20.4 percent were identified as needing of therapeutic intervention. The authors concluded that maternal perceptions of their infants at one month could be used as a predictive measure of subsequent intervention needs.

The mothers' perceptions of their infants at twenty-four to forty-eight hours of age as measured by the Neonatal Perception Inventory (NPI I) were not predictive of future child emotional difficulty. The authors stated that this may be because the mother still held a view of her fantasy infant. The authors hypothesized that by the time the infant was one month of age the mother's more realistic perception of her infant may have helped her to develop permanent interaction patterns. This hypothesis was not tested. Broussard and Hartner (1970) reported that factors such as educational level of the parents, father's income and occupation, maternal age, religious affiliation, infant's sex, pre-natal and post-partum complications, and type of delivery had no effect on the child's later development of psychological problems.

Burns (1978) studied the relationship between a mother's perceptions of her infant, as measured by the Neonatal Perception Inventory II (NPI II), and the infant's temperament. The purpose of the study was to determine whether the mother's NPI II score

was based on an accurate perception of her infant. Fifty primiparous mothers were given questionnaires one month post-partum, and were asked to score their infant's temperament on a modified version of the Carey Infant Temperament Scale. The mothers also rated their infants' behaviors compared to the average infants behaviors using the NPI II. The study attempted to determine if mothers who had a negative NPI II score had infants whose temperament characteristics were extreme as scored on the Carey Infant Terperament Scale. The infant's intensity of reactions, rhythmicity, and activity level were more strongly related to the mother's attitudes about her infant than were the comparison of her infant to the "average infant". Three infants with extreme temperment profiles and ten infants with average temperament profiles were viewed negatively by mothers. On the other hand, four infants with extreme temperment profiles were rated positively by their mothers. Therefore, something other than the mothers' perceptions of their infants' temperments influenced their NPI II scores. Burns found that maternal age, education, and family income were significantly related to the NPI II results ($p<.05$). These findings were contrary to the findings of Broussard and Hartner (1970) who found no relationship between maternal age, education, and income.

Palison (1980) longitudinally replicated the original Broussard and Hartner (1970) study which established the predictive validity of the Neonatal Perception Inventory II (NPI II). Fifty mother-child pairs were selected for the follow

up evaluation of the child. They represented a portion of a larger sample of 183 families who were participants in the Nursing Child Assessment Project in Seattle, Washington. These subjects were selected because the one month post-partum NPI II assessment form had been completed by the mothers. This sample had a 66% low risk score which compared to the 61% low risk score of Broussard and Hartner's Pittsburgh sample. Thirty four percent of the Seattle population as compared to 39% of the Pittsburgh sample had high risk NPI II scores.

Evaluation of the Seattle children's emotional development was made by a psychiatrist during a fifty minute session at the Child Development and Mental Retardation Center at the University of Washington. The assessment conditions were similar to the Pittsburgh conditions with the exception that two psychiatrists conducted the evaluations in the Pittsburgh study. The percent of the sample needing followup intervention based on the psychiatrists assessment was similar to that reported for the Pittsburgh group. Twenty-two percent of the Seattle sample and 28% of the Pittsburgh sample were diagnosed as in need of intervention. Forty-four percent of the Seattle sample and 42% of the Pittsburgh sample were diagnosed as socially-emotionally healthy. Twenty-four percent of the Seattle sample and 23% of the Pittsburgh sample were categorized as needing more information before a diagnosis could be made, and 10% of the Seattle sample and 6% of the Pittsburgh sample were referred for interventions for other reasons, e.g. mental retardation. There

were no statistically significant differences reported between the Pittsburgh and Seattle studies in regards to percent of children assigned to each group.

In the Seattle study, however, there was no significant relationship between the psychiatrists evaluation of the children at about four years of age and the NPI II scores of their mothers at one month post-partum. Specifically, of the eight Seattle children determined to be in need of professional help, four had high risk and four had low risk scores at the one month NPI II. Of the 42 children determined to not require intervention, 13 had high risk one month NPI II scores and 29 had low risk scores. Thus, the investigator was unable to demonstrate any relationship between the children's emotional development and their one month NPI II scores.

While unable to explain the discrepant findings from those reported by Broussard and Hartner (1970), Palison (1980) suggested that the value of the NPI II may be in its use as a vehicle for discussing infant caregiving with new mothers. Specifically, perhaps discussing mother's perceptions about how much or to what extent a baby spits up, cries, has difficulty sleeping, has difficulty with bowel movements, and has trouble settling into a predictable sleep-wake pattern may be very useful since mothers identified these infant behaviors as troublesome. The predictive value of the NPI II is at least questionable based on comparison data from the two longitudinal studies and the sampling bias of the studies.

Maternal Attachment: Maternal Perceptions and Infant Behavior

Based on the assumption that the characteristics of both the parent and the infant affected the interaction and thus the parental perception of the infant, Perry (1983) provided parents with structured information about their infants' behaviors and assessed changes in the parents' perceptions of their infants behaviors as measured by the Neonatal Perception Inventory (NPI) following the sessions. Fifty-nine married couples and their infants were randomly assigned to a control group, a mother assessment group, a father assessment group, or a parents assessment group. The three experimental treatment groups were given oral and printed explantation of the Neonatal Behavior Assessment Scale (NBAS) after they had completed the NPI on the first post-partum day. The investigator assessed the infant in a separate room using the NBAS and compared her results with those scored by the mother, father, or parents as they elicited behaviors from their infants. At a one week follow-up home visit, the infant was again assessed using the NBAS by the investigator. This was done with the either the mother, father or parents present. The subject parent(s) was also asked to complete the NPI for the second time and requested to mail in a third NPI II form when the infant was one month old.

The data from the NBAS was used to predict mother and father NPI scores at one day post-partum and one week post partum. Multiple regression analysis yielded low magnitude relations and thus the investigator concluded that the infant behaviors

measured by the NBAS did not influence parental perceptions as measured by the NPI during the early post-partum period. The structured interaction did affect perception as measured by the NPI II. The significance was accounted for by the increase in the mother's perception score in all three experimental groups at time II or one week post partum. Thus, providing anticipatory guidance to parents about their own infant's behaviors influenced the mothers' perceptions about their infants.

Roberts (1983) also assessed the effect of infant behaviors on parents' perceptions of their infants. She further assessed the relationship between parents' perceptions of their infants and ease of transition to parenthood. Sixty-four couples who were attending prepared childbirth classes volunteered to participate in the study. Obligatory infant behavior was measured using a 14-item, four point scale which assessed the predictability of infant behavior, frequency of obligatory behaviors such as crying, frequency of satisfaction responses such as smiles, sleep patterns, and time required for feedings. The scale was developed by the investigator and had an alpha reliability coefficient of .685 for mothers and of .595 for fathers. Parents' perceptions of the infant were assessed using Broussard and Hartner's Neonatal Perception Inventory (NPI) (1970). Ease of transition to parenthood was assessed using the Hobb's crisis checklist which asked questions about changes in housekeeping, feelings about oneself, changes in spouse

relationships, and feelings about self. These questionnaires were administered to the subjects during a home visit at approximately five weeks post partum.

Pearson correlation coefficients were calculated separately for mothers and fathers. For mothers, the amount of obligatory behaviors was negatively correlated with the NPI ($r = -.30$, $p < .007$) and the NPI was positively correlated with the ease of transition to parenthood score ($r = .36$, $p < .001$). For fathers the results were also significant although the relationship between the infant behaviors and the NPI was weaker than for the mothers. Specifically, the correlation between the obligatory infant behaviors and NPI was $r= -.27$ ($p < .015$) and between the NPI and ease of transition to parenthood was $r= .53$ ($p < .001$).

Thus, contrary to Perry's 1983 study, Roberts' results supported the relationship between infant behaviors and the perception of parents of their infants. There were, however, considerable differences in how infant behaviors were assessed. Perry used observation data and Roberts used self report data, therefore, the independent variable measured in the two studies may have been different. Of importance, however, is the relationship which Roberts reports between the ease of transition to parenthood and parents' perceptions of their infants. This was the first study which addressed the relationship between reported infant behavior, perceptions of the infant, and ease of taking on the parenting role. This study did not, however, answer the question about the relationship between observed infant

behaviors, and parents' perceptions of their infant. Robert's study was clearly descriptive and her sample was non-random which limits the generalizability of her results. Perry randomly assigned study parents to study or control groups, but had a small sample size (N=57, or 14-15 per group). Therefore, the results of the Perry study should also be cautiously interpreted, and the results of work examining the relationship between infant behavior and parental perception must be considered preliminary.

Maternal Attachment: Maternal Sensitivity to Infant Cues

As indicated by the above work, the behaviors which a mother exhibits when interacting with her infant in a sensitive and responsive manner, may or may not be related to her perceptions of her infant. Regardless of the relationship of these behaviors to perceptions, the effect of maternal sensitivity in interaction on the child's attachment has been demonstrated by researchers. Sensitivity of the mother to the infant's behavior cues may lead the mother to respond contingently and appropriately to her infant and is one of the indicators of an attached mother-infant relationship (Ainsworth, 1977).

The infant, experiencing sensitive maternal behavior, learns that its actions lead to predicatable responses. This allows the infant to develop a sense of personal efficacy which is important as the infant explores and learns about its environment. Sensitivity in mother-infant interaction is defined as the mother's ability to perceive, interpret, and

respond to her baby's signals (Goldberg, Perrotta, Minde, and Corter (1986).

Ainsworth and Bell (1969) studied the relationship between security of infant attachment and the mother-infant interaction during feeding. Twenty-six infant-mother pairs were visited in their homes approximately every one to three weeks starting when the infants were three weeks of age. The observational and interview visits lasted two to four hours. The observers' narrative reports of the visits were then coded and analyzed by project staff. Cluster information about the feedings related to the schedule of the feeding, the determination of amount of food ingested, handling of baby's food preferences, and allowing the infant to pace the feeding.

Several feeding patterns emerged. These were; consistent infant demand feeding schedule, flexible schedule with some attempt to regulate the infants' schedules, demand and scheduled overfeeding in order to gratify the infant, demand and scheduled overfeeding in order to lengthen times between feedings, postponing or holding off feedings, mother's impatient during feeding with inconsistent attention to infant cues, arbitrary feeding with no predictable pattern, and rigid feeding according to the clock. Ainsworth stated that the various feeding patterns reflected differing levels of sensitivity to infants' hungar cues on the part of the mothers. Data from the interviews and observations were also coded for maternal-care variables. Nine point scales were developed to rate the

accuracy of the mother's perception of her baby's cues, the delight in the baby, acceptance of the baby, appropriateness of interaction with the baby, amount of physical contact, and effectiveness of response to baby's crying. High ratings on these scales indicate a mother who is sensitive and responsive to her infant's cues. High maternal care scores ($x = 7.0$) were associated with feeding patterns of demand, flexible, and demand and schedule overfeeding to gratify the infant.

At one year of age infants were tested for security in their attachment in the standarized strange situation developed by Ainsworth. The strange situation allows observers to assess the exploratory behavior of the child in a strange situation and to determine whether or not the child uses its mother as a secure base for exploration; the response of the child to a brief separation from its mother when left with a stranger and to a brief separation from its mother when left alone; and finally the child's response to its mother when reunited with its mother after being left alone. The procedure is divided into seven three minute segments which are arranged to cause increasing amounts of stress for the infant (Lamb, Thompson, Gardner, Charnov, and Estes, 1985).

Babies are classified into three main groups and seven subgroups based on their responses to the situation. Group A infants are classified as avoidant because they ignore and avoid interacting with their parents. The two subgroups differ in the overtness and consistency of the avoidant behavior. Group B

infants are considered securely attached because they seek contact with their parents either physically or by distant interaction when reunitied. The four subgroups differ in the amount and closeness of contact sought. Group C infants are labeled resistent because these infants interact with both proximity seeking behavior and angry rejecting behavior when their parents return. The two subgroups differ in the activity and passivity with which they display their behaviors (Lamb, Thompson, Gardner, and Estes, 1985).

Ainsworth and Bell (1969) found that infants classified in group B, or securely attached, were infants whose maternal care scores were high and who had experienced feeding schedules of demand, flexible, or demand or schedule overfeeding to gratify the baby. Thus, they claim that a relationship does exist between maternal sensitivity to infant cues in caregiving, type of feeding behavior exhibited by the mother and the security of the infant attachment to its mother at one year. This complex descriptive study added new information about the relationship between maternal-infant interaction early in life and the attachment of the child, but did not answer questions about cause and effect of these relations. Also, the sample size of this study was 26 maternal-infant pairs with the outcome of attachment being determined in seven categories. The number of subjects in each category was therefore very small and the generalizability of the results must be cautiously considered.

Blehar, Lieberman, and Ainsworth (1977) did address the

generalizability of the context of evaluation of early maternal-infant interaction and the security of infant attachment. Observers conducted home visits for 26 mother-infant pairs in their homes from the time the infant was six weeks to fifteen weeks of age. Mothers were instructed to go about their usual activities, but observers were instructed to carefully examine maternal-infant face to face interactions. Data were coded from the field notes of the observers. The following measures of maternal behaviors were derived: presence or absence of a response, contingent pacing, encouraging further interaction, playfulness, routine manner, abruptness, termination of interaction, and livliness of maternal stimulation. Infant behaviors derived from the data were: affective state prior to episode, initiation of interaction, response to adult stimulation, termination of interaction and intensity of response. Also, frequency of face-to-face interactions during an hour, duration of interactions, and ensuing or continuing interactions were coded. At one year of age the infants were tested in the strange situation to determine security of infant attachment (Ainsworth, 1969). T- tests were done to determine group differences for securely attached, intermediately attached, and anxiously attached infants on maternal, infant, and dyadic measures obtained from the home observational data.

The intermediately attached group mothers were significantly less contingent in their responses than the securely attached group. This was the only significant difference for the

intermediately attached group. The securely attached group differed from the anxiously attached group on maternal behaviors of silent unsmiling initiation; response to baby's initiation; contingent pacing; encouraging further interaction; routine manner; abruptness; brief episode; and ensuing interaction. In other words, mothers of securely attached infants were significantly more apt to encourage further interaction, more contingent in their pacing of interaction, more responsive to infants' initiation of interaction, more verbal and smiling in initiation of interaction, less routine in interaction,and less abrupt in interaction. These moms also had longer periods of interaction with more ensuing interactions. Therefore, as in the feeding interaction, sensitivity and responsiveness of the mother to her infant's behavioral cues did have an impact on the security of the infant's attachment at one year of age.

The focus of these two studies has been to describe the relationship between maternal sensitivity to infant cues and its outcome on infant attachment. Although the focus has been to assess the sensitivity of the mother, the infant's ability to transmit clear and/ or consistent cues, which allow the mother to respond, must also be acknowledged as affecting the sensitivity and contingency of the mother's responses.

Maternal Attachment: Impact of Premature Birth and Infant Illness

Parents of premature or ill infants deal with not only altered perceptions of their infants, and altered infant behaviors but also additional psychological stresses all of

which may have an impact on the process of maternal attachment. Premature birth interrupts the the mental preparation for motherhood that a woman experiences during her last trimester of pregnancy (Mirdal, 1979). Additionally, the mother experiences grief over the loss of the anticipated full term child, fear of the possible death of the ill infant, fear of the long term outcome if the infant lives, and physical separateness imposed by the needs of the ill infant (Johnson, 1979 and Kennell & Klaus, 1976. All of these variables may affect the mother's ability to engage in caregiving behaviors and thus her attachment to her infant. In addition, the infant behaves differently than a full term or well infant and may have poorly organized behavioral cues which are difficult for the parent to interpret (Klein, 1971). This portion of the literature review will present selected research work related to these issues.

Barnett (1970) reported the results of a pilot study conducted during the years of 1964-1966 at Stanford University School of Medicine. The experimental group of thirteen randomly selected mothers were allowed to touch their infants and progress to the caregiving tasks of feeding and diapering while the infants were still in incubators. Only two of the experimental mothers refused this handling contact while the premature infants were still in the incubator.

The control group, consisting of thirteen mothers, had visual contact with their infants in the incubator, but were not allowed to carry out caregiving activities until just prior to

hospital discharge. The control mothers, who were deprived of the touching interaction with their infants until just prior to discharge from the hospital, tended to return to interests and responsibilites they held prior to delivery during the three to twelve week separation from their infants. When the infants of the control mothers came home from the hospital, they appeared to enter the family as individual members not as dependent infants, and had to compete for their mother's time and attention. Differences between the control group and the experimental group of mothers as documented by home interviews seemed to center around commitment to the infant, confidence in their ability to mother the infant, and stimulation of the infant. There was no statistical analysis or content analysis of the data reported.

Another study which assessed the impact of preterm birth on the parent-infant relationship was conducted in England. Jeffcoate, Humphrey, and Lloyd (1979) interviewed seventeen families of full term and seventeen families of healthy singleton preterm infants in their own homes when the infants were approximately one year old. Mothers and fathers were interviewed separately. They were asked to complete the Broussard Neonatal Perception Inventory (NPI) which assessed their rating of their infant as compared to the average infant and to report on when they had first felt real warmth or love for their baby. Health records of all the study infants were also reviewed.

In the preterm group, one infant had suffered non-accidental

injury and another infant had been hospitalized for failure to thrive. No such incidents were present in the fullterm infant group. Of the preterm mothers, eight reported that feelings of "real love" for their infant had not occurred until the infant was about two months of age. No such delay was reported for mothers of the fullterm infants. Other preterm mothers, fullterm mothers and all fathers reported feelings of "real affection" having occurred during the first two weeks after birth. In the preterm mother group, five out of six mothers who felt affection early for their infants had held them within the first week of life, while five of eight mothers who reported delayed feelings of affection had not held their infants until the second week of life or later. Mothers of fullterm infants had, of course, held their infants during the first day of life. Parents of the preterm infants scored significantly lower on the NPI than did parents of fullterm infants. Additionally, parents of preterm infants reported more anxiety over leaving their infant with another caregiver than did parents of fullterm infants.

Although there are some problems associated with drawing conclusions from this retrospective small sample study, the data does suggest areas of further study in comparing parental attachment or affection in preterm and fullterm infant-parent dyads. For example, there is no data reported on the relationship between maternal or paternal caregiving variables and the attachment of the infant to its caregiver. Also, there is no measure of perception of attachment to the infant at the

data collection time. The only data reported in the study on the status of the relationship at one year was data about anxiety in leaving the preterm infant with a childcare person. The significance of this data is unclear in terms of assessing parental attachment to the child.

Another focus of research with preterm infants has been to assess the differences, if any, in behaviors which the preterm infant exhibited as compared to the fullterm infant which might impact on the maternal infant interaction. McGehee and Eckerman (1983) assessed the behavioral responses of sixteen low birthweight preterm infants compared to the behavioral responses of fullterm infants. All preterm infants had birthweights of less than 1500 grams and were born between 27 and 32 weeks gestation and were without neurologic impairment or obvious congenital anomalies. The fullterm infants were assessed on their second or third day after birth and the preterm infants were assessed 24 to 48 hours before hospital discharge. The infants were videotaped in two structured interactions with an adult investigator. The interactions were separated by no more than 24 hours. The adult looked at the infant, stroked the infant's head, abdomen, and extremities, talked to the infant, and talked and touched or stroked the infant simultaneously a in very structured manner and order. The entire interaction occurred over a six minute period. Infant responses of jerky body movements, smooth body movements, no movements, gasp or grunt vocalization, state transitions, EN FACE gaze, cry or fuss,

and availibility were coded from the videotapes.

For both fullterm and preterm infants there were no significant differences in responses between time one and time two. The groups did differ significantly on five of the response measures. The preterm group scored significantly higher on jerky movements, gasps or grunts, and state transitions. The fullterm group scored significantly higher on frequency of smooth movements and periods of no movement. Thus, the behavior which preterm infants exhibited was significantly different than the behavior exhibited by the full term infants during the interaction with the investigator. Parents may have had little experience interacting with the preterm infant and may have some difficulty interpreting the jerky movements and frequency of state transitions exhibited by the preterm infant. Therefore, sensitivity and responsiveness in parental interaction with the infant may be affected.

Alfasi, Schwartz, Brake, Fifer, Fleischman, and Hofer (1985) conducted a comparison study with well preterm infants and fullterm infants to determine if the parental sensitivity and responsiveness to the preterm infant was different than that exhibited by parents of full term infants. Twenty-four preterm infants, gestational age at birth of 33 to 36 weeks, and 29 full term infants and their mothers from an inner city hospital were observed feeding their infants prior to discharge. They also returned to the hospital at one month of age so researchers could observe a second feeding interaction. One or two trained

observers completed the Nursing Child Assessment Feeding Scale (NCAFS, 1979) shortly after observing the feeding interaction. The 76 item binary behavioral check list has observers rate maternal sensitivity to infant cues, maternal response to infant distress, maternal cognitive growth fostering behavior, maternal social emotional growth fostering behavior, infant clarity of cues, and infant response to the parent.

Preterm and full term infants showed significant differences during the time I feeding ($p<.001$) with full term infants scoring higher on both infant scales. At time II, full term infants scores significantly higher ($p.<.001$) on the responsiveness to parent scale only. The mothers of full term infants scored significantly higher ($p.<.001$) on sensitivity to infant cues at time one, but by time II there were no significant differences in the maternal scale scores or combined maternal score between the mothers of full term or preterm infants. Additionally, both preterm and full term infants showed significant improvement in scale scores over time, but only the mothers of preterm infants scored higher on sensitivity to infant cues at a significant level by time II.

The mothers also completed the Neonatal Perception Inventory II (Broussard and Hartner, 1970) and rate their infants behaviors. There were no significant differences between the full term and preterm mothers' ratings of their infants' behaviors. Also, the ratings on the NPI were not correlated with maternal ratings on the NCAFS at either time I or time II.

The authors concluded that healthy preterm infants are less responsive to their mothers and that their cues are less clear than those of full term infants, but that over time any differences in maternal interaction scores decrease and that mothers of the two groups appear similar. However, because of the significantly lower scores of the preterm dyad, they conclude that the preterm dyad may face different tasks during the first month of life than mothers and full term infants. This study was conducted with "well" preterm infants as the subjects. Therefore, prematurity only may have accounted for the differences in the interactions of the dyads.

Many preterm infants, however, experience life threatening episodes during their hospitalization. The impact of the illness and belief of vulnerability of the infant was not accounted for in this study. Also, there was no attempt to control for experience interacting with that particular infant. The observed feeding at time I was simply a feeding prior to discharge from the hospital. This may have made a difference in the interaction experience of individual and group dyads and introduced a sampling bias which was not reported by the authors.

This and other descriptive studies have led researchers to look at interventions which may decrease perceived differences in interaction between preterm dyads and full term dyads. Brown, LaRossa, Alward, Davis, Rutherford, and Bakeman (1980) described the impact of an intervention program on the synchrony in interaction demonstrated by mothers and their premature infants.

Forty-one prematurely born infants and their mothers were randomly assigned to one of four groups. The infants received additional infant stimulation of about 30 minutes twice a day (infant stimulation), or their mothers met with the project nurse daily to discuss infant care issues, mothers' concerns, and to have infant stimulation explained and demonstrated (mother training). Infants in the third experimental group (both group) received the infant stimulation twice a day and had mothers who received training in the stimulation as well as had their questions about infant care answered. The control group infants received the usual care and treatment procedures.

Multivariate Analysis of Variance revealed no significant differences between the infant groups on rate of weight gain, length of hospital stay, or scores on the Brazelton Neonatal Behavioral Scale. When the mothers were hospitalized during the post-partum period, the mothers in the mother training, and both treatment groups visited their infants significantly more often than did the mothers in the other two groups ($p<.05$). After the mothers' discharge from the hospital, there were no between group differences in frequency of visitation. At a nine month follow up assessment of the quality and quantity of social, emotional, and congitive support given to their infants as assessed by the HOME scale, there continued to be no between group differences. The scale, an observational checklist, is composed of six subscales which sample sensitivity and responsiveness of the mother to her infant at home. The

subscales are: 1) the emotional and verbal responsivity of the mother; 2) avoidance of restriction and punishment; 3) organization of the physical and temporal environment; 4) provision of appropriate play materials; 5) maternal involvement with the child, and 6) opportunities for variety in daily stimulation (Snyder and Spietz, 1978). Also, there were no between group differences in the mothers on a rating of maternal responsiveness during a videotaped interaction at 12 months of age. Finally, the infants did not differ on their 12 month mental and motor developmental scores on the Baily Scales of Infant Development.

While these results are not supportive of the efficacy of the specific intervention program, the study did raise questions about what else might have occurred between hospitalization of the infant and the follow-up assessment which might have altered or affected the outcomes. The authors hypothesized that the results might have been influenced by the high risk social situation of the mothers. Mothers were black, had completed on the average 11 years of school, and had an average monthly income of $390. Fifty percent of the mothers were on welfare and only 15 % lived with husbands. No other social-demographic data was presented. Also, little was done in this study to either assess or increase the mothers' knowledge about their preterm infants' behavior cues.

A second study was designed by the same investigators to study the impact of increasing the mother's awareness of her

infant's behavioral status on her interaction with her infant. Thirty healthy preterm infants were assigned to one of two treatment groups or a control group. One treatment method was for the mothers to observe and have explained to them the Brazelton Neonatal Assessment Scale (NBAS) for their infant, and for the mother to administer the Mother's Assessment of the Behavior of Her Infant Scale (MABI) at birth and weekly for a month. The second treatment group did not observe the administration of the NBAS, but were asked to complete the MABI at birth and weekly for four weeks. The control group was asked to complete a weekly assessment of their infant's developmental milestones. An ANOVA analysis of the one month data and videotapes of feeding interactions indicated that, compared to the control group of infants, both treatment groups did significantly better on interactive process scores. Thus, increasing the mother's awareness of her infant's capacities and behavioral pattern increased her interaction with her infant and improved her sensitivity and responsiveness to her infant at four weeks. Once again, however, the subjects were "healthy" preterm infants and no attempt was made to account for the impact of the infant's illness on the sensitivity and responsiveness of the mother to the infant's cues.

Knowledge and behaviors seem to be related in the above studies. However, other investigators have raised the question about whether increasing the amount of interaction between the mother and her preterm infant early in hospitalzation would

increase the sensitivity and responsiveness of the mother to her mother and the infants clarity of cues and responsiveness to its mother. White-Traut and Nelson (1988) had mothers administer auditory, visual, and vestibular stimulation to their preterm infants. Thirty-three mothers were randomly assigned to a control group, a talking treatment group, or an interactive treatment group. The interactive treatment group provided massage, rocking, talking, and eye-to-eye contact for their infants. Control group mothers were encouraged to visit; were encouraged to provide visual stimuli for their infants; and spent time with the investigator while hearing about premature infant clothing and premature infant care. Mothers in the talking group were instructed to talk or sing to their infants for 15 minutes at specified time intervals. The interactive group mothers used the RISS technique to provide tactile stimulation, vestibular motion, auditory stimulation, and eye-to-eye contact in a scheduled and structured manner. Infants were 28-35 weeks gestation at birth and off assisted ventilation by 24 hours of age. Thus, they were essentially "well" preterm infants.

Sensitivity and responsiveness in interaction was measured during a feeding interaction. The investigator and reasearch assistants were certified to administer the Nursing Child Assessment Feeding Scale (NCAFS, 1979). Mother-infant interaction during a feeding was observed one day prior to discharge from the hospital. Analysis of Variance results

identified significant group differences for maternal behaviors with routine care mothers scoring lowest and the RISS interaction treatment group scoring highest. The infants who received the RISS interaction scored higher on the subscales than infants from the talking interaction group, and both groups scored higher than the routine care infants, but the differences were not significant. Thus teaching a mother to "read" her infant's behavioral cues and increasing her interaction with her infant prior to discharge from the hospital did increase the mother's sensitivity and responsiveness to her infant during feeding interactions prior to taking the infant home. The group sizes in this study were small (N=11) and the results should be considered preliminary. Also, a specific interaction model was used (RISS) and alternate models for providing infant stimulation were not considered. Therefore, the results have very limited generalizability.

Although the above study used a structured interaction which a professional designed to increase the mothers awareness of the infant's behaviors, simply increasing the frequency of contact between the mother and infant may increase the mother's knowledge about her infant's behavior. Zeskind and Iacino (1984) hypothesized that increasing the frequency of mothers' contacts with their preterm infants would positively affect the mother-infant relationship. Thirty-two mothers and their preterm infants were randomly assigned to a control or experimental group. The control group was encouraged to visit their infants

as per the usual hospital practice. The experimental group received the usual treatment plus attention by the project interventionist. The interventionist made weekly appointments for the mother to visit her infant, and arranged transportation or other services needed by the mother so that she could visit her hospitalized infant. In addition, the interventionist acted as an advocate by making sure the mother understood information she was given by health professionals. Finally, the interventionists made weekly home visits for six weeks after discharge from the hospital and answered questions about development or infant care.

As hypothesized, the intervention group independently visited their infants more than twice as often as the control mothers, and the length of hospitalization was significantly shorter for the intervention group than the control group at $p<.01$. There was also a significant difference in the mother's positive perceptions of her infant as measured by the Neonatal Perception Inventory (NPI) with the experimental group scoring lower than the control group. The investigators had hypothesized that compared to control mothers the experimental mothers would be more realistic about their perceptions of their infants as compared to the average baby. The findings of this study may be explained by this hypothesis, however, the hypothesis was not tested and alternate explanations may account for the differences. Clearly, the intervention did increase the time spent in visiting their infants for the mothers, but once

again there was no measurement of the maternal-infant interaction differences between the groups after discharge.

Assuming that the reasons that mothers didn't visit their preterm infants were limited emotional resources and social resources, Dillard, Auerbach, and Showalter (1980) described a program which was built on a crisis intervention model. Social workers assigned to the Neonatal Intensive Care Unit (NICU) developed an intervention program which provided emotional support and guidance, daily assessment of parental status, and fostered frequent parent-infant interactions. Sixty-one mothers of infants hospitalized in the NICU and 42 mothers of full term infants were asked to complete questionnaires at the time of discharge. The questionnaire assessed pregnancy attitudes, the mother's view regarding her care and her infant's medical care, feelings of attachment to her child, maternal resolution of anger and guilt, and mother's perception of her baby's future health and behavior.

There were no statistically significant differences in the responses to the items between mothers of healthy full-term infants and mothers of preterm infants who participated in the crisis intervention program. Thus, the intervention strategy may have been successful in decreasing any differences between groups. Also, mothers completed the Neonatal Perception Inventory regarding the rating of their infants behaviors compared to those of the average infant (Broussard and Hartner, 1970). There were no differences between the responses of

mothers of full-term infants and mothers of pre-term infants. The authors concluded that causality of the findings of "no difference" could not be determined by the study, but that the interventions at least caused no harm to the study participants. Comparison data collected prior to the implimentation of the program would have helped to establish the effectiveness of the intervention.

Investigators have also recently examined the relationship between the health of the infant and infant behavior which might impact on the maternal-infant interaction and attachment process. Greene, Fox, and Lewis (1983) stated that it was difficult to assess the behavior of preterm infants as a group without accounting for the differences in their state of illness or wellness. Infants who were either preterm without medical complications, preterm with at least one major medical complication, fullterm with the medical complication of birth asphyxia, or healthy fullterm, were assessed prior to hospital discharge and again when the infant was three months old. There were 14-16 infants in each of the groups.

The Neonatal Behavior Assessment Scale (NBAS) was used to assess the infants prior to hospital discharge. The NBAS scores were analyzed in the seven clusters of habituation, orientation, motor, regulation, autonomic, range, and reflex. The clusters were then analyzed with a 2 (healthy/sick) x 2 (Fullterm/preterm) analysis of varience. Orientation, state regulation, and reflex clusters revealed significant main

effects for health. Healthy infants had better orientation scores, state regulation scores, and a higher percent of usual reflexes than infants who had been ill. Motor cluster scores, autonomic regulation cluster scores and reflex cluster scores showed a significant main effect for maturity. Preterm infants had lower motor control scores, less autonomic regulation and more abnomal reflexes than full term infants. There were no significant interactions.

At three months of age, the mothers and infants were videotaped during a 15 minute free play interaction. A 2 x 2 analysis of varience was used to analyze the mother and infant behavioral variables. Healthy infants looked at their mothers significantly longer ($p<.05$) than ill infants during the play session. Mothers of preterm infants, however, were more responsive to their infants than mothers of fullterm infants ($p.03$). Mothers of ill fullterm infants received the most proximal and movement stimulation, but received the least affective and distal stimulation ($p<.05$). A multiple regression analysis assessed the relationship between the neonatal, behavioral, and health characteristics and the three month infant social behaviors and mother interaction behavior scores. The infant's orientation behavior cluster accounted for a significant amount of variance in the infant and maternal three month behaviors. The less irritable infants at three months had been more alert and attentive during the neonatal assessment. Also, mothers of the more alert and attentive infants used less

proximal stimulation than did mothers of less attentive infants. Thus, the attending behavior during the neonatal period did relate to the three month social interaction pattern of the mother-infant pairs regardless of neonatal maturity. However, the sick infants were significantly less alert prior to hospital discharge and were also more irritable at three months and received more proximal maternal stimulation.

This study does suggest that both infant maturity and illness must be assessed when analyzing the maternal-infant interaction pattern. One other group of researchers who assessed the impact of the premature infant's illness state on the infant's behaviors and subsequently on the maternal-infant interaction pattern was Minde, Whitlaw, Brown, and Fitzhardinge (1983). One hundred eighty four small premature infants admitted to the Neonatal Intensive Care Unit of the Toronto Hospital for Sick Children and their parents comprised the study population. Infants were assessed daily on a illness index which was developed by the researchers. Infants were assigned to the "well" group if they had never experienced a life threatening condition during their hospitalization. The infants determined to be sick were those who had experienced serious and long lasting complications. Twenty mother-infant pairs from the ill group and the well group were matched on birthweight, family socio-economic status, and gestational age. There were significant sex distribution differences between the ill infant and well infant group ($x^2=8.1, p<.01$). Data were collected during

three separate maternal visitations. The first observation was made during the second week of hospitalization, the second was made when the sick infant had been medically stable for approximately two days, and the third occurred two weeks after the second. For well infants, the second observation was made during the third hospital week and the third made two weeks later. This was necessary because of the decreased length of stay of the well infants.

The sick infants exhibited significantly less body movement, including keeping their eyes closed during the first observation time, than did the well infants. By the second and third observation periods, these group differences were not significant. All of the infants infrequently exhibited smile, cry, hand-to-mouth or vocalization behaviors, but there were no between group differences noted. Thus, the illness did impact on the motor behavior of the premature infant, but the impact was only evident during the illness.

Mother behaviors of looking, looking "EN FACE", vocalizing to baby, touching baby, and smiling at baby were also analyzed for the well mother-infant and ill mother- infant pairs during the second and third observation period. Mothers of sick infants touched less, smiled less, and looked "EN FACE" less that did mothers of the well infants. This was true even at time three when the differences between the sick infant's behavior and the well infant's behavior had disappeared. Thus, mothers of sick infants engaged in less active interaction with

their infant even when their infant was no longer ill than did mothers of well infants. These behavioral differences between the mothers of sick infants and the mothers of well infants were still observed during a home visit which occurred close to the fiftieth day after the infant's due date.

Conclusion

The studies reviewed here have addressed diverse issues related to maternal attachment for both the fullterm well infant and the ill or preterm infant considered to be at risk for poor attachment. A variety of intervention program designed to influence the mothers contact with their infants and/or their understanding of their infants' behaviors have been presented. Information about the mothers' frequency and amount of contact and sensitivity and responsiveness of interaction to their hospitalized infants' behavioral cues in addition to the impact of the infants' maturity and illness has not been studied. The present study will examine that relationship.

Purpose of the Study

Maternal perception of her infant (Broussard & Hartner, 1970, and Robson & Moss, 1970), timing and extent of maternal interaction with her infant (Kennell & Klaus, 1970, deChateau, 1976, and Svejdos, Campos, & Emde, 1980), mother's sensitivity and responsivenvess to the infant's behavior, (Ainsworth and Bell, 1969), and the influence of the infant's behaviors (Roberts, 1983) have been studied with fullterm mother-infant pairs. Additionally, for the preterm infant, the infant's

behaviors and illness state have been assessed to determine their impact on the maternal-infant interaction process (Greene, Fox & Lewis, 1983 and Minde, Whitlow, Brown, & Fitzhardinge, 1983). This study will assess the relationship between the mother's sensitivity and responsiveness to her infant's behaviors during feeding interactions and the infant's illness or wellness, the mother's prior contact with her infant, and the mother's perceptions of her infant's behaviors. The following are hypothesized correlational relationships.

Hypotheses

I. Maternal contact with her infant and maternal perception of her infant will be positively related to her sensitivity and responsiveness to her infant during feeding.

II. The infant's illness state will be negatively related to the mother's perception of her infant and the mother's sensitivity and responsiveness to her infant during feeding.

III. The infant's illness state will be negatively related to the infant's behavioral cues emitted during the feeding interaction.

The data will be collected at two different times for each mother-infant pair. Therefore, the following hypothesis is proposed:

IV. There will be no differences in maternal sensitivity and responsiveness to her infant between Time I and Time II.

Definition of Terms

INC: Intermediate Nursery Care Unit. A sick or preterm infant care unit. Infants admitted here are not in a life threatened state.

NICU: Neonatal Intensive Care Unit. A care unit for preterm or sick infants who are experiencing a life threatening situation.

CHART: A medical record for the patient. Includes documentation of all data pertinent to that patient's hospitalization and medical care.

TIME I: The first time a mother held and fed her infant.

TIME II: A feeding interaction between mother and infant within 24 hours of discharge from the hospital.

MORBIDITY: Illness of the infant.

ILLNESS: The cumulative illness score of the infant at Time I and Time I as determined by the daily score on the "Neonatal Morbidity Scale".

DAYS: The number of days since birth to the day of the Time I and Time II feeding.

ILLDAYS: The average illness score per day calculated for Time I and Time II.

MATERNAL CONTACT (MCONT): The average interval scale score for each time the mother visited her infant at Time I and Time II. The scale rates amount of time spent with the infant and amount of infant caregiving.

FREQUENCY OF CONTACT (FCONT): Calculated by dividing the number of days visited by the number of days at Time I and Time II.

MATERNAL PERCEPTIONS: The answers given by the mother to questions about the amount of difficulty the "Average Baby", "Your Baby" , and "Expected Your Baby" has with common infant behaviors.

NEONATAL PERCEPTION INVENTORY (NPI): The score achieved by the mother when subtracting her rating of "Your Baby" behaviors from her rating of "Average Baby" behaviors.

NPI SUBSCALES:

AVERAGE BABY (ANPI): Mother's rating of average baby's behaviors.

YOUR BABY (YNPI): Mother's rating of her baby's behaviors.

EXPECTATIONS ABOUT YOUR BABY (ENPI): Mother's rating of her baby's anticipated behaviors.

DIFFERENCE SCORES:

AVERAGE BABY - YOUR BABY (AYNPI): The actual NPI Score

AVERAGE BABY - EXPECTED BABY (AENPI): The difference between perception of average baby behaviors and expectations about your baby's behaviors in the future.

YOUR BABY - EXPECTED BABY (YENPI): The difference between preceptions of your baby's behaviors

now and expectations about your baby's behaviors in the future.

SENSITIVITY AND RESPONSIVENESS IN MOTHER-INFANT INTERACTION: Mothers ability to perceive, interpret, and respond to her baby's signals during feeding interactions.

NURSING CHILD ASSESSMENT FEEDING SCALE (NCAFS): A 76 item binary observation scale used to rate sensitivity and responsivenss in mother-infant interaction during feeding.

NCAFS SUBSCALES:

Maternal Sensitivity to Infant Cues (MSENS)

Maternal Response to Infant Distress (MRES)

Maternal Social-Emotional Growth Fostering Behaviors (MSOCEMO)

Maternal Cognitive Growth Fostering Behaviors (MCOG)

Maternal Subscale Total (MNCAFS)

Infant Clarity of Cues (ICLAR)

Infant Responsiveness to Parent (IRES)

Infant Subscale Total (INCAFS)

Total of all Maternal and Infant Subscales (TNCAFS)

CHAPTER III

METHODS

Participants and Setting

Participants in this study were a sample of fifty three mother-infant pairs recruited from a population of infants who were admitted to the Neonatal Intensive Care Unit (NICU) or Intermediate Nursery Care Unit (INC) of the Oregon Health Sciences University Hospital in Portland, Oregon between July and November 1988. The NICU is a 22 bed tertiary care unit for very ill neonates. Infants admitted to this unit often have life threatening conditions requiring intensive medical interventions. Infants admitted to this unit may be very small or premature requiring very controlled environmental support, may have respiratory distress requiring ventilatory support, or may have congenital anomalies which require surgical intervention for the survival of the infant. Infants admitted to the NICU are either born at University Hospital (about 60&) or transported to University Hospital NICU from other hospitals throughout the state. During the period of data collection, the NICU had an average occupancy reate of 63% per month (University Hospital Workload Report 1987).

Infants admitted to the 16 bed INC are not as critically ill or premature as infants admitted to the NICU. Infants admitted

to the INC may be preterm but not require ventilatory support, may have sepsis of the newborn, or may have been transferred to the INC from the NICU as they grew and medically improved. Infants admitted to INC are born at University Hospital (80%) or transferred from the NICU. The occupancy rate for the INC during the six months averaged 105% (University Hospital Workload Report 1987).

Data were collected during the infant's hospitalization. Questionnaires, medical record audits and coding of videotaped feeding interactions were used to collect data. This study was reviewed and approved by the human subjects review committee of the Oregon Health Sciences University prior to enrolling subjects.

Infants

Infants enrolled in the study were between 25 and 42 weeks gestational age at birth. All infants had medical conditions requiring their admission and care on either of the above two hospital units. Infants with illness or congenital anomalies which would prevent oral feeding prior to discharge from the hospital were excluded. Infants were selected to participate in the study once they had been determined to be medically stable by their physicians or nurses. This allowed the investigator to screen and exclude those infants at risk for death during the post-delivery period.

Mothers

Mothers, recruited for this study, were between the ages of 15 and 37, were primiparous or multiparous, spoke English as their primary language, kept their infants, and were free from pre-existing handicapping conditions which would affect their ability to assume the caregiving activities. No attempt was made to screen for previous child care experiences or number of previous births. Further descriptions of the sample can be found in the results section.

Procedure

The investigator reviewed medical records of infants admitted to the Neonatal Intensive Care Unit (NICU) and Intermediate Care Nursery (INC) to determine infants and mothers who met the admission criteria for the study. The investigator then contacted the mother in person, explained the procedures and purpose of the study, and obtained informed consent from the mother for participation in the study (Appendix A).

Infants enrolled in the study were identified by placing a "study" label on the isolette or crib. Nurses, caring for the infant in the NICU or INC, were requested to inform the investigator of the anticipated time and day of the infant-mother first feeding interaction and a feeding interaction within 24 hours prior to the discharge of the infant. The investigator videotaped feeding interactions as they occured at Time I and Time II in the NICU and INC. Time I is defined as the first feeding interaction of the mother and her infant. Time II is a feeding interaction between the mother and infant within 24

hours prior to the infant's hospital discharge. Mothers were requested to complete questionnaires when enrolled in the study and at Time II. These procedures are more fully described later in this chapter.

Measurement of Variables

The variables in this study were measured using a variety of methods. The independent variables assessed were infant illness (morbidity); maternal perception of her infant; and maternal contact with her infant during hospitalization. The dependent variables, maternal sensitivity and responsiveness to her infant's behaviors, were measured during feeding interactions. Maternal and child demographic data were also collected.

Independent Variables

Infant Illness

The infant illness status, or infant morbidity, was assessed from the day of admission to the NICU or INC through the day of the second feeding assessment within 24 hours prior to discharge home. Infant illness is defined as the presence of medical complications (Minde, Whitlow, Brown, & Fitzhinge, 1983). The "Neonatal Morbidity Scale" was used to determine the infant's illness score (Minde, Whitlaw, Brown & Fitzhardinge, 1983) (Appendix C). The scale is designed to be used to collect daily information about the infant's illness status from the medical record, and to provide a cumulative illness score which reflects both severity of symptoms or complications and duration

of illness. The cumulative illness score is the total sum of the daily scores. The infant's cumulative illness scores at the time of the first maternal-infant feeding interaction and the time of the feeding interaction prior to discharge from the hospital were calculted and labeled Illness 1 and Illness 2 respectively. The scale rates 20 of the most common medical complications experienced by the infant hospitalized in NICU or INC units. The complications assessed were convulsions, hydrocephalus, intracranial hemorrhage, perinatal asphyxia, diarrhea, necrotizing enterocolitis, meningitis, sepsis, pneumothorax, apnea, respiratory distress syndrome, chronic lung-disease, cardiac failure, hyperbilirubinemia, hypoglycemia, acidosis, bleeding tendency, anemia, tracheostomy, and nil per os (nothing by mouth). Each complication is rated 0 if absent or 1 to 3 depending on its severity. The hypothetical range of daily scores is 0 to 57 reflecting slight differences in items. Two NICU nurses and the developer of the scale achieved a 90% interrater reliability using the scale. Validity data on the scale was not reported. The present investigator and the two reasearch assistants, NICU nurses, using retrospective medical record audits, established 90% interrater reliability on a random sample of one hospital day for each of ten different infants who were on the NICU or INC unit during the previous three months.

Additionally, the days between birth and the first feeding, including the day of birth and the day of the first feeding were counted. This figure represents the Days 1 variable. Days 2 is

the total number of days, including birth day and day of feeding, at time II. Finally, Illdays 1 and 2 is the infant's score at those times calculated by dividing the Illness score by the number of days hospitalized up to that time.

Maternal Contact

Documentation of the mother's contact with her infant was recorded by the nurse caring for the study infant. Maternal contact is defined as direct contact, visual, tactile or verbal, with the infant. These data were collected for each maternal-infant interaction during the infant's hospitalization. Recording maternal contacts is standard practice on the NICU and the INC unit. Nurses record length of each contact and their observations about the mother's verbal and behavioral interactions with her infant on the "Nurses Progress Record" in the infant's medical record each time a contact occurs. (A copy of Nurses Progress Record is attached in Appendix D.)

The contact score for each day an interaction occurred was assigned by the investigator after reviewing the medical record data using an interval scale developed by the investigator. This scale was reviewed by neonatal nurses and determined to contain mutually exclusive categories. A mother's contact was given a score of 1 if she was noted to have visited briefly and did not hold or provide care for her infant. A score of 2 was assigned if she visited two or more times, or for an hour or more at a single visit, but did not hold or provide caregiving for her infant. A score of 3 was assigned if the mother visited less

than an hour but did hold or provide care for her infant. A score of 4 was assigned if the mother visited one to three hours in a day and held or provided care for her infant. A score of 5 was assigned if the mother visited more than three hours and provided care. Care was defined as feeding, diapering, dressing, holding, or taking the infant's temperature.

The "MATERNAL CONTACT 1 (MATCONT 1)" score is the total contact score divided by the number of days of contact at the time of the first maternal-infant feeding interaction. The "MATERNAL CONTACT 2 (MATCONT 2)" score is the total contact score divided by the number of days of contact at the time of the feeding interaction prior to discharge from the hospital. For example, a mother may have contact scores of 1, 2, 3, 3, 4, 4, on six visits of the child's ten days of hospitalization which are the days up to Time I. Her MATERNAL CONTACT 1 score would be 17/6 or 2.83.

Additionally, a frequency of contact was calculated for Time I and Time II. Frequency of contact at time I (FCONT1) is the number of days the mother visited divided by the number of days the infant was in the hospital prior to the first feeding. The frequency of contact at Time 2 (FCONT2) is the number of days the mother visited divided by the number of days the infant was in the hospital until and including the day of the Time II feeding.

Maternal Perception of Her Infant

The mother's perception of her infant is a self report of the mothers' rating of six infant behaviors for her infant as

compared to the average infant. The mother's perception of her infant was determined using the Neonatal Perception Inventory (NPI II) (Broussard & Hartner, 1970) (Appendix E). The mothers were be asked to rate the "Average Baby" and "Your Baby Now" and "Expectations About Your Baby" on the six behaviors of crying, spitting, elimination, feeding, sleeping, and predictability. The six equally weighted behaviors scores range from a high score of five for the response of "a great deal" to a low score of one for the response of "none". To obtain the mother's NPI score, her score for her infant is subtracted from her score for the "Average Baby".The possible range of scores is -24 to 24.

The researchers, who developed the scale, claim strong predictive validity for the scale based on their longitudinal data. The infant whose mother's NPI II score is between 0 and 24 is considered to be at low risk for developing subsequent emotional or developmental difficulties. The infant whose mother's NPI II score is between -24 and 0 is considered to be at high risk for developing subsequent emotional or developmental difficulties because its mother rates it lower than the average baby on the six behaviors. A Chi Square test for significant association between the risk rating of the child and subsequent childhood emotional disorders was reported (Broussard and Hartner, 1970). No signficant association between maternal perceptions and subsequent emotional or developmental difficulties was reported by Palison (1983).

Mothers were asked to complete the NPI II at the time of the second feeding observation just prior to discharge from the hospital. This allowed the mother to experience maximum interaction with her infant and thus be very familiar with her infant's behaviors prior to asking her to report on those behaviors.

Demographics

Various researchers have claimed that demographics may be predictive of or related to child or interaction outcomes. Broussard and Hartner (1970) claim that the variables of maternal age and education, religion, sex of the infant, and socioeconomic status had no effect on the probability of risk for developmental and emotional problems for the child. Burns (1978) reported, however, that maternal age, education, and income level were significant factors influencing the results of the NPI II score. Barnard (1982) reports that maternal education does relate to subsequent development for children. Because of conflicting data regarding the impact of demographics on various outcomes, this investigator collected information about the mothers desire for this pregnancy; the prenatal care she received; previous pregnancies; knowledge of well infant care, knowledge of premature or ill infant behaviors, knowledge of her infant's care equipment, educational level; economic status; stability of her current partner relationship; and age. This information was collected by means of the demographic questionnaire (Appendix B) at the time the mother was enrolled in the study.

Dependent Variable

Sensitivity and Responsiveness in Mother-Infant Interaction

The dependent variable, sensitivity and responsiveness in mother-infant interaction, is defined as the mother's ability to perceive, interpret, and respond to her baby's signals (Goldberg, Perrotta, Minde, & Corter, 1986). The Nursing Child Assessment Feeding Scales (NCAFS) (Barnard, 1978) (Appendix F) was used to score the mother's sensitivity and responsiveness to infant cues during feeding interactions. The feeding interaction allows for assessment of maternal-infant dyads during a standardized context and samples behaviors which are consistently demonstrated in other interactions (Spietz, 1978). The NCAFS consists of 76 binary behavioral items which are applicable to feeding interactions during the first year of life. The 50 parent items are divided into subscales of sensitivity to cues (n=16), response to distress (n=11), social-emotional growth fostering (n=14), and cognitive growth fostering (n=9). The 26 infant items comprise the subscales of clarity of cues (n=15), and responsiveness to parent (n=11). All items are scored as either present or absent. The scale score and the total score of the NCAFS equals the total number of "yes" observed behaviors. Cronbach Alpha internal consistency scores are reported as .94 for the total scale, as .91 for the maternal scale and .86 for the infant scale (Barnard, 1982).

Researchers wishing to use the scale are required to attend an 8 hour training session in the use of the tool and achieve at least 85% interrater reliability on three of five training videotapes as well as at least 85% interrater reliability on three of five home visits to observe mother-infant feeding interactions. Thus, data collected using this scale is reliable (Barnard, 1982). The investigator and the two research assistants attended the training session, and achieved 85% interrater reliability on scoring of the videotapes as well as the home visits.

For this study, the research assistants scored the NCAFS from videotapes of participant mother-infant pairs during two feeding interactions. The investigator videotaped the Time I first feeding interaction between the mother and infant and the Time II feeding interaction which occurred within 24 hours prior to discharge from the hospital. A small color video camera (Sharp) and portable 1/2 inch VHS recorder was used to record the interactions. The camera was placed on a tripod approximately four feet from the mother, and focused prior to initiation of the feeding episode. The mother wore a small lapel microphone in order to decrease the recording of the ambient noise. The investigator stayed three to four feet from the recording equipment during the videotaping episode thus decreasing the invasiveness of the procedure. The videotaping was done with the usual lighting on the NICU and INC unit. The NCAFS Time I and Time II data for a single subject were coded

from the videotaped interactions by the same research assistant. Interrater reliability was maintained by the investigator and research assistants by coding every 10th mother-infant pair videotape and establishing at least 85% interrater reliability with the NCAFS.

Analyses of Data

Data analysis was completed using a variety of statistical methods. Maternal demographic data, maternal perception data, maternal-infant contact scores, infant illness scores, and maternal-infant NCAFS scores were analyzed using descriptive statistics to determine means, ranges, frequency of responses, and standard deviation of responses. Correlation matrices were run both for Time I and Time II data to test the relationship between the independent variables, demographic variables, and the sensitivity and responsiveness during maternal-infant interaction. In addition, paired t-tests were calculated to examine the differences between NCAFS scores at Time I and Time II. T-tests were also calculated to determine sub group differences due to demographic characteristics of the maternal and infant sample.

CHAPTER IV

RESULTS

Subjects

Using the recruitment procedure described in the preceding chapter, fifty-eight mothers and infants were enrolled in the study. Five mothers and infants were excluded from the final data analysis because of attrition. They were unavailable for the Time II data collection. The total number of subjects for which data were reported was fifty-three mother and infant pairs.

Descriptive Statistics

Mothers

The mothers in this sample were primarily between the ages of 20 and 30 and had at least a high school education. Most mothers also reported having a stable partner situation, but reported a very low income level. (see Table 1)

Pregnancy

Forty mothers (75% of the sample) reported that the pregnancy was unplanned. That same number reported that they did not suspect any trouble with the pregnancy or infant prior to the birth of the infant. Thus, most of this sample did not have time to prepare for the birth of an ill or preterm infant. This was the first pregnancy for 17 mothers, the second pregnancy for 11 mothers and the third pregnancy for 8 mothers. Other mothers reported this pregnancy number between 4 and 8. Twenty-five mothers were primiparous, or this was their first living child,

TABLE 1

Number and Percent of Mothers by Demographic Characteristics

	Response Category and Number			
Age	15-19	20-25	26-30	31-37
	N=7 13%	N=29 55%	N=12 23%	N=5 10%
Education	<High School	High School	College/Tech	College Grad
	N=12 23%	N=20 38%	N=17 32%	N=4 8%
Partner	Married	Living With	Not With	
	N=21 40%	N=18 34%	N=14 26%	
Income	<10,000	10-19,999	20-29,999	30-49,999
	N=34 64%	N=11 21%	N=6 11%	N=1 2%

and 28 were multiparous meaning that this was not their first living child. (see Table 2)

Knowledge of Infant Care

Mothers reported on their knowledge of well infant care, knowledge of preterm or sick infant behaviors, and knowledge of the equipment used with their ill infants. Most mothers reported that they had some knowledge of well infant care, but 55% of the mothers reported very little or no knowledge of preterm or ill infant behavior, and 43% reported very little or no knowledge of their the equipment their infant was using. (see Table 3)

Infants

Twenty-nine male infants and twenty-four female infants comprised the infant sample. Two infants were black and 51 were caucasion. Gestation at birth ranged from 25 weeks to 42 weeks with a mean gestation of 34.86 weeks. Birth weights for the infants ranged from 0.715 Kg. - 4.630 Kg. The mean birthweight was 2.398 Kg. and the standard deviation was 0.835 Kg.

Descriptive Statistics

Independent Variables

Maternal Contact

Maternal Contact with her infant was calculated for Frequency (number of days visited/number of days hospitalized, "FCONT") and average amount of contact and caregiving (average contact score for days of contact, "MATCONT") The variables Frequency of Contact and Maternal Contact were Calculated for time I and time II. (see Table 4) The higher the frequency

TABLE 2

Number and Percent of Mothers by Pregnancy History Characteristics

	Response Category, Number, and Percent					
Parity	Primiparous	N=25	47%	Multiparous	N=28	53%
Planning	Unplanned	N=40	75%	Planned	N=13	25%
Anticipated Trouble	No Suspicion	N=40	75%	Suspected	N=13	25%

TABLE 3

Number and Percent of Mothers by Knowledge of Infants

	None/Little		Good Bit/Moderate/Great Deal	
Knowledge of Well Infants	N=3	6%	N=50	94%
Knowledge of Ill Infants	N=29	55%	N=24	45%
Knowledge of Equipment	N=23	43%	N=30	57%

TABLE 4

Range, Mean and Standard Deviation of Maternal Contact Variables

	Time I	Time II
	Actual Range, Mean, (SD) (Possible)	Actual Range, Mean, (SD) (Possible)
Frequency of Contact	.17-1.00 .664 (.247) (0-1.00)	.30-1.00 .713 (.215) (0-1.00)
Maternal Contact (Caregiving)	1.17-5.00 2.916 (.865) (1.00-5.00)	1.91-4.33 2.392 (.539) (1.00-5.00)

score, the more often the mother visited her infant, and the higher the maternal contact score the more time the mother spent with her infant and/or the more caregiving the mother engaged in during each visit. There was a wide range of scores for both frequency of contact and maternal contact. There was no significant correlation between frequency of contact at Time 1 and maternal contact at Time 1, however by time II, the two measures of maternal contact were significantly correlated ($r=.29$, $p<.05$).

Infant Illness

The infant illness scores at Time I (Illness 1) and Time II (Illness 2) are the sum total of daily illness scores as determined by the "Neonatal Morbidity Scale" (Minde, Whitlaw, Brown, & Fitzhardinge, 1983). Additionally, there are three other indicators of infant illness. These are the number of days between birth and the feeding at Time I (DAYS 1) and Time II (DAYS 2), the gestational age at Time I and Time II and the Ilness score divided by the number of days since birth and Time I and Time II (Illdays 1 and Illdays 2) (Table 5). There was great variability in these scores across the sample for both Time I and Time II. Gestation at Time I and Time II were signficantly correlated only with the Illdays 1 score ($r=.31$, $p <.05$, $r=.45$, $p<.001$) and Illdays 2 ($r=.30$, $p <.05$, and $r=.43$, $p <.001$). Thus, these two indicators of infant illness are directly related.

Maternal Perception of Infant Behaviors

Using the "Neonatal Perception Inventory" scale, mothers

TABLE 5

Range, Means and SD of Infant Illness Variables

	Range	Mean	Standard Deviation
Days1	1-68	9.623	12.868
Illness1	0-356	27.170	53.837
Illdays1	0-12	2.173	2.056
Gest1	31-43	36.132	3.328
Days2	3-108	24.472	21.035
Illness2	1-435	35.962	65.553
Illdays2	.16-4.03	1.168	.982
Gest2	34-44	38.358	2.723

rated the "Average Baby"(ANPI), "Your Baby Now" (YNPI), and "Expectations About Your Baby" (ENPI) on the behaviors of crying, spitting, elimination, feeding, sleeping, and predictability at the Time II feeding interaction. Scores for each version of the scale were calculated. In addition, difference scores between the versions of the scale were calculated (Table 6). (Average-Your=AYNPI, Average-Expected=AENPI, and Your-Expected=YENPI) The higher the individual scale score, the more difficulty the mother perceived the infant would have with the behavior. The difference obtained by subtracting the "Your Baby" score from the "Average Baby" score is the score reported in the literature as the Neonatal Perception Inventory score (NPI).

Broussard and Hartner (1970) reported that 39% of their sample had "high risk" NPI score, or had negatively rated their infants, and Pallison (1980) reported that 34% of his sample mothers had "high risk" NPI scores. Five mothers (15%) of this sample had "high risk" NPI scores indicating that the mothers tended to view their own infants as having less difficulty with the rated behaviors now than the average. However, they did expect their infants to experience slightly more difficulty with the behaviors in the future than they were experiencing at the present time or the time of the rating. (Mean "Your Baby"= 12.731, Mean "Expected Your Baby"= 13.538)

Dependent Variables

Sensitivity and Responsiveness in Interaction

The dependent variables are the interaction scores for the

TABLE 6

Range, Mean, and SD of Maternal Perception of Infant Behavior

Scale	Range	Mean	Standard Deviation
Average Baby	9-22	15.538	2.967
Your Baby Now	7-22	12.731	3.255
Expected Your	7-20	13.538	2.880
	Difference Scores		
* Average-Your	-10-+9	2.769	3.750
Average-Expected	-6-+9	2.000	2.951
Your-Expected	-8-+8	-.808	2.997

*Neonatal Perception Inventory (NPI) Score

infant and mother at Time I and Time II. These scores were determined from videotaped feeding interactions and coded by the research assistants. The Nursing Child Assessment Feeding Scale (NCAFS), made up of six subscales, was used. The scores reported at Time I and Time II are the scale scores of maternal sensitivity to cues (MSENS1 & MSENS2); maternal responsiveness to infant distress (MRES1 & MRES2); maternal social-emotional growth fostering behaviors (MSOCEMO1 & MSOCEMO2); maternal cognitive growth fostering behaviors (MCOG1 & MCOG2); infant clarity of cues (ICLAR1 & ICLAR2); infant responsiveness to parent (IRES1 & IRES2); total of the maternal scale scores (MNCAFS1 & MNCAFS2); total of the infant scale scores (INCAFS1 & INCAFS2); and the total of all subscale scores (TNCAFS1 & TNCAFS2). Possible scale scores are: 16 for maternal sensitivity to cues; 11 for maternal response to distress; 14 for maternal social-emotional growth fostering behaviors; 9 for maternal cognitive growth fostering behaviors; 50 for the combined maternal scale scores; 15 for the infant clarity of cues scale, 11 for the infant responsie to parent; 26 for the combined infant scale; and 76 for the total scale score (Table 7).

The means on all scales were higher at Time II than Time I. Also, there was greater variability in maternal scores at Time II, but less variabilility in infant scale scores at Time II across the sample. Alfasi, Schwartz, Brake, Fifer, Fleischman, and Hofer (1985) reported scale scores for their preterm and fullterm sample separately. At Time I the present sample of both

TABLE 7

Range, Mean, and SD of Sensitivity and Responsiveness During Feeding Scores at Time I and II

	Time 1			Time 2		
Scale	Actual Range (Possible)	Mean	Standard Deviation	Actual Range (Possible)	Mean	Standard Deviation
MSENS	6-15 (0-16)	10.566	2.080	7-16 (0-16)	12.43	2.043
MRES	7-11 (0-11)	10.509	1.012	5-11 (0-11)	10.151	1.199
MSOCEMO	4-13 (0-14)	10.340	1.786	5-14 (0-14)	10.887	1.928
MCOG	1-8 (0-9)	4.094	1.811	1-9 (0-9)	5.585	2.080
MNCAFS	22-45 (0-50)	35.472	4.589	22-47 (0-50)	39.000	5.567
ICLAR	2-15 (0-15)	6.528	2.771	5-15 (0-15)	10.792	2.231
IRES	1-9 (0-11)	3.226	1.436	2-9 (0-11)	5.170	1.614
INCAF	3-24 (0-26)	9.698	4.032	7-24 (0-26)	15.943	3.433
TNCAFS	27-69 (0-76)	45.189	7.491	38-70 (0-76)	54.962	8.022

preterm and fullterm dyads mean scores fell between the range for preterm and fullterm maternal scores and total scores and below the mean for the preterm and fullterm infant scores (Figure 1). The subjects in the Alfasi et. al. study were, however "well" and the Time 1 observations were not first feeding interactions.

At Time 2, the present sample scores higher on maternal cognitive and maternal social-emotional growth producing behavior than did the Alfasi et. al. samples, but differences in infant scores were very slight (Figure 2). Also, means reported for a normative sample of 73 one month olds by the Nursing Child Assessment Satellite Training Program, were higher than those in the present sample for all scales. The normative data, however, included only fullterm well infants (Figure 2).

Inferential Statistics

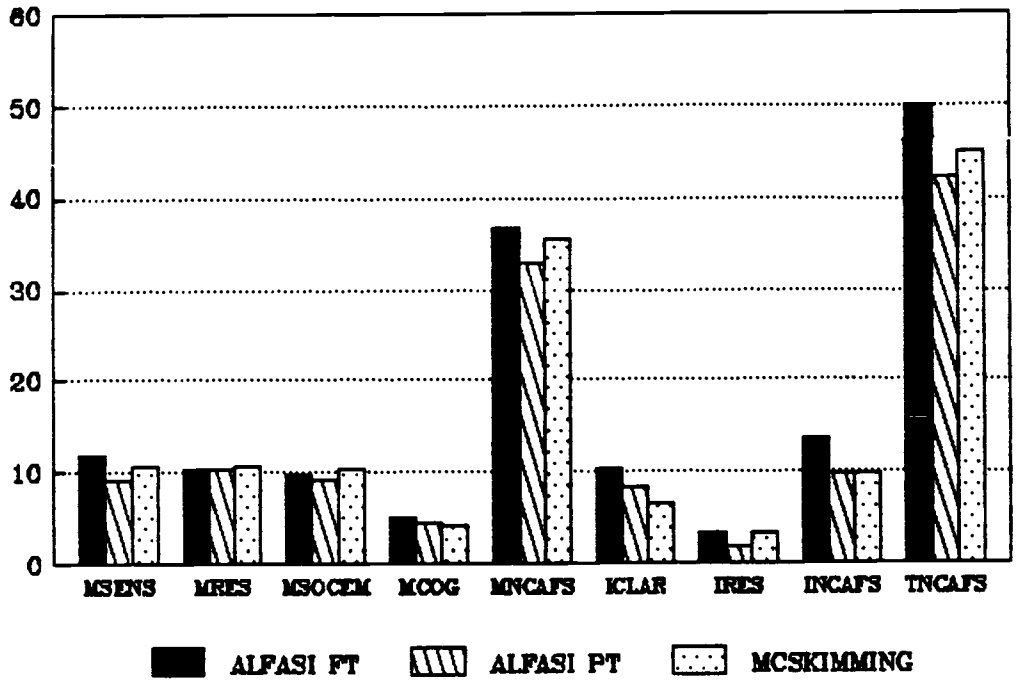
The literature suggests that various demographic characteristics of both mother and infant may contribute to differences in the interaction and responsiveness of each to the other during an interaction episode. For that reason, and because random assignment of subjects was not possible, independent t-tests for significant differences in the dependent variables were calculated.

Maternal

The maternal subjects were divided into a group of primiparous mothers (N=24) and multiparous mothers (N=25). T - tests for differences in group means revealed no significant differences in the means of any of the maternal scale scores at

FIGURE 1

Comparison of NCAFS at Time I

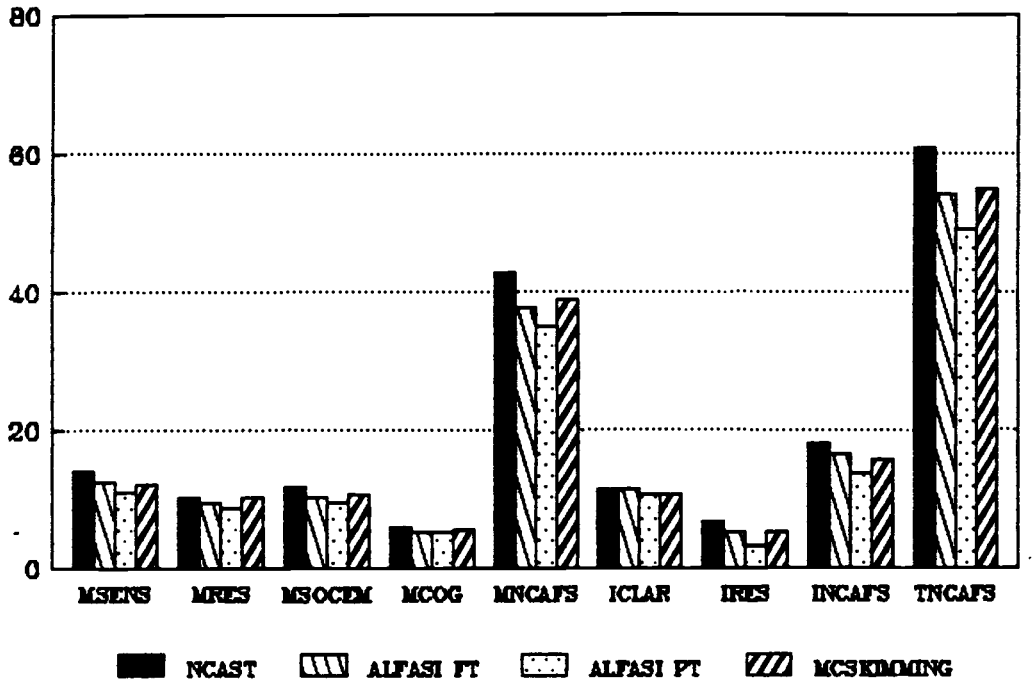


	MSENS	MRES	MSOCEMO	MCOG	MNCAFS	ICLAR	IRES	INCAFS	TNCAFS
ALFASI FT	11.700	10.200	9.700	5.000	36.600	10.400	3.100	13.600	50.100
ALFASI PT	9.100	10.300	9.100	4.300	32.900	8.300	1.600	9.800	42.700
MCSKIMMING	10.566	10.509	10.340	4.094	35.472	6.528	3.226	9.698	45.189

Note: "PT" = Preterm Infants, "FT" = Fullterm Infants

FIGURE 2

Comparison of NCAFS at Time 2



	MSENS	MRES	MSOCEMO	MCOG	MNCAFS	ICLAR	IRES	INCAFS	TNCAFS
NCAST	14.397	10.304	11.795	6.110	42.605	11.630	6.699	18.329	61.014
ALFASI FT	12.700	9.400	10.500	5.200	37.800	11.500	5.100	16.600	54.400
ALFASI PT	11.300	8.900	9.600	5.200	35.100	10.600	3.300	13.900	49.000
MCSKIMMING	12.434	10.151	10.807	5.505	39.000	10.792	5.170	15.943	54.952

Note: "PT"= Preterm Infants, "FT"= Fullterm Infants

either Time I or Time II. Additionally, there was no significant difference in the means of the total scale score at either Time I or Time II (Table 8). Thus, there were no systematic differences in the maternal-infant interactions scores by the parity of the mother at either Time I or Time II for this sample.

Infant

Infant sex, gestational age, and illness are all reported in past research to have influenced the maternal - infant interaction scores. There were 29 male infants and 24 female infants comprising the study sample. There were no significant differences in the means of any of the maternal and infant interaction scales at either Time I or Time II based on the sex of the infant (Table 9). Thus, the sex of the infant did not influence the maternal-infant interaction scores.

The study sample consisted of 16 infants who had a birth gestation of 37 weeks and above, and 37 infants who were born at the gestational age of less than 37 weeks. Thirty - seven weeks was chosen to divide the preterm infant from the fullterm infant because at 37 weeks a healthy infant may stay at its mother's bedside and be cared for by its mother. Again, there were no significant between group differences in the means of any of the maternal-infant interaction scales at either Time I or Time II by gestational age at birth (Table 10). Contrary to other investigators' findings, the prematurity of the infant did not contribute to differences in maternal or infant interaction scale scores.

TABLE 8

Means and T-test Values for NCAFS Scores by Maternal Parity

	Group 1 Primiparous (N=25)			Group 2 Multiparous (N=28)		
	Time 1			Time 2		
Scale	Group 1 means	Group 2 means	t-value	Group 1 means	Group 2 means	t-value
MSENS	10.280	10.821	-.95	12.000	12.821	-1.49
MRES	10.440	10.572	-.47	10.160	10.143	.05
MSOCEMO	10.320	10.357	-.08	10.760	11.000	-.45
MCOG	4.280	3.929	.07	5.600	5.571	.05
MNCAFS	35.280	35.643	-.29	38.480	39.464	-.63

*p <.05

**p <.01

***p <.001

TABLE 9

Means and T-test Values for NCAFS Scores by Sex of Infant

	Group 1 Male (N=29)			Group 2 Female (N=24		
	Time 1			Time 2		
Scale	Group 1 means	Group 2 means	t-value	Group 1 means	Group 2 means	t-value
MSENS	10.559	10.583	-.05	12.103	12.883	-1.35
MRES	10.379	10.667	-1.07	9.966	10.375	-1.30
MSOCEMO	10.517	10.125	.78	10.897	10.875	.04
MCOG	4.241	3.917	.65	5.621	5.542	.13
MNCAFS	35.655	35.252	.32	38.517	39.583	-.68
ICLAR	7.103	5.833	1.77	11.000	10.542	.73
IRES	3.483	2.917	1.49	5.069	5.292	-.49
INCAFS	10.483	8.750	1.66	16.034	15.833	.21
TNCAFS	46.138	44.042	1.05	54.552	55.458	-.40

*p <.05

**p <.01

***p <.001

TABLE 10

Means and T-test Values for NCAFS Scores by Gestational Age of the Infant

	Group 1 Term (N=16)			Group 2 Preterm (N=37)		
	Time 1			Time 2		
Scale	Group 1 means	Group 2 means	t-value	Group 1 means	Group 2 means	t-value
MSENS	10.938	10.405	.92	12.500	12.405	.14
MRES	10.063	10.703	-1.79	9.813	10.297	-1.28
MSOCEMO	10.438	10.297	.28	11.000	10.838	.31
MCOG	4.500	3.919	1.17	5.750	5.514	.34
MNCAFS	35.938	35.270	.49	39.188	38.919	.15
ICLAR	7.313	6.189	1.59	11.438	10.514	1.48
IRES	2.938	3.351	-1.12	5.125	5.189	-.12
INCAFS	10.250	9.459	.82	16.313	15.784	.50
TNCAFS	46.188	44.757	.76	54.500	54.730	.30

*p <.05

**p <.01

***p <.001

Finally, infants were divided into two groups based on their illness score at Time I. Group I infants had a illdays1 score of less than or equal to 1.5 (N=29) and were relatively well. Group II infant had an illdays1 score of less than or equal to 1.79 (N=23) and were considered to be ill. Dividing the group by illness status at Time I did reveal some significant differences in the means of the the maternal-infant interaction scales. There were no significant differences between the "ill" and "well" infant groups on infant behaviors at either Time I or Time II, but there were some significant differences between the groups on the maternal scale scores (Table 11). Mothers of "ill" infants were significantly more sensitive to their infants' cues during feeding and exhibited significantly more social-emotional growth fostering behaviors than did the mothers of "well" infants at Time I. At Time II, the mothers of "ill" infants continued to exhibit significantly more social-emotional growth fostering behaviors as well as significantly more cognitive growth fostering behaviors. These differences contributed to a signficantly higher MNCAFS2 score for mothers of "ill" infants and a significantly higher Total NCAFS scale score at Time II.

Correlated T-Tests

T-tests were calculated for the study sample matermal-infant interaction scores at Time I and Time II. Significant differences were found for all the maternal and infant scales as well as combined scales. The mean scores at Time II were significantly higher on all maternal and infant scales except for

TABLE 11

Comparison of NCAFS Scores by Illdays 1 of Well Versus Ill Infants

	Group 1 Well (N=29)			Group 2 Ill (N=23)		
	Time 1			Time 2		
Scale	Well Infant means	Ill Infant means	t-value	Well Infant means	Ill Infant means	t-value
MSENS	10.000	11.304	-2.35*	11.931	13.000	-1.87
MRES	10.586	10.391	.66	10.276	10.043	.70
MSOCEMO	9.897	10.870	-2.15*	10.241	11.652	-2.83**
MCOG	4.103	4.000	.20	5.000	6.217	-2.27*
MNCAFS	34.552	35.522	-1.59	37.414	40.826	-2.27*
ICLAR	6.517	6.609	-.12	10.414	11.217	-1.29
IRES	3.172	3.304	-.31	4.897	5.435	-1.21
INCAFS	9.759	9.696	.05	15.310	16.609	-1.37
TNCAFS	44.414	46.130	-.82	52.724	57.478	-2.20*

*p <.05

**p <.01

***p <.001

the mean score on the maternal response to infant distress scale. The maternal response to infant distress scale score was significantly lower at Time II (Table 12). The response to infant distress scale, however, is scored with an "11" if the infant does not exhibit distress during feeding. Thus, the higher score at Time I may have related to the fact that the infants did not exhibit distress during the feeding. In fact, forty mothers scored an "11" at Time I and 26 scored an "11" at Time II. Also, at Time I only six mother scored at "10" compared to eighteen mothers who scored a "10" at Time II. Therefore, the interpretation of the significance of the difference in the maternal response to distress score is questionable.

Correlations

Pearson product-moment correlations were calculated to determine the relationships, if any, between the independent variables and the dependent variables. For this data set, there were no significant correlations between either the frequency of maternal contact or the amount of maternal contact (caregiving and visiting) the mother had with any of the maternal or infant sensitivity and responsiveness subscales and combined scales at Time I or Time II (Table 13)

The days1 and raw illness score at Time I were significantly correlated with the maternal sensitivity to infant cues at the first feeding. Illdays1 (illness/days at time I) was significantly positively correlated with all scale scores, except maternal response to distress, at Time II. The illdays2 score

TABLE 12

Means, SD, and T-test Values for NCAFS Scores at Time I and II

	Time 1		Time 2		
Scale	Means	Standard Deviations	Means	Standard Deviations	t-value
MSENS	10.566	2.080	12.434	2.043	6.831***
MRES	10.509	1.012	10.151	1.199	-2.051*
MSOCEMO	10.340	2.088	10.887	1.928	2.089*
MCOG	4.094	1.811	5.585	2.080	6.087***
MNCAFS	35.472	4.589	39.000	5.657	5.417**
ICLAR	6.528	2.771	10.792	2.231	9.424***
IRES	3.226	1.436	5.170	1.614	6.366***
INCAFS	9.698	4.032	15.943	3.433	9.326***
TNCAFS	45.189	7.491	54.962	8.022	9.111***

*p <.05

**p <.01

***p <.001

TABLE 13

Correlation of Maternal Contact, Infant Illness and NCAFS Scores

	FCONT1	MATCONT1	FCONT2	MATCONT2	DAYS1	ILLNESS1	ILLDAYS1	DAYS2	ILLNESS2	ILLDAYS2
FCONT1	1.000									
MATCONT1	-.1117	1.000								
FCONT2	.4121**	.2789*	1.000							
MATCONT2	-.0199	.6552***	.2877*	1.000						
DAYS1	-.2493	.3210*	-.4194**	-.3734**	1.000					
ILLNESS1	-.1261	-.2482	-.2697*	-.2483	.8998***	1.000				
ILLDAYS1	.0517	-.2648	.0138	-.0252	.2409	.3870**	1.000			
DAYS2	-.2411	-.2984*	.4422***	-.3644**	.9042***	.8155***	.2463	1.000		
ILLNESS2	-.1080	-.2541	-.2507	-.2595	.8772***	.9852***	.4093**	.8331***	1.000	
ILLDAYS2	-.0869	-.2664	-.1274	-.1794	.4971***	.6361***	.7509***	.3896**	.6444***	1.000
MSENS1	-.1240	.0045	-.1454	-.0897	.2905*	.2952*	.2571	.2408	.3094*	.3236*
MRES1	-.0812	.2163	.0800	.1509	.1273	.0580	-.0863	.2071	.0722	-.1983
MSOCEMO1	-.0144	-.1542	-.1629	-.1060	.1923	.1346	.2241	.1461	.1228	.2501
MCOG1	-.0674	.0047	-.1002	.1539	-.0496	-.0893	.2039	-.0810	-.0902	.0884
MNCAFS1	-.0967	-.0046	-.1484	.0229	.2024	.1607	.2632	.1767	.1684	.2331
ICLAR1	.0917	-.0299	.0961	-.1079	-.0671	-.1200	.0155	-.1868	-.1493	.0367
IRES1	.0516	-.0341	.0282	-.0177	.2367	.1310	-.0059	.1873	.1122	.0144
INCAFS1	.0984	-.0242	.0807	-.0910	-.0137	-.0614	.0020	-.0997	-.0827	.0167
TNCAFS1	-.0103	.0042	-.0344	-.0147	.1007	.0537	.1542	.0454	.0481	.1458
MSENS2	-.2874*	.1639	.0253	.1142	.1834	.2048	.3189*	.1504	.2365	.3169*
MRES2	-.1375	.1641	.2230	.3326*	.0524	.0246	-.0652	.0299	.2228	-.0358
MSOCEMO2	-.1631	-.1473	.1315	-.0266	.2757*	.2975*	.3639**	.1772	.2970*	.4270**
MCOG2	-.0554	-.0978	-.0232	.0428	.1198	.1350	.3862**	.0529	.1211	.3296*
MNCAFS2	-.2273	.0298	.0790	.1271	.2177	.2326	.3682**	.1432	.2391	.3790**
ICLAR2	.0684	-.1140	-.0215	-.2738	-.0048	.0751	.2947*	-.0028	.0899	.2133
IRES2	.0893	-.1555	-.0932	-.0988	.0855	.1510	.3685**	.1284	.1500	.3149*
INCAFS2	.1246	-.1232	-.0219	-.1617	.0509	.1188	.3516**	.0848	.1298	.2507
TNCAFS2	-.1062	-.0320	.0453	.0196	.1862	.2295	.4137**	.1468	.2387	.3816**

*P <.05

**P <.01

***P <.001

significantly positively correlated with all scale scores, except maternal response to distress, at Time II. The illdays2 score was also positively correlated to interaction scores at Time II, although the correlations were not significant for the infant clarity of cues score or combined infant NCAFS scale score at Time II. In other words, the infant's illdays1 score was more strongly related to clarity of cues at Time II than the illdays2 score. Thus, the illness scores divided by days hospitalized had a strong and persistent correlation with maternal-infant interaction scores during feeding.

Birthweight, sex, and gestational age of the infant were not correlated with the maternal or infant sensitivity and responsiveness subscales and combined scales at Time I or Time II. Maternal age, however, was positively correlated with maternal response to distress at Time I, and maternal sensitivity to infant cues, maternal social-emotional growth fostering behaviors, the combined maternal scale scores, and the total NCAFS score at Time II (Table 14). The older the mother, the higher her interaction scale scores. Maternal reports of knowledge of well infant care, and equipment used by their infants did not correlate significantly with maternal interaction scores. Maternal reports of knowledge of premature or ill infant behaviors did, however, correlate significantly with maternal cognitive growth fostering behaviors at Time I ($r=.2658$, $p= <.05$).

TABLE 14

Correlation of Maternal and Infant Demographics and NCAFS Scores

Scale	BIRTHWT	SEX	GESTBIR	MATAGE	MPARITY
MSENS1	.001	.0076	-.165	.2483	.1312
MRES1	-.2707*	.1427	-.2810	.3239*	.0655
MSOCEMO1	-.0187	-.1104	-.0971	.1187	.0105
MCOG1	.2329	-.0901	.1093	.0350	-.0978
MNCAFS1	.0337	-.0444	-.0569	.2366	.0398
ICLAR1	.1742	-.2304	.2243	.0425	-.0109
IRES1	-.1611	-.1981	-.2284	.1227	-.1153
INCAFS1	.0941	-.2160	.0928	.0232	-.0146
TNCAFS1	.0740	-.1406	.0184	.1636	.0189
MSESN2	.0103	.1795	-.0285	.4161**	.2026
MRES2	-.1833	.1716	-.1418	.2102	-.0072
MSOCEMO2	.0236	-.0056	-.0878	.3237*	.0627
MCOG2	.1779	-.0191	.0096	.0857	-.0069
MNCAFS2	.0466	.0947	-.0542	.3315*	.0877
ICLAR2	.2198	-.1033	.1430	.1017	.2192
IRES2	.0442	.0693	-.0477	.0933	.0531
INCAFS2	.1170	-.0294	.0278	.1452	.1732
TNCAFS2	.0781	.0568	-.0323	.3021*	.1382

*P <.05

**P <.01

***P <.001

Another question addressed by this study was the relationship between the observed interaction scores of the mothers and infants at Time II and the mothers' perceptions of their infants' behaviors and the average infant behaviors. Maternal rating of the "average baby" behaviors was significantly correlated with some of the maternal interaction scores at Time II. Scores on "Your Baby Now" scale was also related to maternal interaction scores at both Time I and Time II. "Expected Baby" behaviors scale score was not correlated with maternal interaction scores (Table 15). The difference score between the "average baby" and "your baby" (NPI) correlated only with the maternal response to distress score ($r=.3194$, $p < .05$). The difference between "your baby now" score and "your expectations for your baby" score also showed significant correlations with maternal social-emotional growth fostering behaviors and maternal cognitive growth fostering behaviors. The higher the difference score (i.e. the more change the mothers expected in their infants' behaviors), the higher the maternal interaction scores.

Finally, the relationship between Time I and Time II measures of maternal infant interaction was addressed. There were no significant correlations between the Time I and Time II measures of infant clarity of cues, infant responsiveness to parent and the combined infant scores. Maternal sensitivity to infant cues, maternal responsiveness to infant distress, maternal social emotional growth fostering behaviors, maternal cognitive

TABLE 15

Correlation of Maternal Perceptions and NCAFS Scores

	ANPI	YNPI	ENPI	AYNPI	AENPI	YENPI
ANPI	1.00					
YNPI	.2509	1.000				
ENPI	.4910***	.5283***	1.000			
AYNPI	.5648***	-.6542***	-.0791	1.000		
AENPI	.5264***	-.2634	-.4823***	.6450***	1.000	
YENPI	-.1993	.5783***	-.3871**	-.6345***	.1774	1.000
MSENS1	.0941	.3177*	.1105	-.2040	-.0133	.2389
MRES1	.0224	.0193	.2102	-.0039	-.1826	-.1810
MSOCEMO1	-.0790	.2290	-.0891	-.2595	.0075	.3343*
MCOG1	.1184	.2723*	.1678	-.1424	-.0448	.1344
MNCAFS1	.0565	.3438**	.1335	-.2553	-.0734	.2451
ICLAR1	.0822	.0869	.0716	-.0008	.0128	.0256
IRES1	.1995	.1313	-.0139	.0527	.2142	.1559
INCAFS1	.1474	.1170	.0871	.0249	.0632	.0433
TNCAFS1	.1143	.2545	.1207	-.1262	-.0029	.1604
MSENS2	.2987*	.2628	.1459	.0103	.1580	.1453
MRES2	.2919*	-.1106	.1143	.3194*	.1820	-.2299
MSOCEMO2	.1320	.2922*	-.0640	-.1337	.1952	.3788**
MCOG2	.2004	.3223*	.0403	-.0983	.1621	.3112*
MNCAFS2	.3025*	.3115*	.0900	-.0183	.2163	.2518
ICLAR2	.0593	.2201	-.0244	-.1500	.0834	.2625
IRES2	.0006	.1051	-.0119	-.0896	.0122	.1255
INCAFS2	.0453	.1825	.0132	-.1259	.0327	.1855
TNCAFS2	.2349	.2976*	.0662	-.0648	.1716	.2595

*P <.05

**P <.01

***P <.001

growth fostering behaviors, and the combined maternal scores were all significantly correlated at Time I and Time II (Table 16). In other words, the infant's behaviors exhibited during the two feeding interactions were not related, but the behaviors exhibited by the mother seemed to be more consistent.

TABLE 16

Correlation of Time I and Time II NCAFS Scores

	MSENS1	MRES1	MSOCEMO1	MCOG1	MNCAFS1	ICLAR1	IRES1	INCAFS1	TNCAFS1
MSENS1	1.000								
MRES1	.0431	1.000							
MSOCEMO1	.5787***	-.0124	1.000						
MCOG1	.4603***	-.2681	.4537**	1.000					
MNCAFS1	.8639***	.1253	.8059***	.7072***	1.000				
ICLAR1	.4443***	-.1527	.3827**	.4755***	.5083***	1.000			
IRES1	.4132**	-.0147	.2768*	.2796*	.3941**	.6314***	1.000		
INCAFS1	.4908***	-.1266	.3670*	.4649***	.5223***	.9511***	.7958***	1.000	
TNCAFS1	.7878***	.0099	.6951***	.6834***	.8840***	.8049***	.6787***	.8488***	1.000
MSENS2	.5339***	.3189*	.3383*	.2694	.5316***	.0946	.1101	.1236	.3841**
MRES2	.0807	.3474**	.1282	-.0598	.1336	.1260	.1696	.1369	.1616
MSOCEMO2	.3855***	.0991	.4749***	.2399	.4473***	.1338	.2177	.1613	.3557**
MCOG2	.4243***	-.0438	.5089***	.5877***	.5912***	.3459**	.1802	.3380**	.5273***
MNCAFS2	.5017***	.2083	.4873***	.3848**	.5889***	.2331	.2177	.2530	.4874***
ICLAR2	.3905**	-.1823	.2401	.3525**	.3573**	.1457	.0029	.1405	.2798*
IRES2	.2343	.0049	.2998*	.3234*	.3369**	.0398	-.0584	.0376	.2136
INCAFS2	.4139**	-.0358	.3419**	.4216***	.4643**	.1569	.0182	.1544	.3519**
TNCAFS2	.5349**	.1327	.4908***	.4504***	.6159***	.2293	.1627	.2435	.4949***

*p <.05

**p <.01

***p <.001

TABLE 16 (cont.)

Correlation of Time I and Time II NCAFS Scores

	MSENS2	MRES2	MSOCEMO2	MCOG2	MNCAFS2	ICLAR2	IRES2	INCAFS2	TNCAFS2
MSENS1									
MRES1									
MSOCEMO1									
MCOG1									
MNCAFS1									
ICLAR1									
RES1									
INCAFS1									
TNCAFS1									
MSENS2	1.000								
MRES2	.2946*	1.000							
MSOCEMO2	.6913**	.2986*	1.000						
MCOG2	.5774***	.0487	.6259***	1.000					
MNCAFS2	.8736***	.4280***	.8745***	.7994***	1.000				
ICLAR2	.4243**	-.4194**	.3969**	.4786***	.3856**	1.000			
IRES2	.4321**	-.1724	.4450***	.6173***	.4950***	.6242***	1.000		
INCAFS2	.4999***	-.2688	.4668***	.6405***	.5229***	.8825***	.8829***	1.000	
TNCAFS2	.8319***	.1865	.8191***	.8383***	.9307***	.6509***	.7239***	.7981***	1.000

*p <.05

**p <.01

***p <.001

CHAPTER V

DISCUSSION

The hypothesized relationships were only partially supported by the results of this study. Specifically, the following hypothesized relationships were not supported by the results of the study.

Hypotheses

Not Supported: I. Maternal contact (FCONT and MATCONT) with her infant will be positively related to her sensitivity and responsiveness to her infant's behavior during feeding.

The frequency of contact score for the mother (i.e. number of days visited divided by number of days the infant was hospitalized up to the time of the first feeding and the feeding just before discharge), was not significantly correlated with any of the interaction subscales and combined scale scores for the mother and infant at Time I or II. Although mothers in previous studies reported feelings of separateness from their infants (Johnson, 1979, and Kennell & Klaus, 1976) and intervention strategies have been initiated to increase the frequency of contact for the mother and her hospitalized infant ((Dillard, Auerbach, & Showalter, 1980) , there was no significant correlation between the frequency of visitation (FCONT) and the sensitivity and responsiveness of the mother during the

sensitivity and responsiveness of the mother during the videotaped feeding interactions.

Additionally, there was no significant correlation between the time the mother had spent with her infant or the amount of caregiving the mother had experienced (MATCONT) prior to the feeding interactions and the mother's sensitivity and responsiveness to her infant during the feeding interactions.

The present study measured different dependent variables than those reported by Zeskind and Iacino (1984) and Brown, LaRossa, Alward, Davis, Rutherford, and Bakeman (1980) The above studies also reported "no difference" in interactions scores between mothers and infants who had received additional support in learning more about or providing care to their infants prior to the infant's discharge from the hospital. Thus, one conclusion may be that frequency of contact with the preterm infant alone does not influence maternal interaction with the infant during feeding or after discharge from the hospital. Another possibility is that the maternal contact scale score measures behavior that is unrelated to sensitivity and responsiveness to infant behaviors.

More likely, however, is that the mother engaging in caregiving behaviors without additional guided support from knowledgable professionals may not receive or perceive needed information about their infants in order to respond to their infants in a more sensitive and responsive manner. It is also possible that the maternal behaviors and contacts which the

nurses record each time the mother visited her hospitalized infant were not discriminating enough to determine critical maternal contact behaviors. In other words, recording information about feedings, holdings, bathing, and lengthy visits may not be providing critical data which would be useful in determining which mothers and infants may be at risk for interaction difficulty. This possibility is significant if observations of interactions are to be used to plan interventions for those mothers and infants in this category.

The results of this study data base may indicate that nurses need to provide additional interventions or observe and record more discrete contact data for it to be meaningful in determining which mothers and infants are at risk for interaction problems. The current data observed and recorded for this sample does not provide useful information about those mothers and infants at risk for interaction difficulties.

Not Supported: II. Maternal perceptions of her infant will be positively related to her sensitivity and responsiveness to her infant's behavior during feeding.

The scoring of the NPI, the difference between the "Average Baby" score and "Your Baby" score, was not significantly correlated with any of the maternal infant interaction scale scores or combined scores at Time I or Time II. The findings of this study differ from those reported by Zeskind and Iacino (1984) who found differences in the NPI score of the preterm

mothers who participated in their experimental group conpared to preterm mothers who were in the control group. Experimental group mothers, who visited their infants significantly more often than control group mothers, scored significantly lower on the NPI. Therefore, the more the mother knew about her infant, the more accurately she may have rated her babys' behaviors.

The present investigator found a significant correlation between the mother's scores on the "Your Baby Now" scale and the maternal sensitivity and responsiveness to infant cues, maternal social emotional growth fostering behavior, maternal cognitive growth fostering behavior, and the combined maternal score at Time II.

Additionally, the relationship was significant for the maternal sensitivity and responsiveness to infant cues and combined maternal scale score at Time I. In other words, mothers who rated their infants' behaviors as more difficult now (i.e. the score was higher) were more sensitive and responsive to their infants during feeding both the first time they fed the infant, and prior to discharge from the hospital. These infants may also have been the infants who experienced more difficulty with these behaviors because of their illness. The maternal perception questionnaires were completed by the mothers at the time of the second feeding interaction.

This finding seems to be congruent with that reported by Zeskind and Iacino if one can assume that the more a mother "knows" her infant, the more "accurately" the mother rates her

infant's behaviors. Thus, it may be that the mothers who were more sensitive and responsive to their infants were the mothers whose ratings of infant behaviors were more accurate. It may also be that mothers who are more skilled at reading cues and responding to them are the mothers who report their perceptions with greater accuracy, and that both the behavioral rating and the self reports of perception reflect their ability. This relationship was also true for the mothers rating of the "Average Baby" behaviors and her sensitivity and responsiveness to infant cues and the combined maternal scale score at Time II. Mothers who rated the average baby as having more difficulty with the behaviors scored higher on the measures of sensitivity and responsiveness to her own infant. These mothers may simply be more accurate in their perceptions of infant behaviors and behave accordingly.

Finally, the correlation between the "Average Baby" and "Your Baby Now" scale scores approached significance ($r=.2509$, $p=.0729$). It may be that mothers bring with them past knowledge of average baby behaviors and that they believe their infants are very similar to the average baby. Since this population of infants are ill or preterm, this view of their infants behaviors as related to the average infant behaviors could be a reflection of viewing their infants as being "close to average" instead as very different from the average. If this is accurate, the mothers in this sample did not see their infants as very

different from the expected infant as the literature would suggest (Johnson, 1979).

Not Supported: III. The infant's illness state will be negatively related to the mother's sensitivity and responsiveness to her infant during feeding interactions.

This hypothesis was not supported by the study data. Additionally, the opposite relationship was indicated by the data. The higher the infant's illness score, either cumulative illness score or illness score divided by number of days hospitalized, the more sensitive and responsive the mother was to her infant during feeding interactions.

This finding has not been documented by other investigators. On the contrary, Minde, Whitlaw, Brown, and Fitzhardinge (1983) reported that there were significant differences in the behaviors exhibited by mothers of ill preterm infants compared to mothers of well preterm infants. Mothers of ill infants in their study touched less, smiled less, and looked "En Face" less than did the mothers of the well preterm infants. This would lead one to suspect that maternal behaviors exhibited during feeding interactions with ill preterm infants would be less sensitive and responsive than those exhibited by mothers of well preterm infants. This is epecially true since the differences between the ill preterm and well preterm mothers' behaviors were still observed at a three month home visit. However, these behaviors

were not measured during a social interaction (or feeding episode) and may have been over generalized.

The present study had no "well" infants for comparison. There was a range of "illness" scores for the sample, but this may present a different pattern of results than the comparison of the "well" infant and "ill" infant. This investigator suggests that the finding of a positive correlation between infant illness and responsiveness and sensitivity in maternal interaction may be accounted in two ways. First of all, it may be that the feeding interactions were more meaningful for the mothers of the sicker infants because feeding is an indicator of wellness. Therefore, the mothers of the sicker infants may have been more sensitive to the importance of the feedings and attended to their infants' behaviors more carefully than the mothers of infants who were less ill. Secondly, nurses caring for the sicker infants may have spent more time helping the mothers identify and respond to the behaviors of their infants than nurses working with the less ill infants.

The findings of the relationship between illness and sensitivity and responsiveness of the mother during the feeding interaction were more robust than the relationship between the number of days the infant was hospitalized. Days of hospitalization at Time I was only significantly related to maternal sensitivity and responsiveness to infant cues at Time I (r=..2905, p=.0349). Thus, one may suppose that the mother may have had more opportunity to observe her infant prior to the

first feeding interaction. However, frequency of contact did not correlate with either the summative illness score or the illdays score at Time I. Maternal contact at Time I, or the amount of caregiving the mother engaged in, approached significant negative correlation with the illdays 1 score (r=.-.2648, p=.0553). Thus, the mother of the sicker infants engaged in less caregiving prior to the first feeding. Therefore, actual caregiving and contact did not account for the higher maternal interaction scores the mothers of sicker infants achieved.

The intervention studies of Brown, LaRossa, Alward, Davis, Rutherford, and Bakeman (1980) and White-Taut and Nelson (1984) would support the hypothesis that the more the mother is aware of the specifics of her infant's behavior, the more sensitive and responsive the mother is to infant behavioral cues during feeding interactions. This investigator speculates that the correlation between the illness of the infant and the sensitivity and responsiveness of the mother may be due to either the increased knowledge which the mother has acquired about her infant due to careful observation, or due to the increased knowledge which the mother has acquired about her infant due to careful behavioral descriptions provided by nurses.

Not Supported: IV. The infant's illness state will be negatively related to the infant's behavioral cues emitted during the feeding interaction.

Once again, the study data did not support the hypothesized relationship. Infant illness scores and mean illness scores (illdays) were not correlated with infant clarity of cues, infant response to parent, or the combined infant scale at Time I. The illness divided by the days hospitalized at Time I (illdaysl), however, were positively correlated with the infant clarity of cues at Time II (r=.2947, p=.0322), and with infant responsiveness to parent at Time II (r=.3685, p=. 0066). This finding is in the opposite direction as that predicted. The sicker the infant at Time I, the higher the score on clarity of cues and responsiveness to the mother at the Time II feeding interaction.

This finding differs from that reported by Greene, Fox and Lewis (1983) and Minde, Whitlaw, Brown, Fintzhardinge (1983) who report that ill infants exhibit lower state regulation, lower percent of usual reflexes, and decrease in body movement compared to well preterms. Their data were collected during an observation of the infants' usual activity and did not occur during interactions with a caregiver. Subsequent investigators have generalized these differences to include anticipated differences exhibited by the infants during feeding interactions. This may not have been valid since the finding of this study suggest support for the hypothesis of the interactive nature of the feeding episode. The sicker infants with higher response to their mother and higher clarity of cues scores at Time II had

mothers who were more sensitive and responsive to them during feedings at both Time I and Time II.

Another finding consistently reported in the literature is that preterm infants behave differently than fullterm infants. Contrary to this, there were no significant between group differences found for full term and preterm infants in this study on clarity of cues, responsivness to parent, and combined infant scale scores at Time I or Time II. Again, infant behaviors were assessed during a feeding interaction and existing neurological differences between the groups may not be evident during interactions with the mother. McGehee and Eckerman (1983), and Alfasi, Schwartz, Brake, Fifer, Fleischman, and Hofer (1985) reported differences in behaviors of the preterm and fullterm infant. McGehee and Eckerman (1983) compared preterm infants to full term infants in interactions with an adult investigator as the investigator stroked and talked to the infant. The infant did not have to signal the investigator nor did the investigator modify his behaviors in response to cues from the infant. Therefore, although the behaviors were significanly different, they did not occur within the context of a socially interactive episode. Also, Alfasi et.al. (1985) were only observing "well" infants during feeding episodes. As has already been discussed, the illness of the infant may make a difference in the infant behaviors in response to the sensitivity and responsiveness of the mother.

In summary, neither the illness status of the infant nor the gestational age of the infant were significantly correlated with infant scale scores. Nor when the group was divided into relatively "well" infants compared to "ill" infants were there significant between group differences on the infant behavioral scale scores. This finding again supports the interactive nature of maternal-infant bahaviors during feedings. In fact, infant clarity of cues at Time I was significantly correlated to infant response to parent, and the combined infant score at Time I was correlated with maternal sensitivity to infant cues, maternal social emotional growth fostering behaviors, and maternal cognitive growth fostering behavior (Table 16). At Time II, infant clarity of cues was also significantly correlated to infant response to parent. The combined infant score at Time I was correlated with maternal sensitivity to infant cues, maternal social emotional growth fostering behaviors, and maternal cognitive growth fostering behaviors (Table 16). Thus, the behaviors of both mother and infant during the feeding episode are highly interactive.

Not Supported: V. There will be no differences in maternal sensitivity and responsiveness to her infant between Time I and Time II.

As described in the results section, all Time II mean scale scores were significantly higher than those reported at Time I ($p < .003$). These findings are consistent with those of other

authors who report that interaction scores increase over time as relationships develop (Barnard and Eyres, 1978, and Ruff, 1987). However, the correlation between the Time I and Time II scores indicate that the behaviors measured are robust over time and may be present very early in the interaction pattern (Table 16).

Demographics

Maternal: The fact that there were no significant differences between the interaction scores of primiparous mothers and multiparous mothers was an unexpected finding. However, it may mean that it is the illness of this infant and not the prior experience which the mother may bring to the interaction which is the most powerful influence on her sensitivity and responsiveness to this infant during the feeding interaction. Partner status of the mother also did not correlate with sensitivity and responsiveness in interaction. This may be attributed to the fact that thirty-nine of the fifty-three mothers reported that they were in a stable partnered relationship. Therefore there was very little variance within the sample.

Educational level also did not relate to sensitivity and responsiveness of the mother during feeding interactions. This finding is contrary to the findings of Barnard & Eyres (1979) who reported direct correlational relationships between the mothers educational level and sensitivity and responsiveness during feeding interactions. The difference in findings may be attributed to the categorical nature of the reported educational level in the present study. In other words, mothers reported

either not finishing high school, finishing high school, some technical school or college, or college graduate. These categories may have masked any direct correlational relationship between educational level and sensitivity and responsiveness of the mother during a feeding interaction.

Maternal age, however, was reported in real years and correlated significantly with the combined maternal interaction score at Time II. As with other studies, the greater the maternal age, the more positive the maternal interaction score during feeding (Barnard & Eyres, 1979, Mercer, 1986, and Ruff, 1987).

Maternal income for this sample was also not related to sensitivity and responsiveness of the mother during feeding. Income reported by these mothers may be suspect. As mothers completed the demographic questionnaire, they routinely hesitated and stated that they didn't know their annual income. If partners were present when the mother completed the questionnaire, the mother sought clarification of income from the partner. At other times, the investigator requested that the mother estimate income to the best of her ability. Regardless of this potential recall error, however, forty-five subjects reported incomes of less than $20,000 annually and thus there was little variance in the categorical income reported by the study mothers (Table 1). This predominantly low income sample is representative of the low income population of mothers delivering

infants at University Hospital or mothers whose high risk infants are transferred to University Hospital.

Infants: Infants were between 25 - 42 gestational age at birth with birthweights ranging from 0.710 to 2.34. McGehee and Eckerman (1983),and Alfasi, Schwartz, Brake, Fifer, Fleischman, and Hofer (1985) state that the prematurity of the infant as well as the altered appearance of the infant may affect the parents ability to read cues and respond to the infants needs. This investigator did not find the relationship to be true for prematurity. In fact, there were no significant differences in means on the interaction scales when the preterm group was compared to the fullterm group. However, for this study all fullterm infants were considered in need of additional medical care and were therefore considered to be ill. It may be that the illness of the infant had such a strong influence on mother's interactions that the impact of the prematurity of the infant on the mother's interactions during feeding was negated. Also, other comparison studies were conducted with "well" preterm infants.

Gestational age at the time of feeding I and feeding II also did not correlate significantly with either the maternal scales or the infant scales. The gestational age of the infants at Time I ranged from 31 - 43 weeks with a median age of 35 weeks. Therefore approximately half of the population were still premature and there was enough variance in the numbers to support a correlation if it was present. At Time II, gestational age

ranged from 34 - 44 weeks with a median age of 37 weeks. Again, there was no correlation with interactions scales. Infant behavioral differences between Time I and Time II were apparent in that there was no signficant correlation between the infant scores at Time I and Time II. One of the research assistants made the comment that:

> "at Time I all the babies looked the same. The babies were swaddled and wearing hats. They couldn't move if they wanted to. By the second feeding, the babies did not even look like their Time I selves".

It may be that this caregiving practice of presenting the securely wrapped infants to the mother for feeding inhibits the infants ability to cue the mother and actively participate in the interaction. By Time II, mothers were picking up and preparing their own infants for the feeding. Thus, at Time II differences in infant behaviors secondary to preterm status should have been evident. Again, the present investigator suggests that previous studies have assessed differences in infant behaviors independently of interactions with the mother (McGehee & Eckerman,1983) or only with "well" preterm infants (Alfasi, Schwartz, Brake, Fifer, Fleischman, and Hofer, 1985) and their results must be compared cautiously with those of the present study.

CHAPTER VI

IMPLICATIONS AND CONCLUSIONS

In order to better understand the attachment process between an ill infant and its mother, this study assessed the relationship between the amount of contact a mother had with her ill or preterm infant, the illness of the infant, the mother's perception of her infant on the sensitivity and responsiveness of the mother to the infant during feeding interactions. The illness of the infant was related to maternal sensitivity and responsiveness to the infant during feeding episodes. The "sicker" the infant, the more sensitive and responsive the mother was to the infant during feeding. One can suppose that the mothers were compensating for decreased contribution to the interaction by the sicker or more preterm infant. However, the illness or gestational age of the infant was not related to infant's behavioral scores at either feeding interaction. Therefore, it seems that the illness of the infant provided a powerful influence on the sensitivity and responsiveness of the mother to the infant during feeding interactions regardless of the infant behaviors. The mother may have been compensating for perceived deficits in infant cues by increasing her sensitivity and responsiveness to any cues exhibited by the infant but these deficits in cues were not evident.

Nevertheless, the mother becomes the most active partner in this pre-attachment phase for ill infants. By the time the infants were discharged from the hospital, there were no

significant differences in infant behaviors attributable to their illness state, but the pattern of increased sensitivity and responsiveness on the part of the mother continued. Therefore, contrary to some of the existing concerns about the ill infant being at risk for a decrease in parent responsiveness, ill infants are the recipients of increased sensitivity and responsiveness in interaction.

These findings were unexpected and are not explained by this study data. Additionally, the preterm dyad in this study was no more at risk for interaction difficulty than the fullterm dyad. The prematurity of the infant did not infuence the the mother's sensitivity and responsiveness to the infant during feeding. Mothers of preterm infants related to their infants no differently than the mothers of fullterm infants during feeding interaction, at least up until the time of hospital discharge.

Perhaps instead of generalizing concerns about maternal interaction with sick and preterm infants, the concerns and interventions need to be more specifically focused on those who are considered at high risk because of the social situation or health status of the mother. This study did not address those issues. Mothers in high risk social situations or health status categories self-selected out of the study by refusing to participate (N=5) even though "Informed Consent" was sought prior to the investigator being aware of their "high risk" status. Examples of high risk social situations were those where the mother did not have an established home, or had made no

preparation for caring for the infant at home and had no economic support for infant care supplies and equipment.

Limitations of the Study

The non-random sample and primarily lower income of the sample mothers may limit the generalizability of the results. However, this sample was representative of the population of mothers whose infants are preterm or hospitalized following birth. Another limitation of the study may have been the use of videotaped interactions. It is possible that the behaviors exhibited by the mothers were influenced by the presence of the camera. However, in viewing the videotapes, mothers did not seem to overtly focus on the camera. Regardless, comparison of these results with those of investigators using "live" observations should be undertaken cautiously. The feedings selected for documentation of interaction may have also influenced the maternal interaction scores. Specifically, the first time a mother is allowed to feed her "ill" infant may not provide data which is typical of other feeding interactions. Feedings filmed close to the time of discharge from the hospital may also have provided data which was not typical of usual feeding interactions. Assessment of random feeding interactions between the mother and her hospitalized infant may provided data which would be more typical for the dyad. Therefore, the results should be compared to other investigators results with careful attention to the specific information provided about the "typical" nature of the feeding interaction.

Finally, as discussed in the previous chapter, the maternal interaction data as recorded by the nurses may not have provided discriminating enough data about the interactions of the mothers prior to the feeding interactions. The relationship between maternal contact and sensitivity and responsiveness of the mother to her infant during feeding may have been masked by the limits of the data collection method.

An additional possible a limitation of the study is the use of chart audit data for two of the major independent variables--infant illness and maternal contact. The investigator has confidence that the chart audit data for infant illness is very reliable because of the potential liability of health professionals for their diagnosis, and treatment of hospitalized patients. The health professional is highly likely to observe carefully for signs and symptoms of illness and to carefully record medical interventions. The chart audit data related to maternal contact may be more suspect. Although documentation of maternal contact is expected in these units, and most often occurs, there may have been documentation omissions. This was, however, the only method available to the investigator of obtaining the maternal contact data and is a very specific limitation of a clinical study.

The maternal contact measures (FCONT and MATCONT) reflect observable behaviors reported to influence maternal-infant attachment (Ainsworth, 1979) but not attitudes or feelings of attachment. However, attachment behaviors have been identified

(Kennell and Klaus, 1974) and are hypothesized to be reliable representations of the attachment of the mother to her infant.

The correlational design of this study further limits the applicability of the results. Specifically, variables were simply measured and no attempt was made to manipulate them. Therefore, the data from this study cannot be used to develop a model of cause and effect in increasing knowledge of the attachment process between the mother to her ill or preterm infant. The results of the study do suggest the need for further investigation of variables which may account for the variance in sensitivity and responsiveness of the mother to her hospitalized infant during feeding interactions.

Implications for Future Research

The results of this study raise several questions about variables which were not assessed by this study. First of all, the role of health caregivers in modeling or educating the mothers of ill infants about the infant's behaviors needs to be assessed. Specifically, do caregivers providing care to well preterm infants interact differently with the infants and their mothers than they do with ill preterm infants and their mothers? Are caregivers of relatively well infants so routine in their caretaking and so complacent about the risk to the well infant that they fail to systematically point out specific infant behaviors to the mothers? Or, do caregivers of the ill infants provide more responsive and intense care to the infants and thus

are better able to interpret and model appropriate responses for the infant's mother?

Also, were the results influenced by the choice of specific feeding interactions? If so, assessment of random feeding interactions would provide a better sampling of the interaction behaviors of mothers and infants. Additionally, if there was a significant influence due to filming the feeding interaction, a random feeding interaction should be filmed and compared to a random live feeding interaction. Finally, research needs to investigate the specific maternal variables which contribute to the sensitivity and responsiveness of the mother to her infants cues. Understanding the maternal variables would help determine those mothers and infants at risk for interaction difficulty.

Finally,the longitudinal significance of these very early interactions should also be assessed for the preterm and ill mother-infant dyads. In other words, the stability of the interaction pattern over time, and the importance of the interaction pattern to the attachment of the "ill" or preterm infant was not addressed by this study. Also, this study did not provide results which would explain what differences, if any, there are between preterm and ill mother-infant dyads sensitivity and responsiveness, and the sensitivity and responsiveness of fullterm mother-infant dyads.

Practical Applications

Although the results of this study are exploratory, they should not be ignored by professionals working with hospitalized

ill and preterm infants and their mothers. First of all, it appears that frequency of visitation alone does not correlate with sensitivity and responsiviness of the mother to her infant's behavioral cues. Thus, mothers should not be pressured to visit their infants more often than the mother's personal schedule and finances can support. Visitation and interaction should continue to be encouraged, but nurses need to actively assist mothers identify behavioral cues of their infants and to assist mothers develop sensitive and responsive interaction patterns with their infants.

The second application of the findings of this study are in the area of analyzing the interaction of the mother with her infant more carefully. What behaviors do mothers actually exhibit when visiting their infants, and which of those behaviors are related to the mothers' sensitivity and responsiveness to her infants cues? It is the discrimination of these behaviors which will probably be the key to determining mother-infant dyads at risk for interaction difficulty. Finally, the more careful analysis of interactions between mothers and ill infants may help determine behaviors which are supportive to interaction and which can be modeled or explained to mothers of other ill or preterm infants.

In conclusion, the results of this study support the robust nature of maternal-infant interaction regardless of the gestational age of the infant and the frequency of contact the mother has with her infant during hospitalization. Also, the

illness of the infant seems to increase the mothers sensitivity and responsiveness to the mother during feeding interaction rather than inhibit it. Therefore, the hospitalization and illness alone, do not place the mother-infant dyad at risk for interaction difficulties.

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APPENDICES

APPENDIX A

Informed Consent For Human Subjects

MATERNAL SENSITIVITY AND RESPONSIVENESS DURING FEEDINGS OF THE HOSPITALIZED NEONATE

Consent to Participate in Research

1. Sylvia McSkimming, RN,MN, is doing a study to learn more about reciprocal interactions between sick or premature babies and their mothers when being fed.

2. Dr. John Reynolds, Director of Neonatal Services, knows about this study and is available to answer questions I might have about it.

3. If I agree for my baby and I to be a part of this study, I understand thatI will be asked to fill out two brief questionnaires, and that I will be videotaped talking to Sylvia and feeding my baby the first time I feed my baby and one time before I take my baby home. Sylvia will also be looking in my baby's chart for information about my baby's medical status.

   The first questionnaire asks me to reveal some personal information such as age, grade completed in school, and income and marital status. The second questionnaire asks me to rate my baby's behaviors compared to the average baby's behaviors. Each questionnaire takes about 10 minutes to complete.

   I will be wearing a microphone during each of the videotaping sessions. Sylvia will interview me for about 15 minutes and will tape the information. She will be asking questions about how things have been going,and how my baby is doing. She will also videotape me feeding my baby.

   That will take as long as my baby takes to eat, but no longer than one hour.

4. I understand that my answers to the questionnaires will be strictly confidential. I also understand that Sylvia McSkimming and/or her research associates will decode the interactions from the videotapes. Sylvia will keep the tapes and may chose to use them in future work and for teaching purposes. Neither my nor my chid's name nor identity will be used for publication or publicity purposes.

5. "The Oregon Health Sciences University, as an agency of the State, is covered by the State Liability Fund. If you suffer any injury from the research project, compensation would be available to you only if you establish that the injury occurred through the fault of the University, its officers or employees. If you have further questions, please call Dr. Michael Baird, M.D., at (503) 225-8014."

6. I understand that there is no direct benefit to me or my baby for participating in this study. In the future, other premature or hospitalized babies and mothers may benefit from the study as nurses better understand the interaction between mothers and babies during feeding.

7. I have talked with Sylvia McSkimming, and she has offered to answer any questions I have. I can telephone Sylvia McSkimming at 225-8185 if I have other questions. She has also offered to make a 1/2 inch VHS copy of the videotape of me feeding my baby, if I provide her with a blank tape.

8. I understand that I may refuse to participate or have my baby participate in this study, and that I may withdraw from this study at any time without affecting my or my baby's relationship with or treatment at the Oregon Health Sciences University.

9. I have read the above, and I agree to have my baby and I participate in this study.

_____ _____

Subject's Signature Date Witness Signature Date

10. I give my permission to allow this video tape to be used in future educational settings.

_____ _____

Subject's Signature Date Witness Signature Date

APPENDIX B

Demographic Questionnaire

ID Number_____

Demographics

1. How old were you on your last birthday?

_____Age

2. Was this baby: (circle one number)

1 Not Planned-Trying To Prevent Pregnancy
2 Not Planned-But Not Trying To Prevent Pregnancy
3 Planned-Had No Trouble Getting Pregnant
4 Planned-Had Been Trying To Have a Child For Awhile

3. When did you first seek prenatal care?
_____weeks pregnant

4. After being told you were pregnant, did you see your doctor or midwife: (circle one number)

1 Less Than 4 Times Before You Started to Labor or Gave Birth
2 5-8 Times Before You Started to Labor or Gave Birth
3 At all scheduled appointments except for missing two
4 At all scheduled appointments

5. Did you suspect any possible trouble with your pregnancy or baby? (Circle one number)

1 Did not suspect any trouble with baby or pregnancy
2 Felt something was wrong with the baby or pregnancy
3 Doctor or Midwife told me there was something wrong with pregnancy or pregnancy

6. This baby was what number pregnancy for you? (include all)
_____number

7. How much infant care experience have you had other than with this baby: (circle one number)

1. A great deal
2. A good bit
3. A moderate amount
4. Very little
5. None

8. How much do you know about premature or sick baby behaviors: (circle one number)

1. A great deal
2. A good bit
3. A moderate amount
4. Very little
5. Nothing

9. How much do you know about the equipment your baby uses: (circle one number)

   1. A great deal
   2. A good bit
   3. A moderate amount
   4. Very little
   5. Nothing

10. Do you currently have a partner? (Circle one number)
   1 Married, living with partner
   2 Unmarried, living with a partner
   3 Married, not living with a partner
   4 Unmarried, not living with a partner

11. What is your highest level of education ? (circle one number)

   1 Less Than High School
   2 High School Graduate
   3 Some College or Technical School
   4 College Graduate
   5 Advanced Degree (M.S., Ph.D., M.D., etc)

12. What is your best estimate of your total household income before taxes last year? (circle one number)

   1 Under $5,ooo
   2 $5.000 to $9,999
   3 $10,000 to $14,999
   4 $15,000 to $19,999
   5 $20,000 to $29,999
   6 $30,000 to $39,999
   7 $40,000 to $59,999
   8 $60,000 or more

THANK YOU VERY MUCH FOR AGREEING TO PARTICIPATE IN THIS STUDY

APPENDIX C

Neonatal Morbidity Scale

NEONATAL MORBIDITY SCALE

ID Number:_____ Birthweight:_____Gestational Age ____

Apgars:_____one minute; _____five minute Sex_____

Admission Date:_____ Birth Date:_____

Date:_____

Day number	1	2	3	4	5	6	7	8	9
Convulsions									
Hydrocephalus									
Intracranial hemorrhage									
Perinatal asphyxia									
Diarrhea									
Necrotizing enterocolitis									
Meningitis									
Sepsis									
Pneumothorax									
Apnea									
Respiratory distress syndrome									
Chronic lung-disease									
Cardiac failure									
Hyperbilirubinemia									
Hypoglycemia									
Acidosis									
Bleeding tendency									
Anemia									
Nil per os									
Tracheostomy									

Observations:

Neonatal Morbidity Scale: 2

Day Number	10	11	12	13	14	15	16	17
Convulsions								
Hydrocephalus								
Intracranial hemorrhage								
Perinatal asphyxia								
Diarrhea								
Necrotizing enterocolitis								
Meningitis								
Sepsis								
Pneumothorax								
Apnea								
Respiratory distress syndrome								
Chronic lung-disease								
Cardiac failure								
Hyperbilirubinemia								
Hypoglycemia								
Acidosis								
Bleeding tendency								
Anemia								
Nil per os								
Tracheostomy								

Observations:

Neonatal Morbidity Scale: 3

Day number	18	19	20	21	22	23	24	25
Convulsions								
Hydrocephalus								
Intracranial hemorrhage								
Perinatal asphyxia								
Diarrhea								
Necrotizing enterocolitis								
Meningitis								
Sepsis								
Pneumothorax								
Apnea								
Respiratory Distress Syndrome								
Chronic lung-disease								
Cardiac failure								
Hyperbilirubinemia								
Hypoglycemia								
Acidosis								
Bleeding tendency								
Anemia								
Nil per os								
Tracheostomy								

Observations:

CRITERIA FOR SCORING ON NEONATAL MORBIDITY SCALE

Convulsions

3 Frequent motor convulsions (>6 per day)
2 1-5 convulsions per day
1 Anticonvulsive therapy but no seizures

Hydrocephalus

3 Surgery--shunt inserted, head size rises >0.5cm day
2 Rapid increase in head size, >2cm per week or <0.5cm/day
1 Hydrocephalus without increase in head circumference and good shunt function

Intracranial hemorrhage

3 Massive 1C hemorrhage and major symptoms such as convulsions,
apnea confirmed on LP or CAT scan or ultrasound
2 Moderate ICH with signs such as irritability and head retraction or ICH with residual signs. Signs may also be: decrease in hemoglobin, deterioration in baby's condition or blood in CSF
1 ICH confirmed on CAT scan or ultrasound, with some deterioraion in condition (If ICH is confirmed on CAT scan but patient exhibits no signs or symptoms, do not rate--not a problem)

Perinatal asphyxia

3 Cardiac arrest or prolonged attempts at resuscitation at birth or during transfer, severe neurological signs, apnea or frequent convulsions, Apgar <5 at 5 minutes of age
2 Neurological abnormalities; e.g. extensor hypertonus, transient myocardiac ischemia or moderate acute renal tubular necrosis
1 Mild irritability or hypotonia intubated at birth, but Apgar > 5 at 5 minutes

Diarrhea

3 Severe dehydration from diarrhea; loss of 10 percent bodyweight requiring rehydration
2 Moderate dehydration requiring IV fluids
1 Diarrhea noted and treated by dietary restriction only

Necrotizing enterocolitis

3 Perforation or surgery or very poor condition
2 Active necrosis with marked distention; X-ray changes confirming necrosis; concern about perforation; or ostomy

with problems in functioning

1 Necrotizing diagnosis on initial X-ray; or blood in stools and patient put on total parenteral regimen; colostomy or ileostomy without problems

Meningitis

3 Very poor condition; shock or convulsions

2 Proven meningitis by positive blood cultures; condition stable or ventricular reservoir in place

1 Meningitis well controlled by antibiotics and sterile CSF

Sepsis

3 Very poor condition, shock, disseminate intravascular coagulation; clinical signs septicemia, e.g. exchange transfusion required

2 Sepsis confirmed by positive blood culture elevated WBC and condition fair. Score 2 for 48 hours after infection confirmed or infant condition not substantially improved (look at 0; requirements and activity to see if better)

1 Mild infection (cultures must be positive or serious infection well controlled with antibiotics (no score for antibiotics given for suspected infection only)

WBC normal values

at birth	20,000 to 40,000
2 days	10,000 to 40,000
2 weeks	5,000 to 25,000
3 months	5,000 to 15,000

Pneumothorax

3 Bilateral pneumothorax; or central cyanosis before drain

2 Pneumothorax--drain inserted

1 Drain inserted and function satisfactory

Apnea

3 Requiring ventilation

2 Requiring CPAP or bagging 3 times a day

1 Requiring extra O_2 or aminophylline

Respiratory distress syndrome

3 Requiring ventilation

2 Requiring CPAP

1 Extra O_2 requirements

Cronic lung-disease

3 Confirmed on X-ray, requiring ventilation

2 Nasal catheter 0; and negative pressure box

1 Extra O_2 including O_2 catheter (low flow O_2)

Cardiac failure

3 Intractable CCF despite vigorous treatment
2 CCF with symptoms requiring Lasix and responding to Indomethacin
1 CCF requiring digoxin (and diuretics) but condition stable do not rate PDA with no failure)

Hyperbilirubinemia

2 Exchange transfusion
1 Jaundice requiring phototherapy (do not rate jaundice not treated with phototherapy)

Hypoglycemia

3 Producing apnea or convulsions
2 Requiring persistent high glucose intravenous infusion of over 10 per cent dextrose solution
1 Transient and easily corrected. <20mg/day

Acidosis

3 pH>7.0
2 pH between >7.01 and 7.09
1 pH between 7.1 and 7.19

Bleeding tendency

3 Fulminating disseminated intravascular coagulation or plumonary hemorrhage
2 Bleeding requiring transfusion
1 Abnormal laboratory tests for coagulation; ie. Pt >15 seconds, PTT >70 seconds, platelets <100,000

Anemia

3 Life-threatening anemia requiring transfusion correction
1 Anemia requiring top-up transfusion

Nil per os

1 If baby NPO more than 12 hours a day

Tracheostomy

3 Surgery
2 Problems with tracheostomy
1 Satisfactory tracheostomy

APPENDIX D

Nurses Progress Record

The Oregon Health Sciences University
Hospital and Clinics

DATE

ACCOUNT (#)
MED. REC. (#)
NAME
BIRTHDATE

NURSING PROGRESS RECORD

Date Time	Problem Number	FORMAT: PROBLEM NUMBER and TITLE: S=Subjective O-Objective A=Analysis P=Plans

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APPENDIX E

Neonatal Perception Inventory (NPI)

ID Number:_____

Neonatal Perception Inventory II

AVERAGE BABY

Although this is your first baby, you probably have some ideas of what most little babies are like. Please check the blank you think best describes the AVERAGE baby.

How much crying do you think the average baby does?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much trouble do you think the average baby has in feeding?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much spitting up or vomiting do you think the average baby does?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much difficulty do you think the average baby has in sleeping?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much difficulty does the average baby have with bowel movements?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much trouble do you think the average baby has in settling down to a predictable pattern of eating and sleeping?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

ID Number:_____

Neonatal Perception Inventory II

YOUR BABY NOW

You have had a chance to get to know your baby while your baby has been in the hospital. Please check the blank you think best describes your baby.

How much crying has your baby done?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much trouble has your baby had feeding?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much spitting up or vomiting has your baby done?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much difficulty has your baby had sleeping?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much difficulty has your baby had with bowel movements?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

How much trouble has your baby had settling down to a predictable pattern of eating and sleeping?

_____ _____ _____ _____ _____
a great deal a good bit moderate amount very little none

ID Number:_____

Neonatal Perception Inventory II

EXPECTATIONS ABOUT YOUR BABY IN THE FUTURE

Most mothers have expectations about their babys' behaviors. Please check the blank which best describes your expectations about your baby's behavior.

How much crying do you expect your baby to do?

_____ _____ _____ _____ ____
a great deal a good bit moderate amount very little none

How much trouble do you expect your baby to have feeding?

_____ _____ _____ _____ ____
a great deal a good bit moderate amount very little none

How much spitting up or vomiting do you expect your baby to do?

_____ _____ _____ _____ ____
a great deal a good bit moderate amount very little none

How much difficulty do you expect your baby to have sleeping?

_____ _____ _____ _____ ____
a great deal a good bit moderate amount very little none

How much difficulty do you expect your baby to have with bowel movements?

_____ _____ _____ _____ ____
a great deal a good bit moderate amount very little none

How much trouble do you expect your baby to have settling down to a predictable pattern of eating and sleeping?

_____ _____ _____ _____ ____
a great deal a good bit moderate amount very little none

APPENDIX F

Nursing Child Assessment Feeding Scale (NCAFS)

USUAL FEEDING TIME (CIRCLE)
YES NO

PERSON OBSERVED IN INTERACTION (CIRCLE)
MOTHER FATHER OTHER

MAJOR CAREGIVER (CIRCLE)
YES NO

TYPE OF FEEDING (CIRCLE)
BREAST BOTTLE SOLID

LENGTH OF FEEDING (CIRCLE)
10 OR LESS 10-20 20-30 30 OR MORE

SETTING (CIRCLE)
HOME CLINIC OTHER

UNIVERSITY OF WASHINGTON
SCHOOL OF NURSING
NURSING CHILD ASSESSMENT TRAINING

FEEDING SCALE
(BIRTH TO ONE YEAR)

RECORDER'S NAME _____

DATE _____

CHILD'S FIRST NAME _____

CHILD'S AGE (IN MONTHS) _____

CHILD'S SEX _____

CHILD'S RACE _____

PARITY _____

MOTHER'S EDUCATION (CIRCLE)
0 YRS OR LESS 7-8-9-10-11-12-13-14-15-16-17-18-19-20 +

MARITAL STATUS (CIRCLE)
MARRIED NOT MARRIED

MOTHER'S AGE (AT BIRTH OF CHILD) _____

	YES	NO
I. SENSITIVITY TO CUES		
1. PARENT POSITIONS CHILD SO THAT CHILD IS SAFE BUT CAN MOVE HIS ARMS		
2. PARENT POSITIONS CHILD SO THAT THE CHILD'S HEAD IS HIGHER THAN HIPS.		
3. PARENT POSITIONS CHILD SO THAT TRUNK-TO-TRUNK CONTACT IS MAINTAINED DURING MORE THAN HALF OF THE BREAST OR BOTTLE FEEDING (50%).		
4. PARENT POSITIONS CHILD SO THAT EYE-TO-EYE CONTACT IS POSSIBLE		
5. PARENT'S FACE IS AT LEAST 7-8 INCHES OR MORE FROM THE CHILD'S FACE DURING FEEDING EXCEPT WHEN KISSING, CARESSING, HUGGING OR BURPING THE CHILD		
6. PARENT SMILES, VERBALIZES, OR MAKES EYE CONTACT WITH CHILD WHEN CHILD IS IN OPEN-FACE-GAZE POSITION		
7. PARENT COMMENTS VERBALLY ON CHILD'S HUNGER CUES PRIOR TO FEEDING		
8. PARENT COMMENTS VERBALLY ON CHILD'S SATIATION CUES BEFORE TERMINATING FEEDING		
9. PARENT VARIES THE INTENSITY OF VERBAL STIMULATION DURING FEEDING		
10. PARENT VARIES INTENSITY OF ROCKING OR MOVING THE CHILD DURING THE FEEDING		
11. PARENT VARIES THE INTENSITY OF TOUCH DURING THE FEEDING		
12. PARENT ALLOWS PAUSES IN FEEDING WHEN THE CHILD INDICATES BY CRY FACE, HALT HAND, BACK ARCHING, PULLING AWAY, PUSHING FOOD AWAY, TRAY POUNDING, TURNING HEAD, SHAKING HEAD NO OR SAYING "NO" OR FALLING ASLEEP OR WHEN CHILD IS IN PAUSE PHASE OF THE BURST-PAUSE SEQUENCE OF SUCKING (75% OF THE TIME).		
13. PARENT SLOWS PACE OF FEEDING OR PAUSES WHEN CHILD AVERTS GAZE, PLACES HAND-TO-EAR, HAND-TO-MOUTH, HAND-BEHIND-HEAD, HAND-BACK-OF-NECK, HANDS OVER STOMACH, YAWNS, RUBS EYE OR DISPLAYS FEET MOVEMENT (75% OF THE TIME).		
14. PARENT TERMINATES THE FEEDING WHEN THE CHILD TURNS HEAD, FALLS ASLEEP, COMPRESSES LIPS, PUSHES FOOD AWAY, SHAKES HEAD NO OR SAYS NO ONCE OR MORE OR AFTER OTHER METHODS (REPOSITIONING, BURPING, OR WAITING) HAVE PROVED UNSUCCESSFUL		
*15. PARENT DOES NOT INTERRUPT CHILD'S SUCKING OR CHEWING BY REMOVING THE NIPPLE, JIGGLING THE NIPPLE, OR OFFERING THE CHILD MORE OR OTHER KINDS OF FOOD WHILE CHILD IS EATING		
*16. PARENT DOES NOT OFFER FOOD WHEN THE CHILD LOOKS AWAY, LOOKS DOWN, TURNS AWAY OR TURNS AROUND		
SUBSCALE TOTAL (NO. OF YES ANSWERS)		
II. RESPONSE TO DISTRESS (INDICATE IN BOX WHETHER OCCURRED OR NOT. IF NO DISTRESS, MARK EACH BOX "YES".) IF CHILD SHOWS DISTRESS DURING THE FEEDING DOES THE PARENT		
17. STOP OR START FEEDING IN RESPONSE TO THE CHILD'S DISTRESS.		
18. CHANGE THE CHILD'S POSITION IN RESPONSE TO CHILD'S DISTRESS		
19. MAKE POSITIVE OR SYMPATHETIC VERBALIZATION IN RESPONSE TO CHILD'S DISTRESS		
20. CHANGES VOICE VOLUME TO SOFTER OR HIGHER PITCH IN RESPONSE TO CHILD'S DISTRESS		
21. MAKES SOOTHING NON-VERBAL EFFORTS IN RESPONSE TO CHILD'S DISTRESS.		
22. DIVERTS CHILD'S ATTENTION BY PLAYING GAMES, INTRODUCING A TOY, OR MAKING FACES IN RESPONSE TO CHILD'S DISTRESS		
23. PARENT DOES NOT MAKE NEGATIVE VERBAL RESPONSE IN RESPONSE TO CHILD'S DISTRESS.		
24. PARENT DOES NOT MAKE NEGATIVE COMMENTS TO HOME VISITOR ABOUT CHILD IN RESPONSE TO CHILD'S DISTRESS.		
25. PARENT DOES NOT YELL AT THE CHILD IN RESPONSE TO HIS DISTRESS		
26. PARENT DOES NOT USE ABRUPT MOVEMENTS OR ROUGH HANDLING IN RESPONSE TO CHILD'S DISTRESS.		
27. PARENT DOES NOT SLAP, HIT, OR SPANK CHILD IN RESPONSE TO DISTRESS.		
SUBSCALE TOTAL (NO. OF YES ANSWERS)		
III. SOCIAL-EMOTIONAL GROWTH FOSTERING		
28. PARENT PAYS MORE ATTENTION TO CHILD DURING FEEDING THAN TO OTHER PEOPLE OR THINGS IN ENVIRONMENT.		
29. PARENT IS IN EN FACE POSITION FOR MORE THAN HALF OF THE FEEDING (50%)		
30. PARENT SUCCEEDS IN MAKING EYE CONTACT WITH CHILD ONCE DURING FEEDING		
31. PARENT'S FACIAL EXPRESSION CHANGES AT LEAST TWICE DURING FEEDING		
32. PARENT ENGAGES IN SOCIAL FORMS OF INTERACTION (PLAYS GAMES WITH CHILD) AT LEAST ONCE DURING THE FEEDING		
33. PARENT USES POSITIVE STATEMENTS IN TALKING TO CHILD DURING THE FEEDING		
34. PARENT PRAISES CHILD OR SOME QUALITY OF THE CHILD'S BEHAVIOR DURING THE FEEDING		
35. PARENT HUMS, CROONS, SINGS OR CHANGES THE PITCH OF HIS/HER VOICE DURING THE FEEDING.		
36. PARENT LAUGHS OR SMILES DURING THE FEEDING.		
37. PARENT USES GENTLE FORMS OF TOUCHING DURING THE FEEDING.		
38. PARENT SMILES, VERBALIZES OR TOUCHES CHILD WITHIN 5 SECONDS OF CHILD SMILING OR VOCALIZING AT PARENT		
39. PARENT DOES NOT COMPRESS LIPS, GRIMACE, OR FROWN WHEN MAKING EYE CONTACT WITH CHILD		
40. PARENT DOES NOT SLAP, HIT, SHAKE, OR GRAB CHILD OR CHILD'S EXTREMITIES DURING THE FEEDING		
41. PARENT DOES NOT MAKE NEGATIVE OR UNCOMPLIMENTARY REMARKS TO THE CHILD OR HOME VISITOR ABOUT THE CHILD OR CHILD'S BEHAVIOR		
SUBSCALE TOTAL (NO. OF YES ANSWERS)		
IV. COGNITIVE GROWTH FOSTERING		
42. PARENT PROVIDES CHILD WITH OBJECTS, FINGER FOODS, TOYS, AND/OR UTENSILS		
43. PARENT ENCOURAGES AND/OR ALLOWS THE CHILD TO EXPLORE THE BREAST, BOTTLE, FOOD, CUP, BOWL OR THE PARENT DURING FEEDING.		
44. PARENT TALKS TO THE CHILD USING TWO WORDS AT LEAST THREE TIMES DURING THE FEEDING.		
45. PARENT VERBALLY DESCRIBES SOME ASPECT OF THE FOOD OR FEEDING SITUATION TO CHILD DURING FEEDING		
46. PARENT TALKS TO CHILD ABOUT THINGS OTHER THAN FOOD, EATING, OR THINGS RELATED TO THE FEEDING		
47. PARENT USES STATEMENTS THAT DESCRIBE, ASK QUESTIONS OR EXPLAINS CONSEQUENCES OF BEHAVIOR MORE THAN COMMANDS IN TALKING TO THE CHILD		
48. PARENT VERBALIZES TO CHILD WITHIN FIVE SECONDS AFTER CHILD HAS VOCALIZED		
49. PARENT VERBALIZES TO CHILD WITHIN FIVE SECONDS AFTER CHILD'S MOVEMENT OF ARMS, LEGS, HANDS, HEAD, TRUNK.		
50. PARENT DOES NOT TALK BABY TALK.		
SUBSCALE TOTAL (NO. OF YES ANSWERS)		

*NEED ONLY OCCUR ONCE TO SCORE "NO"

	YES	NO
V CLARITY OF CUES		
51. CHILD SIGNALS READINESS TO EAT		
52. CHILD DISPLAYS A BUILD-UP OF TENSION AT THE BEGINNING OF FEEDING		
53. CHILD DEMONSTRATES A DECREASE IN TENSION WITHIN A FEW MINUTES AFTER FEEDING HAS BEGUN.		
54. CHILD HAS PERIODS OF ALERTNESS DURING THE FEEDING.		
55. CHILD DISPLAYS AT LEAST TWO DIFFERENT EMOTIONS DURING THE FEEDING.		
56. CHILD HAS PERIODS OF ACTIVITY AND INACTIVITY DURING THE FEEDING.		
57. CHILD'S MOVEMENTS ARE SMOOTH AND COORDINATED DURING THE FEEDING.		
58. CHILD'S ARM AND LEG MOVEMENTS ARE GENERALLY DIRECTED TOWARD PARENT DURING FEEDING (NOT DIFFUSE).		
59. CHILD MAKES CONTACT WITH PARENT'S FACE OR EYES AT LEAST ONCE DURING FEEDING.		
60. CHILD VOCALIZES DURING FEEDING.		
61. CHILD SMILES OR LAUGHS DURING FEEDING.		
62. CHILD AVERTS GAZE, LOOKS DOWN OR TURNS AWAY DURING FEEDING		
63. CHILD ACTIVELY RESISTS FOOD OFFERED		
64. CHILD DEMONSTRATES SATISFACTION AT END OF FEEDING THROUGH SLEEP, FACIAL EXPRESSIONS, DECREASED MUSCLE TONE, ARMS EXTENDED ALONG SIDE, VOCALIZATIONS OR CHANGE IN ACTIVITY LEVEL OR MOOD		
65. CHILD DOES NOT HAVE MORE THAN TWO RAPID STATE CHANGES DURING FEEDING.		
SUBSCALE TOTAL (NO. OF YES ANSWERS)		
VI RESPONSIVENESS TO PARENT		
66. CHILD RESPONDS TO FEEDING ATTEMPTS BY PARENT DURING FEEDING.		
67. CHILD RESPONDS TO GAMES, SOCIAL PLAY OR SOCIAL CUES OF PARENT DURING FEEDING.		
68. CHILD LOOKS IN THE DIRECTION OF THE PARENT'S FACE AFTER PARENT HAS ATTEMPTED TO ALERT THE CHILD VERBALLY OR NON-VERBALLY DURING FEEDING.		
69. CHILD VOCALIZES TO PARENT DURING FEEDING		
70. CHILD VOCALIZES OR SMILES WITHIN 5 SECONDS OF PARENT'S VOCALIZATION		
71. CHILD SMILES AT PARENT DURING FEEDING		
72. CHILD EXPLORES PARENT OR REACHES OUT TO TOUCH PARENT DURING FEEDING		
73. CHILD SHOWS A CHANGE IN LEVEL OF MOTOR ACTIVITY WITHIN 5 SECONDS OF BEING HANDLED OR REPOSITIONED BY PARENT		
74. CHILD SHOWS POTENT DISENGAGEMENT CUES DURING LAST HALF OF FEEDING.		
75. CHILD SHOWS POTENT DISENGAGEMENT CUES WITHIN 5 SECONDS AFTER PARENT MOVES CLOSER THAN 7 TO 8 INCHES FROM CHILD'S FACE		
76. CHILD DOES NOT TURN AWAY OR AVERT GAZE FROM PARENT DURING FIRST HALF OF FEEDING		
SUBSCALE TOTAL (NO. OF YES ANSWERS)		

ENTER TOTALS FOR EACH CATEGORY	
SENSITIVITY TO CUES	
RESPONSE TO DISTRESS	
SOCIAL-EMOTIONAL GROWTH FOSTERING	
COGNITIVE GROWTH FOSTERING	
CLARITY OF CUES	
RESPONSIVENESS TO PARENT	
TOTAL (NO. OF YES ANSWERS)	

HOME VISIT QUESTIONS:

1. WOULD YOU SAY THIS WAS A TYPICAL FEEDING?
   A. YES B. NO
   IF NO, WHY NOT?

2. WERE YOU UNCOMFORTABLE DURING ANY PART OF THE FEEDING DUE TO MY PRESENCE?
   A. YES B. NO
   IF YES, WHY?

3. DO YOU HAVE ANY CONCERNS ABOUT THE FEEDING OR YOUR CHILD'S EATING?
   A. YES NO
   IF YES, SPECIFY

4. OBSERVER'S COMMENTS:

NURSING CHILD ASSESSMENT SATELLITE TRAINING
UNIVERSITY OF WASHINGTON
SCHOOL OF NURSING, WJ-10
SEATTLE, WASHINGTON 98195
USA
(206) 543-8528