

THE UNIVERSITY OF CALGARY

THE EFFECTS OF SHORT-TERM INTERACTION COACHING  
WITH MOTHERS OF PRETERM INFANTS

BY

DEBORAH PARKER-LOEWEN

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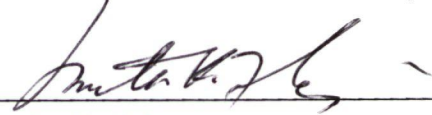
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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Effects of Short-Term Interaction Coaching With Mothers of Preterm Infants," submitted by Deborah Parker-Loewen in partial fulfillment of the requirements for the degree of Doctor of Philosophy.



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## ABSTRACT

This study examined the effects of eight 40-minute interaction coaching sessions on the mother-infant interaction patterns of mother-preterm infant dyads. Thirty-five preterm infants (<37 weeks gestation and weighing 1,000 to 2,000 grams) and their mothers were matched for sex and then randomly assigned to one of two groups, a treatment group (received coaching) and a no-treatment control group (received toys for the infant).

Naturalistic home observations and ratings of maternal and infant interactive behavior were obtained precoaching (TIME 1), postcoaching (TIME 2), and at a 2-month follow-up (TIME 3). Interactive behaviors were coded and behavior counts obtained by means of an electronic event recorder. The Interaction Rating Scale (IRS) (Field, 1980) summary scores were used to provide ratings of maternal sensitivity and responsiveness, and of infant orientation and "signalling" to mother.

During coaching sessions, in a "living room" equipped laboratory, the mother was asked to interact with her infant "as she would at home" while the trainer offered facilitative suggestions via an ear-piece microphone from the opposite side of a one-way mirror.

It was hypothesized that short-term interaction coaching would positively influence mother-infant interaction, mothers' satisfaction with parenting, and mothers' knowledge of infant development.

ANCOVAs, using Days Infant Hospitalized After Birth as the covariate, were carried out for each of the criterion variables to

determine if there were differences between the groups at TIME 2 and TIME 3 due to coaching. For nonfeeding interactions, there were no significant differences found between the groups on the summary IRS ratings of infant or maternal behavior, nor on the duration of infant positive signalling to mother (obtained using behavioral counts). Interestingly, IRS ratings of maternal sensitivity increased significantly over time, regardless of group. Mothers' responsivity to the infants' positive signalling (measured by behavior counts) increased significantly in the control group dyads between TIME 1 and TIME 2 and then decreased between TIME 2 and TIME 3, whereas the treatment group showed a consistent decrease on this variable. This significant effect was contrary to expectations.

For the feeding interactions, no significant differences were found between the groups on summary IRS infant or maternal ratings of behavior, nor on the coded behavior counts. There was a marginally significant decrease in IRS infant ratings over time, regardless of group.

There was no group difference found in the scale measuring mothers' satisfaction with parenting.

The hypothesis that mothers involved in the coaching sessions would increase their knowledge of infant development was confirmed. Coaching had a beneficial effect in this regard.

Results are discussed in terms of possible longitudinal outcomes and implications for future research.

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To the mothers and babies who participated in this study, I extend my heartfelt thanks and best wishes in the years ahead.

*In loving memory of my mother,*

*Clare Ellen Parker*



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## CHAPTER I

### INTRODUCTION

#### Background

There is research evidence to suggest that preterm infants and their caretakers have increased risk for interaction difficulties (Bakeman & Brown, 1980; Field, 1978; Goldberg, 1978; Parmalee, Beckwith, Cohen, & Sigman, 1982). These interactional difficulties appear to be influenced, both positively and negatively, by elements which Sameroff and Chandler (1975) have described as a "continuum of caretaking casualty." These "caretaking" difficulties may affect the later development of a preterm infant. Preterm infants, compared with full-term infants, tend to be relatively unresponsive, and they demonstrate this by behaviors such as gaze aversion, fussiness, and "difficult to read" signalling (Crnic, Ragozin, Greenberg, Robinson, & Basham, 1983; Field, 1979; Goldberg, 1978). Difficult to read signalling has been explained by Goldberg (1977) as including poor readability, predictability and/or responsiveness on the part of the infant. Further, parents of preterm infants have been frequently characterized as more active and investing more effort with less success than parents of full-term infants (Bakeman & Brown, 1980; Beckwith & Cohen, 1978; Crnic, Ragozin, et al., 1983; Divitto & Goldberg, 1979; Field, 1979; Parmalee et al., 1982). Attempts to account for interaction difficulties between mothers and their preterm infants have focussed on these



characteristics. As Beckwith (1984) suggested, preterm infants may be less adequate social partners, indicating a need for the parents to be very sensitive to the infant's efforts at initiating, maintaining and promoting caregiving.

In consideration of this need for increased parental sensitivity, intervention programs have been offered to parents. Bromwich (1981) stressed that the role of intervention is to help make mother-infant behavior more reciprocal and the interaction more pleasurable. Rosenberg and Robinson (1985) used training focussed on interaction strategies to enhance mother's skills and increase child interest. Barrera, Rosenbaum, and Cunningham (1986) found that a home intervention program aimed at enhancing parent-infant interaction was more effective than a curriculum-based model. "Interaction coaching," which is the method of training used in the present study, has been used by Field (1979) with preterm dyads. Field's studies do not indicate the extent that interaction coaching may carry over to the day-to-day home interactions between the mother and infant.

Kogan and Gordon (1975) described an approach for teaching parents to alter their interactions with their children. Using an ear-piece microphone from behind a one-way glass, a trainer provided guidance to the mothers as they interacted with their infants. Although this approach involved older children (ages 2 to 10 years), Kogan's (1975, 1980) results, that interactions were positively altered as a result of 6 or 8 weeks of training, are of interest to this study.

The intervention studies described above have not examined the effects of short-term (6-8 weeks/40 minute sessions) interaction coaching with mother-preterm dyads and, in particular, they have not examined

the effect of this type of intervention on mother-infant interaction in the home.

The present research attempts to integrate Field's studies of interaction coaching in a lab setting with the ear-piece microphone technique described by Kogan to address the issue of the effects of intervention. The issue of carryover of training effects to the home is addressed by utilizing naturalistic home observations.

The position taken here is that intervention can help promote more harmonious interactions between mothers and their preterm infants. If, as Beckwith and Cohen (1980) proposed, increased early reciprocal interactions influence later competence, a training program may serve to enhance this result.

The next chapter presents a selected review of related literature, followed by chapters detailing the procedures, the results, and a discussion of the implications of this study.

## CHAPTER II

### REVIEW OF SELECTED LITERATURE

Literature relevant to this study includes an examination of some theoretical and methodological considerations related to mother-infant interaction, and a specific review of studies related to mother-preterm infant interaction. Studies describing intervention strategies and programs with mother-infant dyads are critically examined. The impact of maternal stress, knowledge of infant development and satisfaction with parenting are also discussed. A summary is provided and research hypotheses are presented based on the literature reviewed. As this study deals specifically with mother-infant interaction, research involving fathers or other caretakers is not specifically described.

#### Theoretical and Methodological Considerations

The study of parent-child relations has been an integral component of socialization literature. The nature of the relationship between the parent and the child is considered to have important implications for the child's "integration into his/her social world" (Lytton, 1980; Richards, 1974). This relationship has, therefore, been studied extensively by investigators seeking to understand the processes contributing to optimal parent-child relations. Maccoby and Martin (1983) completed an extensive review of the research on naturalistic parent-child

interaction. This excellent review reflects a current and emerging theory of interaction as a "bidirectional or multidirectional influence among the participants" (p. 3). This is in contrast to an earlier, unidirectional model of parent-child interaction where the parent was viewed as the primary socializing agent whose influence was seen as a major determinant of the child's development. This "parent-effects" approach was criticized by Bell (1968) in his seminal article in which he called for a "reinterpretation of the direction of effects." Bell's article led to an increased focus on the effect of the infant on his or her caregiver (Lewis & Rosenblum, 1974).

Researchers investigating early mother-infant relationships have generally recognized the importance of the ongoing interaction between the mother and infant, and have been interested in how this influences the development of the child. Sameroff and Chandler (1975), after an extensive review of longitudinal studies of high-risk infants, concluded that as neither the infant's constitution nor the environment is constant over time, it is the mutual influence of the child and environment on each other which needs to be examined as factors predicting infant developmental outcome. They proposed a transactional model to describe the interactions between mothers and infants. In this model, the mother-infant relationship is conceptualized as a process with each partner influencing the other on an ongoing basis.

Within an ethological framework (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969; Sroufe & Waters, 1979), the infant is seen as being pre-adapted to participate in social interactions. Competence in infancy has been related to how effectively an infant can elicit attention and care from his or her environment (Ainsworth & Bell, 1975;

Goldberg, 1977). Ethological theorists argue that infant behaviors, or signals, such as sucking, crying, smiling and vocalizing, serve to elicit adult attention and intervention. Appropriate adult attention then helps to maintain infant gaze, smiling and vocalizing and to modulate infant arousal (Goldberg, 1977). Schaffer (1977) described early interaction sequences as beginning with the infant's own spontaneous behavior followed by the mother supporting, repeating, commenting upon and elaborating upon the infant's response.

Reciprocal mother-infant interactions have been characterized within this process-oriented perspective in terms of maternal responsiveness to infant signals (Bell & Ainsworth, 1972; Osofsky & Connors, 1979). Osofsky and Connors (1979) stressed that the "importance of the mother's sensitivity to infant needs and the proper timing of her stimulation or intervention applies across all modalities" (p. 538), visual, auditory and tactile.

Conceptualizing mother-infant interaction as a reciprocal, interactive process raises methodological issues. Historically, information about parent-infant relationships was obtained from interviews with parents (i.e., Sears, Maccoby, & Levin, 1957). With the movement away from a unidirectional, product-oriented model to the transactional, process-oriented model described above, has come an increase in the use of direct observation as a replacement for or as a supplement to the interview (Yarrow & Anderson, 1979). Observational research techniques have become quite sophisticated with advances in technology and a number of investigators have provided detailed critiques of these techniques (Lytton, 1971; Parke, 1979; Yarrow & Anderson, 1979). Naturalistic observations can occur within a continuum of naturalness and, as Thoman,

Becker, and Freese (1978) pointed out, an experimental study can take place within a natural setting, utilizing naturalistic observations.

One issue in observational studies is the unit of measurement to be used. Bakeman and Brown (1980) discussed this issue in relation to mother-preterm infant interaction and suggested that a microanalytic method (sequential recording of minute particular behaviors) may be a less appropriate choice than a molar method or a rating scale. It may be that certain characteristics of the interactions are more effectively measured using general rather than discrete units. The use of a combination of micro and macro (molar) behavioral measurements is generally considered to be most meaningful (Bakeman & Brown, 1980; Crnic, Ragozin, et al., 1983; Lytton, 1973).

Naturalistic observations of mother-infant interactions may have the advantage of offering increased ecological validity, but "subject as informant" approaches provide information not readily obtained through observation. Maccoby and Martin (1983) have advocated the use of multimethod approaches to the study of parent-child interaction. Utilizing several data sources may serve to minimize the weaknesses of each single data source. Thus, use of interviews, questionnaires, observational data (frequency, duration, and sequential), and ratings may, at this time, offer an optimal approach to the study of the complexities of mother-infant interaction.

This discussion of theoretical and methodological considerations has been presented to offer a framework within which the present study was conducted. Consistent with other recent research on mother-infant interaction, this research has assumed a transactional model and has taken advantage of the multimethod approach to data collection.

### Mother-Infant Interaction in Preterm Dyads

Mother-infant interaction in preterm dyads has primarily been studied by comparing preterm and full-term dyads (Goldberg, 1978). The sequelae of prematurity have also been examined in terms of mother-infant interaction patterns.

Early interaction studies of preterm infants and their mothers conducted at Stanford University (Leiderman & Seashore, 1975; Leifer, Leiderman, Barnett, & Williams, 1972) and at Case Western Reserve (Kennell & Klaus, 1976) examined the effects of neonatal separation and early contact on the behaviors of full-term and preterm dyads. Although these studies have been criticized in terms of the sensitive period or "bonding" hypothesis (Goldberg, 1983), differences between mothers of full-term and preterm infants were observed. The Stanford group found that full-term mothers smiled more than preterm mothers at 1, 3, 12, and 15 months post-hospital discharge (Leiderman & Seashore, 1975). The Case Western Reserve (Kennell & Klaus, 1976) group found that preterm mothers spent less time en face and touched their infants less. As these studies did not focus on "interaction" per se, it is difficult to ascertain if the differential reactions of mothers were based on the separation experiences or if this was a response to differences in preterm vs. full-term infant behavior.

Field (1979) observed three groups of 12 infants with their mothers: normal full-term, post-term postmature and high-risk premature. The high-risk premature infants were all diagnosed as suffering from respiratory distress syndrome. Field found that mothers of high-risk premature infants were most active both during infant gaze and infant gaze aversion when compared with mothers of normal and postmature

infants. This is particularly interesting when considering that several investigators have found that "interaction disturbances are frequently characterized by infant gaze aversion and maternal overstimulation" (Field, 1979, p. 763). Field (1979) followed these infants at 4 months and reported that the high-risk infants "were less attentive, more fussy, and more restless than normal infants during face-to-face interactions with their mothers" (p. 350). Reciprocally, Field (1979) found that maternal imitation and silence during infants' pauses were less frequent for the high-risk group. Field speculated about why the high-risk infant is less attentive and his or her mother is more active.

She stated:

It is difficult to know whether the high-risk infant gaze averts more often because his threshold for stimulation is lower and he is easily aroused during the more animated situations, or whether he is less able to process more animate stimulation than the normal infant, or both. This question is confounded by the higher activity levels of the mothers of high-risk infants. (p. 347)

In a further follow-up of a subsample of these infants at age 2 years, Field (1979) reported that the high-risk infants, less attentive at 4 months, had shorter Mean Length of Utterance Scores and smaller working vocabularies at 2 years. The mothers of these high-risk infants, less imitative at 4 months, were found to use more imperatives with their 2-year-olds. Field, in summarizing the results of this longitudinal work, noted that differences between the high-risk and normal infant-mother dyads appear to persist and that "the data from these studies suggest that it may be helpful to show mothers of high-risk infants techniques which facilitate more harmonious interactions" (p. 355).

Brown and Bakeman (1980) also compared groups of full-term and preterm mother-infant dyads. They chose to observe the feeding situation as feeding is a common activity, interactive by nature and preterm



infants are often difficult to feed. All mothers in this study were Black and disadvantaged. The preterm infants weighed between 1,000 and 1,950 grams and had no obvious neurological or physical abnormalities. Mothers and infants were observed 4 times during the first 12 months after hospital discharge, and subsequently followed up to age 3 years (Bakeman & Brown, 1980). In hospital and one month later, preterm infants were found to be more difficult to care for, less satisfying to feed, and less responsive than the full-term infants (Brown & Bakeman, 1980). At three months, differences between preterm and full-term infants had mostly disappeared, based on measurements of frequencies and durations of specific behaviors. When mother-infant interaction was characterized sequentially in terms of a "dialogue" or "conversation," significant differences were found between the full-term and preterm groups in hospital and at 1-month and 3-month observations. Brown and Bakeman (1980) summarized the important differences as follows:

- (a) Mothers of preterms were more active and were more likely to initiate behavior interchanges than mothers of fullterms;
- (b) Although over time all infants became more likely to initiate behavior interchanges so that the mother-infant dialogues became more balanced, this tendency was less for the preterm than for the fullterm dyads;
- (c) Although the rates of *specific behaviors* changed over the first three months and preterm and fullterm mother-infant dyads became more similar in terms of their specific behaviors, the differences in interaction style during this time period remained stable. (pp. 364-5)

Regarding the third difference summarized above, the stability of the interaction differences refers to the dyadic state in contrast to the specific rates for mother and infant behaviors.

At one year, HOME Scale scores were obtained, the Bayley Scales of Infant Development were administered and the quality of the mother-

infant relationship was assessed using Ainsworth's Strange Situation procedure. Using these measures, no differences between preterm and full-term dyads were detected at one year. At age three years (Mean = 38 months), a day camp was organized and children participated in three-week sessions. Children were observed with both peers and adults in this relatively natural setting. The Stanford-Binet was also administered at this time. Although Bakeman and Brown (1980) reported a number of results from their work, of interest to the present research are the results related to mother-infant interaction. Stanford-Binet scores at age 3 years were not predicted by the measures of early mother-infant interaction used, singly or in combination. However, higher ratings of infant responsiveness were found to be associated with higher social competence and greater social participation at 3 years. It is interesting to note that at 3 years preterms did score significantly lower than full-terms on the Stanford-Binet, but this was predicted from birth status, not mother-infant interaction.

In discussing the results of the one-year assessments, Brown and Bakeman (1980) pointed out that as no differences in the quality of the mother-infant relationship nor in the infant developmental status were observed, the mothers of preterms seemed to have adapted appropriately to the characteristics of their infants. Although at the 3-year follow-up, Bakeman and Brown offered some possible methodological criticisms related to the results they obtained, essentially they pointed out that birth status and possibly social class factors predicted cognitive scores for the preterm infants most effectively. Bakeman and Brown suggested that the "infant responsiveness" measure may be more of a "temperament" variable and a measure of "sociability." They recommended

that antecedents of social outcomes as well as of cognitive outcomes be examined when studying the sequelae of prematurity.

Intermittent reports from a longitudinal study conducted with preterm infants cared for in UCLA nurseries between July 1972 and December 1974 have been published by Beckwith and Cohen (Beckwith & Cohen, 1978; Beckwith, Cohen, Kopp, Parmelee, & Marcy, 1976; Cohen & Beckwith, 1979). Beckwith and Cohen (1984) recently published a summary of the results of this study, including assessments completed when these infants were age 5 years. The research question they examined was similar to that studied by Bakeman and Brown (1980), in that they investigated "how differences in the ways families interact with their infants, beginning early in the infant's life and continuing to age 2 years, affect the child's cognitive test performance at age 5 years" (Beckwith & Cohen, 1984, p. 235). The position taken by Beckwith and Cohen was that "biological risk may alter the relationships between parents and infants" (p. 237) and that "the infant's development cannot be predicted independently of subsequent caretaking experiences" (p. 236). Although a full-term sample was not included in this series of studies, Beckwith and Cohen suggested that at-risk infants may be less adequate social partners because of perinatal problems which may alter or diminish their behavioral capacities.

The 126 infants in the original sample of the UCLA study represented a broad range of ethnic and social backgrounds. All infants were less than 37 weeks gestation and weighed less than 2,500 grams at birth, but there was significant variability in the infants' condition. Thirty-eight percent suffered respiratory distress and the range of hospital stay was 2 to 88 days. One hundred of the original sample

(62 English-speaking) were included in the 5-year follow-up.

At ages 1, 8, 21, and 24 months after the infants' expected date of birth, infants were observed with their primary caregiver (95% of cases the mother). Discrete behaviors (i.e., talking, touching, holding, object and social play) and reciprocal social transactions (interactions occurring mutually or in response to infant gaze, smile, vocalization or gesture) were noted. At each observation period variables were selected a priori that represented "responsive caregiving." The results were converted to standard scores in order to obtain a single score per observation for each child. For the English-speaking sample, results were presented for the infant developmental scores, for caregiver variables and for the relationship between these two sets of variables at each of the age periods. In contrast to Bakeman and Brown (1980), Beckwith and Cohen (1984) found that the level of caregiver-infant interaction, measured at 1, 8, 21 and 24 months, was related significantly to test performance at 24 months. Specifically, "infants who engaged in more social interaction with their caregivers performed more competently" (p. 254). This relationship remained significant even with SES partialled out. These significant relationships were *not* found during the first year of life, indicating that the relationships between reciprocal caregiver-infant interaction and test performance were more significant over time. Regarding the assessments at age 5, and using a summary score of caregiver-infant interaction over three home observation times as a measure of contingent interaction, Beckwith and Cohen (1984) reported:

If a caregiver was able to consistently engage in a very interactive and contingent way with the child, the child tended to perform significantly above the average, even within the lower

SES. The power of consistent, contingent interactions was evident in 2-year test performance and was sustained at 5 years. (p. 256)

Beckwith and Cohen pointed out that this result is not necessarily causal as some children of lower SES and/or impoverished caregiving functioned effectively, although variability was lower in the consistently responsive group. Beckwith and Cohen also reported that infants who fussed less and vocalized more performed more competently at ages 2 and 5 (although less consistently at 5). This finding may be similar to Bakeman and Brown's finding that infant responsiveness predicted later competence.

Another group of investigators including Divitto, Goldberg, and Brachfeld (Divitto & Goldberg, 1979; Goldberg, Brachfeld, & Divitto, 1980) have studied the effects of prematurity on early parent-infant interaction. This research was guided by the assumption that "harmonious social interactions will be facilitated by high levels of parent confidence and infant social competence. The general notion is that the normal competent infant facilitates caretaking decisions and provides feedback 'rewards' for parents, while an infant who is behaviorally a less competent social partner is more problematic for the caretaker" (Divitto & Goldberg, 1979, pp. 311-312). Divitto and Goldberg (1979) studied a sample of 40 infants: 10 full-term, 10 healthy prematures, 10 sick prematures, and 10 infants of diabetic mothers in order to compare parent-infant interactions in families with differing early experiences. They also wanted to determine how the development of these interactions might be influenced by neonatal behavior.

Congruent with the findings of other researchers, Divitto and

Goldberg found that the sick preterm infants were less alert and responsive and were more fussy when compared to the full-term infants, and that these parents were more active with less success than the parents of full-terms, particularly at 8 months of age (Goldberg, Brachfeld, & Divitto, 1980). At one year, group differences had decreased significantly, although the preterms remained less attentive and responsive. Goldberg, Brachfeld and Divitto (1980) argued that the qualitative differences observed between the groups studied cannot be explained by a simple developmental lag, as these differences were observed even when, by using corrected age, maturity was held constant. Divitto and Goldberg (1983) repeated this conclusion. They suggested that although changes in infant behavior due to maturation have an influence on parent behavior, the preterm birth itself may also make a contribution to parent behavior.

Crawford (1982) observed 16 preterm and 17 full-term infants and their mothers in their homes at 6, 8, 10, and 14 months chronological age. Crawford found differences between the groups of preterm and full-term dyads to be similar to those observed by other investigators (i.e., prematures more fretful and less talkative and mothers of prematures spent more time caregiving and being affectionate). Crawford reported that by 14 months these differences were no longer statistically significant and suggested that mothers had responded to the changing developmental level of their infants. However, as Crawford noted, the prematures did not vocalize as frequently as the full-term infants at any time.

Crnic, Ragozin, et al. (1983) assessed a sample of 37 mother-preterm and 42 mother-full-term infant pairs at 1, 4, 8, and 12 months

post hospital discharge. Their results also support the conclusions of earlier studies which described interactional differences between these groups of dyads. In contrast to Crawford (1982), Crnic, Ragozin, et al. found that at 12 months these differences persisted, particularly the more active and stimulating behaviors of the mothers of the prematures. Although Brachfeld, Goldberg, and Sloman (1980) indicated qualitative stability in these differences at one year, the Crnic, Ragozin, et al. findings appear to be more substantial. Based on global ratings of affect rather than discrete behaviors, they concluded that "both the mothers and preterm infants are less positive with each other and enjoy their interactive time less than do mothers and full-term infants" (p. 1208).

Barnard, Bee, and Hammond (1984) observed 88 preterms and 166 term infants during teaching interactions with their mothers at 4, 8, and 24 months of age and during feeding at 4 and 8 months. Although setting of observation varied (between home and clinic), these investigators also confirmed the findings of previous researchers in that at 4 months the preterm infants were initially unresponsive and the mothers seemed to respond with higher levels of stimulation. At 8 months the preterm infants' levels of involvement and responsiveness were similar to those of the term infants, but the mothers of the preterms "showed either stable or declining involvement and positive responsiveness. At 24 months, the two groups were more similar, except that the mothers of preterms were significantly less positive during the teaching task and described themselves as less involved with the child than did the mothers of terms" (p. 112). Barnard et al. suggested that these continued differences up to 2 years of age may indicate that the developing

transactions between the parent and child may be subtly altered by changes in the infant's responsiveness.

Recently, Minde, Perrotta, and Marton (1985) reported on a study designed to replicate the findings of interactional differences between mothers of full-term and preterm infants and replicate the presence of behavioral differences between these groups. These investigators criticized the earlier studies for a number of reasons. The definitions of prematurity varied, both singletons and twins, and infants both appropriate and small for gestational age were included and differences in parental stress and neonatal complications were not adequately explained. Further, the characteristics of parents who refused to participate were not described sufficiently. The Minde et al. sample consisted of 20 preterm (birth weight <1,501 grams) and 20 matched full-term infants who were singletons, of appropriate weight for gestational age and had no physical malformations. Parents of prematures were contacted directly in the hospital 72 hours after the birth and no family of the premature infants refused to participate in the study. Mother-infant interaction was observed during a routine feeding at home, 8 weeks after their expected date of birth. At 12 weeks a 10-minute face-to-face play sequence was observed. Parents of full-term infants were interviewed 2 to 3 weeks post discharge at home and a semi-structured psychiatric history was obtained. Parents of prematures were interviewed in the hospital 3 to 4 weeks after the birth of their infant. From the interview data, differences between these groups of dyads did not appear to be significant. Results from the direct observations at 12 weeks indicated that mothers of prematures looked at and talked to their infants more and smiled at them less, suggesting



that these mothers provide more compensatory care with diminished affect. Unresolved by this study is the issue of what factors may be influencing the observed quantitative differences in maternal behavior in these dyads. However, Minde et al. did find differences between these groups when several possible confounding factors were controlled.

One issue not accounted for by Minde et al. (1985) is that raised by Goldberg (Goldberg, 1978; Goldberg & Divitto, 1983; Goldberg, Perrota, Minde, & Corter, 1986) and discussed by Crnic, Ragozin et al. (1983). This is the issue of the adaptability of the apparently more active responses of mothers to their preterm infants. As Goldberg (1978) pointed out, differences in interaction patterns do not necessarily imply one is "better" and the other "worse." She suggested that the increased activity by these mothers may serve an adaptive function. As an example from her own research, Goldberg stated:

parents of preterm infants made repeated efforts to wake their babies and to stimulate sucking when the infant was drowsy. Parents of full-term infants were more likely to allow the baby to fall asleep and terminate the feeding. One could conclude that the parents in the preterm group "failed" to respond to the baby's signal. However, given the importance of early nutritional intake for these babies, we can also conclude that the parent responded quite appropriately to the signal by rousing the baby and making more intensive efforts to stimulate further sucking. (p. 143)

Goldberg et al. (1986) investigated this issue directly by studying the attachment patterns of small premature twins and singletons. Attachment was described in this study as an important socio-emotional task. The primary research question was "whether patterns of early mother-infant interaction in the preterm group was adaptive when evaluated from the perspective of subsequent attachment outcomes" (p. 41). Their findings indicated that most mothers and infants, particularly

in families with the most seriously ill infants, "established a style of interaction that fostered development of a secure attachment in spite of early difficulties" (p. 41). Bakeman and Brown (1980) also found no differences between preterm and full-term infants on attachment measures at age one (described above).

Wasserman, Lennon, Allen, and Shilansky (1985) found attachment in high-risk, physically-handicapped infants to be comparable to that in healthy infants at age one year. However, Wasserman et al. reported that mother's responsivity, availability and positive affect at 9 months contributed significantly to attachment security at one year, irrespective of risk status.

Differences in responsiveness and cognitive competence have been observed up to age 5 years (detailed above), indicating that the differences in interaction patterns for preterm dyads may have implications for the future development of the infants. Crnic, Ragozin, et al. (1983) suggested that the circular pattern of infant unresponsiveness eliciting greater maternal activity may be counterproductive. Field (1978) defined disturbed interactions as those "characterized by infant gaze aversion and fussiness" (p. 134), behaviors typically observed more frequently with preterm infants. She suggested that these disturbed interactions may be a result of failures to modulate rhythms, limited response repertoires, and/or noncontingent responding. Pointing out that there is still uncertainty about the continuity between early and later interaction disturbances, she offered suggestions to facilitate contingent responsivity between mothers and infants.

In summary, the research reviewed above describes observed interaction differences between preterm and full-term mother-infant dyads

by several different groups of investigators over varying time spans. Consistently, preterm infants are described as relatively unresponsive and their mothers as more active and stimulating. These preterm dyads are also described as having less enjoyment when compared to full-term dyads. The long-term implications of these differences are as yet not clear. It may be that these interaction styles are adaptive and that differences observed in the later competence of preterm infants are related more to birth status or it may be that these early social-environmental factors may be stronger indicators of outcome. Interventions aimed at facilitating more harmonious early interactions between mother-infant pairs are discussed in the following section. If dyads involved in these interventions are consistently found to demonstrate more positive outcomes, it would provide further evidence to indicate that persistent interaction differences contributed to differences in developmental outcome.

#### Mother-Infant Interaction and Intervention Studies

Early intervention programs for infants at risk for developmental problems are numerous, and there has been considerable research published regarding this general topic (Bricker, 1982; Marfo & Kysela, 1985). Bromwich (1981) delineated four models for early intervention: an infant curriculum model, a parent therapy model, a parent education model, and a parent-infant interaction model. As the focus of the present research is on the effect of intervention on mother-infant interaction, the following section reviews research using primarily a parent-infant interaction model. As stated by Bromwich (1981), the basic premise of this model is that "mutually satisfying interactions

between parent and infant establish the foundation for optimal development of the infant" (p. 15). Although, as detailed in the previous section, this basic premise has been questioned, there appears to be sufficient research evidence to support this view.

Stern (1974) studied 24 middle-class, white, educated mothers with their first-born, 4-month-old infants, using repeated naturalistic home observations and video recordings. Based on these observations, Stern has made significant statements about the interactive events which contribute to the mother-infant relationship. He acknowledged that having detailed knowledge of normal dyadic patterns is important to the success of preventive and intervention programs aimed at modifying disturbed mother-infant interactions. Stern found that the average mother attempts to maintain her infant in a state of attention and arousal in which the infant is most likely to perform positive social behaviors, such as smiling or cooing. He noted that there appears to be an optimal range for this and that if the level of stimulation is too low, the infant will "lose interest" and seek more stimulation elsewhere. If the stimulation is too high, the infant seeks to avoid it, often with crying or gaze aversion. Stern observed that maternal behaviors appear to be "infant-elicited." These maternal behaviors include: exaggerated vocalizations (in time and degree), exaggerated facial behaviors that form slowly and are held for a long time, and dramatic approaches and withdrawals. Stern speculated that these exaggerated maternal behaviors may be matched to the infant's rate of processing information. Stern commented that the infant's ability to elicit maternal behavior is crucial. He suggested that with deficient or delayed infants, fewer maternal behaviors will be evoked and, when they are, they will be

maintained at greater effort. Stern also described interactions of overstimulating mothers. He stated that these mothers

do not let the infant freely regulate the initiation and termination of attention episodes. When the infant gaze averts, terminating an attention episode, these mothers may immediately and markedly escalate the intensity and variety of their behavior to recapture the infant's attention and, in a sense, return control of the attention episode to their hands. These escalations in the stimulus display are usually counterproductive since most often the infant gives the impression of averting when his arousal level has climbed too high, and he is more likely to return and maintain gaze in the presence of greatly reduced stimulus display. . . . In these situations the mother deprives the infant of the important experience of self-regulation through gaze control . . . (p. 413)

Informally, Stern and his research team offered mothers information to expand their behavioral repertoires and found that this helped them become more sensitive to infant cues. They believed that this approach, in conjunction with video recordings, would be a valuable adjunct to educational and training programs.

Papoušek and Papoušek (1977, 1979) studied the influence of "mothering" on the infant's cognitive development by observing mother-infant pairs in a series of studies. Central to the findings of their research is the concept of the infant's fundamental adaptive response system or the processes involved in the regulation of behavioral states and attention (among others). As this response system matures, Papoušek and Papoušek found that parents adapted their behavior to the development of the infant in order to have effective interaction. Parents were found to use numerous repetitions when interacting with infants, repeating simple behavioral patterns appropriate to the infant's ability.

Papoušek and Papoušek, based on film analyses of mother-infant interactions, reported that "the mother evaluates the infant's

behavioral state, tried to maintain it at the optimal level, and makes decisions, based upon the infant's attention, as to whether to continue, modify, or stop her repetitious stimulation" (p. 195). Infant visual contact, facial expression and vocalization are the most powerful cues used to obtain adult attention. Parents' use of playful repetitions and imitation of infants' facial expressions, vocalizations and movements were found to be important facilitators of the processes of learning and cognition in the infant.

The studies of Stern and the Papoušek<sup>v</sup>s are discussed here as they offer a foundation for the intervention research to be described below. Many of the elements of reciprocal mother-infant interactions included in these intervention programs have been observed repeatedly in "normal" mother-infant dyads.

Bromwich and Parmelee (1979) described an intervention program oriented to enhancing the quality of interaction between parents and their high-risk preterm infants. Infant-parent interaction was considered to be a reciprocal process with the behavior of each partner affecting the other in a transactional manner. An intervention group (N = 30) and a nonintervention group (N = 33) of families with high-risk preterm infants were studied longitudinally to age 2 years. The intervention program used was home based and continued for 14 months. The focus of the intervention was on parental behavior and an active effort was made to enhance and improve the quality of parent-infant interaction. For example, parents were helped to accurately read their baby's behavioral cues and to be responsive to them. At 2 years, there were no significant differences found in cognitive assessments (based on Gesell and Bayley Scores) for the intervention and nonintervention

groups. However, at 2 years, Home Observation scores were significantly different ( $p < .04$ ). "The Home Observation score was derived from subscores including maternal attentiveness, reciprocal positive interactions, and the amount of time the child engaged in 'intellectual' type activities during the home observation" (p. 400). Bromwich and Parmelee discussed these findings as successful in terms of the expected short-term effect on interaction and possible long-term effect on cognitive development. They proposed that intervention programs with a focus on parent-infant interaction will show greater effects over time.

Kogan (1980) summarized the results of her studies designed to teach parents to alter their interactions with their handicapped or developmentally delayed children. In a 6- or 8-week teaching procedure, parents wore a "bug-in-the-ear" during a half-hour play session and the researcher commented on the interaction from behind a one-way vision mirror. Using this approach in both individual and group sessions, Kogan reported that parents became more competent, self-assured and responded more positively towards their children when involved in this intervention. Although these studies did not involve preterm infants, Kogan has demonstrated the value of a short-term teaching approach to interaction intervention.

Packard, Robinson, and Grove (1983) compared the impact of two types of parent training, written self-instruction and coached (via a "bug-in-the-ear" device) practice on the maintenance of attending and relationship building skills in 30 mother-child pairs. Children, average age 39.7 months, were recruited through local nursery schools and day-care centres. At the conclusion of training and at a 2-week post-training evaluation, both methods of teaching mothers were found

to increase mothers' use of description and praise, and decrease commands and questions when compared to a placebo approach. Eleven weeks post training, mothers in the coached condition generally maintained the skills attained earlier. Packard et al. (1983) have also demonstrated the short-term effectiveness of a coaching procedure, although, as with the Kogan studies, preterm infants were not the population of interest.

Crittenden and Snell (1983) investigated the effects of a weekly parent group on maternal interaction, maternal position vis-à-vis her infant, and infant cognitive and communicative development. Thirty-one severely disadvantaged mothers and their infants (aged 1-19 months, mean age 8 months) were included in the study. Video tapes, role-playing, modelling and discussion were used to help mothers learn to use a facing rather than a beside or behind position when interacting with their infants. Over a 4-month period, mothers were shown their own behavior on video tape, were taught how their behavior affected their infant, and were given suggestions to help change their behavior. The contribution of a group versus an individual approach was not discussed by these researchers. Results indicated that mothers' interactions became more contingent on infant behavior and that infant development improved when mothers consistently faced their infants during interaction.

Rosenberg and Robinson (1985) assessed the impact of training on mothers' interactional skills with their handicapped infants or toddlers. Sixteen mothers and their mildly to severely disabled children, aged 3 to 34 months, participated in this study. Three pre-training observations were obtained to give comparison data. These



baseline observations, using the Teaching Skills Inventory (TSI) to obtain preintervention scores, indicated areas in which mothers could improve. Techniques such as allowing for child-initiated activities were modelled and mothers' use of these was reinforced. Training continued until mothers' performances reached a preset criterion. Based on TSI ratings, mothers' skills were found to increase significantly with training. Severity of handicap was not found to affect parents' skills. Child interest in activities was found to increase. Of further interest in this study is that some parents had been receiving standard content-oriented training prior to and during the baseline period. The systematic interactional training appeared to enhance the training previously being offered.

Butterfield and Miller (1984) designed a 'How to Read Your Baby Program' for families with perinatally compromised infants. The rationale for this program was "that by helping parents become better baby watchers, listeners and communicators, they would become better care-givers and happier parents and that by helping parents understand the usefulness of contingent responses, their babies would become more physiologically stable, predictable, and responsive" (p. 109). Thirty-five medium-risk (gestational age 31-40 weeks and birth weight 1,500-3,040 grams) infants were randomly assigned to an intervention group (N=17) or a control group (N=17). A broad range of families was included, and fathers were encouraged to participate. Individual monthly education and counselling sessions were offered until the baby was 12 months adjusted age. The goals of this program included:

1. involving the parents in defining the unique style of the infant;

2. teaching communication skills and infant communication styles to parents;
3. helping parents realistically anticipate the next developmental step for the baby;
4. suggesting appropriate interactive techniques; and
5. addressing recurrent concerns in the parents' minds.

Video-tape feedback was offered and content was flexible. The results indicated that at one year, infants whose families received the Read Your Baby program were significantly ahead of control-group infants on the Bayley Scales of Infant Development and in all measures of mastery motivation used.

Martin (1985) found that mothers of preterm infants who participated in Brazelton Neonatal Scale administration and who received interaction-skills coaching in the hospital scored higher than control group mothers on observation and rating scales of mother-infant interaction. These results were observed at hospital discharge and at one month adjusted age. She concluded that this hospital-based intervention was effective for enhancing short-term outcomes with mother-infant interaction variables.

Based on research utilizing experimental manipulations of infant-mother face-to-face interaction (Field, 1977), Field (1981, 1983) has described in detail an "interaction coaching" approach to intervention for high-risk infants and their parents. Field (1983) described typical or positive interactions between infants and their mothers as featuring mothers "slowing down, exaggerating, and repeating their behaviors, and as contingently responding by imitating, taking turns or not interrupting, and respecting the infants' occasional breaks from the conversation.

The infant, in turn, looks and sounds attentive and content" (p. 1). Field also described atypical or disturbed interactions as featuring an infant who averts his/her gaze, squirms and fusses, and a parent who appears anxious, controlling and frustrated. High-risk infants and their mothers have been observed to display the features Field described in "disturbed interactions" more frequently.

As there is some evidence that early interaction patterns influence later development, interaction coaching techniques were investigated as an approach to facilitate the interactions of high-risk infants and their parents. Specifically, Field filmed mothers and their 4-month-old high-risk infants (N=60) in a series of 3-minute interactions. A spontaneous interaction where the mother was asked to "pretend she was at home playing with her infant" was filmed, followed by no more than two 3-minute "manipulations" per session. By using multiple sessions the order of manipulations was counterbalanced. The manipulations involved maternal behaviors that occurred naturally in spontaneous interactions. Mothers were asked to "imitate everything the baby does," to repeat phrases and to be silent during infant pauses or gaze aversions. These manipulations resulted in increased infant gaze at mother. This was explained by Field as possibly simplifying the processing of information for the infant. The manipulation, called "attention-getting," which involved asking mothers to keep their infants looking at them, resulted in increases in mother vocalization and decreases in infant gazing at mother. During the game-playing manipulation, where mothers were asked to play "I'm gonna get you," infant gaze at mothers decreased but infant affect (smiling and laughing) increased. It is important to note that 11 of the 60 infants showed increases in

gazing during the "attention-getting" and game-playing manipulations. When this was analyzed further, Field found that these mothers had been less active during spontaneous interactions, thus highlighting the need to assess each dyad and to then tailor interaction coaching to individual differences in dyads.

Field's studies have indicated that mothers and high-risk infants can be taught alternative ways to interact in a lab setting, but do not provide information about how training might influence ongoing relationships in the home.

Barrera, Rosenbaum, and Cunningham (1986) examined the effects of a year-long home intervention program with low birth-weight infants and their parents. Preterm infants ( $N = 59$ ) were randomly assigned to one of three groups: a developmental intervention, a parent-infant intervention, and a no-treatment control. A full-term control group was also included in the study ( $N = 24$ ). They hypothesized that "improving parental responsiveness and sensitivity to the child's needs and behavioral cues would result in both environmental changes and developmental gains" (p. 21). The Bayley Scales of Infant Development, Carey's Infant and Toddler Temperament Questionnaires, Caldwell's HOME inventory and coded video tapes of mother-infant play at home were measured at 4, 8, 12, and 16 months corrected age. Results indicated that the home intervention, in particular the parent-infant interaction intervention (similar to Bromwich and Parmelee, 1979), "produced marked changes in the home environment, some behavioral changes during mother-infant interactions, and modest changes in infants' cognitive development" (p. 28).

Research describing optimal patterns of mother-infant interaction

has been reviewed in this section. This research has been linked to studies implementing a parent-infant interaction model of early intervention. It would appear that interaction-oriented training has a positive impact on mother-infant pairs, although the long-term outcomes of this type of training are as yet unknown. Honig (1984) stressed that "teaching parenting skills and providing supports for accurate parental interpretation of infant signals as well as mobilization of caregiver energies for sensitive, responsive care for infants may be one of the most under-utilized societal tools we have for prevention in infancy of many developmentally inimical outcomes in later childhood" (p. 4).

#### Socioeconomic Status, Maternal Stress, Knowledge of Infant Development and Satisfaction with Parenting

There is some research to indicate that factors such as mothers' education, stress level, knowledge of infant development and satisfaction with the "mother" role may influence or be influenced by mother-infant interaction patterns. Literature related to these factors in mother-preterm infant dyads is reviewed briefly in this section.

#### Socioeconomic Status

The "human caregiver," often the mother, provides and mediates much of the stimulation within an infant's environment (Beckwith, 1976). Given this, it becomes important to examine possible influences of the mother's socioeconomic status on the infant.

Sameroff (1975) summarized data from longitudinal studies of prenatal and perinatal complications and concluded that "socioeconomic

status appears to have a much stronger influence on the course of development than perinatal history" (p. 274). One particular study, reported by Werner and her associates (Werner, Bierman, & French, 1971; Werner & Smith, 1982), suggested that as many as 10 times more children developed school problems related to poor early environment than to the effects of perinatal stress. Werner and Smith concluded that impaired development was more consistently related to perinatal complications when combined with persistently poor environmental circumstances. Children from affluent homes, with an intact, well-educated family, showed negative effects from reproductive stress when there was severe central nervous system damage.

Caputo, Goldstein and Taub (1981) studied a sample of 38 low birth weight and 26 full-sized infants and found that social class and mother's IQ significantly predicted WISC-R IQ at age 8 years. These factors may be interpreted more generally as indicators of the quality of the developmental environment of the child. High social class/high IQ mothers may structure an environment more conducive to intellectual growth. Broman, Nichols, and Kennedy (1975) in their major Collaborative Perinatal Study found that, at age 4 years, maternal education and family socioeconomic status were major contributors to the variance in Stanford Binet IQ scores.

The results of these studies would suggest the importance of considering socioeconomic status when examining outcomes for perinatally compromised infants.

### Maternal Stress and Satisfaction with Parenting

Pederson, Jenkins, Evans, Chance, and Fox (1985) investigated maternal responses to the birth of a preterm infant and found that having a premature infant was emotionally stressful for most mothers, even if the infant was not ill.

Silcock (1984) found that mothers who were better able to cope with the "crises" of premature birth had better mother-infant relationships at 1 and 4 months. "Coping" was measured in terms of the mother's movement through four psychological tasks defined by Caplan, Mason, and Kaplan (1965). Mother-infant relationships were assessed using Bromwich's (1976) Parent Behavior Progression Schedule.

Crnic, Greenberg, Ragozin, Robinson, and Basham (1983) examined the relationship of stress and social support to maternal attitudes and early mother-infant interactive behavior in a sample of 52 mother-premature and 53 mother-full-term infant pairs. "Although no group differences were found, both stress and support significantly predicted maternal attitudes at 1 month and interactive behavior at 4 months when data were pooled. Mothers with greater stress were less positive in their attitudes and behavior, while mothers with greater support were significantly more positive" (p. 209).

Crnic, Greenberg, et al. (1983) included a measure of mothers' satisfaction with parenting in this investigation. Mothers with greater social support and less stress reported more pleasure in their infants and in their parenting roles.

Laney and Sandler (1980) compared full-term and preterm infant-mother dyads on a number of variables, including maternal stress. Mothers of preterms were found to have experienced more prenatal life

stress than mothers of full-terms. This stress did not predict mother-infant interaction at 3 or 6 months but was tentatively implicated as a causal factor in the preterm deliveries.

### Knowledge of Infant Development

Hunt and Paraskevopoulos (1980) studied a group of 50 5-year-olds and their mothers. They found that "mothers who, for whatever reasons, hold false information about what their children can and cannot do also fail to provide development-fostering experience of as high a quality as mothers who hold accurate information about their children's developmental achievements" (p. 290). Carew (1980) arrived at a similar conclusion in her study of home and day-care experiences of infants. She concluded that a caregiver's choice of activities used to engage a child may be critically influenced by her perception of the child's characteristics.

MacPhee (1984) reviewed literature related to specific parent belief-behavior relationships. He concluded, from this review, that expectations or knowledge appears to determine the type of environment provided for the infant. He also suggested that teaching parents to observe their babies and to interpret these observations within the context of realistic knowledge about developmental norms and processes may benefit the parent and child.

### Summary

From the literature reviewed above, several summary points can be made:

1. Parent-child relations have been studied extensively.



Recent theoretical and methodological work would suggest that research conducted within a transactional model utilizing a multimethod approach may be most effective.

2. The interaction patterns of mother-preterm infant and mother-full-term infant dyads have consistently been observed to differ. There is evidence to indicate that these patterns of interaction displayed by mother-preterm infant dyads may influence the infant's future development.

3. Optimal mother-infant interactions have been characterized by maternal responsiveness and mother-infant synchrony. Intervention aimed at facilitating these characteristics in high-risk mother-infant dyads has been found to be successful in a limited number of research studies. The effect of this form of intervention on the ongoing interactions between mothers and high-risk infants has not been well documented.

4. There is some evidence to suggest that mother-infant interactions may be influenced by mother's stress, satisfaction with parenting and previous knowledge of infant development.

These summary points give rise to the following statements of the research problem and research hypotheses.

#### Statement of the Problem

The primary purpose of the present study is to provide evidence regarding the following research question. Can short-term maternal training with preterm mother-infant dyads facilitate more harmonious, mutually-responsive interactions between the mother and infant? In particular:

1. Will the effects of mother training be observable in the

natural home environment immediately following training (i.e., will mothers' behavior become more responsive and sensitive to the infants' cues and will the interaction within the dyad become more satisfying)?

2. Will these effects still be observable 2 months following completion of the training?

3. Will individualized mother-training sessions help mothers to:

(a) feel more satisfied as parents; and

(b) increase their knowledge of infant development?

## CHAPTER III

### PROCEDURES

Thirty-five preterm infants and their mothers were randomly assigned to one of two groups, a treatment group receiving eight 40-minute interaction coaching sessions and a no-treatment group receiving toys. Naturalistic home observations were carried out; ratings of maternal and infant interactive behavior, and measures of attitudes to parenting and knowledge of child development were obtained precoaching, postcoaching, and at a 2-month follow-up. Mother's life stress was assessed as a possible moderator variable. Procedures are described in detail below.

#### Subjects

The subjects were 35 singleton, preterm infants and their mothers. The infants weighed 1,000 to 2,000 grams at birth and were born at less than 37 weeks gestation. These infants were born in, or admitted to, the Neonatal Intensive Care Unit (NICU) of the Calgary Foothills Hospital, the Calgary General Hospital or the Holy Cross Hospital, Calgary, between April 1984 and March 1985. Two excluding criteria were that the infants not be classified as priority infants for follow-up by the Perinatal Follow-up Study being conducted by Alberta Children's Hospital and that the infants not be involved in an early intervention program. In practice, this meant that these infants had no major abnormalities, did not experience an extensive period on a respirator,

and were not considered at high risk for neurological problems. Twins were excluded from the sample for a number of reasons. Specifically, the interaction patterns of twins with their mothers may differ from that of singletons (Lytton, 1980). As the numbers of twins available were not sufficient to study as a separate group, this possible confounding factor was not included in this study. Mothers were English-speaking and lived in urban Calgary or within 50 kilometres of the city.

Mothers were recruited through a series of contacts. Initially mothers were contacted by hospital staff, either by letter (Appendix A) or by telephone, and permission was obtained for the researcher to contact the mother directly. Forty-seven of the 52 (92.31%) mothers of eligible infants agreed to be contacted about the study. Of these 47, 42 (89.36%) mothers met with the researcher in their homes after their infant was discharged from the hospital. During this home visit, the nature of the study was explained to them. Mothers were told that the purpose of this research was to study how mothers and their preterm babies communicated with each other. Mothers were also informed that they may or may not be invited to participate in the training sessions and that this decision would be made randomly; thus, all mothers who volunteered were initially willing to be included in either the training sessions or the control group. Of the 42 mothers to whom the study was explained, 35 (83.33%) consented to participate (see Consent Form, Appendix B). Of the 7 mothers who chose not to volunteer, 2 were planning to move from Calgary before the completion of the study and 2 said they wished to participate but their husbands refused them permission to do so. Two mothers agreed to participate and subsequently withdrew. One mother was not interested in participating. The final overall

acceptance rate for mothers of eligible infants was 35 out of 52 mothers (67.31%).

Family physicians were informed when a mother volunteered to participate in the study. They were asked to contact the researcher if they had concerns. No physician contacted the researcher (see Letter to Physician, Appendix A).

The birth-weight parameters were chosen in an attempt to obtain a homogeneous sample of preterm infants. Infants were recruited from three hospitals in an effort to increase the sample size, although it was recognized that this introduced a possible limitation to the study as hospital practices varied between hospitals. As the sample size was expected to be small, other infant characteristics, such as respiratory distress or weight for gestational age, were not used as criteria for this study. This would have limited the number of eligible infants even further. The total sample is, as anticipated, small. This is due, in part, to the number of dyads that were available during the one-year period that mothers were contacted. The time involved in collecting and analyzing direct observational data also limited the sample size.

Mother-infant dyads were randomly assigned to one of two groups: a treatment group and a nontreatment group. Groups were balanced for sex of the infants. As new dyads were being included in the study continuously, group assignment occurred each time after two mothers of same-sexed infants volunteered to participate in the study.

The Research and Ethics Committee of all three hospitals named above approved of this study and of the procedures for obtaining subjects. The Conjoint Ethics Committee of the Foothills Hospital and the University of Calgary also approved the study.

### Pilot Phase

Prior to implementing the actual data collection procedure, five mother-preterm dyads were included in a pilot phase of this study. The dyads involved in this phase were from the same population as the study sample except that all infants were born in the Calgary Foothills Hospital between February or March, 1984.

These dyads were videotaped in their homes during feeding and nonfeeding interactions. These videotapes were subsequently used to develop the observational coding system and to obtain interobserver agreement. The mothers completed sets of questionnaires and three mothers participated in coaching sessions. Throughout this pilot phase mothers were encouraged to give feedback to the researcher regarding their reactions to the procedures. Confusions regarding questionnaires were clarified and technical adjustments made to equipment. Some of these dyads were also observed in their homes during observer training in order to provide the observer with the opportunity to practice in a "live" situation.

Toys were given to these families following completion of the pilot phase.

### Data Collection

The data collection procedure is outlined in Table 1 and described below.

Mothers who volunteered to participate in the study were interviewed by the researcher (see Appendix C for Initial Interview Form), and pregnancy, birth history, and family data obtained. Infant hospital records were examined to obtain further medical history (see Appendix C

Table 1  
Data Collection Procedures

| Time   | Activity in Order of Occurrence  |  |
|--|--|--|
|  | Treatment Dyads<br>(n = 18)  | Control Dyads<br>(n = 17)  |
|  | Home interview   | Home interview   |
| ONE  | Complete Set I: Questionnaires<br>Pretraining Home Observation and Rating<br>( <u>M</u> Infant Adjusted Age = 12.778 weeks $\pm$ 1.6)    | Complete Set I: Questionnaires<br>Pretraining Home Observation and Rating<br>( <u>M</u> Infant Adjusted Age = 13.00 weeks $\pm$ 2.2)     |
| Random assignment to group, balanced for sex |  |  |
|  | Interaction Coaching<br>(2 $\times$ per week $\times$ 4 weeks = 8 sessions per dyad)   | No activity  |
| TWO  | Complete Set II: Questionnaires<br>Post-training Home Observations and Rating<br>( <u>M</u> Infant Adjusted Age = 19.22 weeks $\pm$ 2.0) | Complete Set II: Questionnaires<br>Post-training Home Observations and Rating<br>( <u>M</u> Infant Adjusted Age = 18.76 weeks $\pm$ 2.3) |
|  | No activity  | Toys delivered or mailed to families   |
| THREE  | Follow-up Home Observations and Rating<br>( <u>M</u> Infant Adjusted Age = 27.00 weeks $\pm$ 2.2)  | Follow-up Home Observations and Rating<br>( <u>M</u> Infant Adjusted Age = 27.00 weeks $\pm$ 2.4)  |

for Hospital Records Form).

The educational level of the mother, obtained during the initial interview, was categorized as shown in Table 2. These categories were used by Lytton (1980) and were found to relate to a greater number of child and parent characteristics than was social class, as indexed by father's occupation.

The demographic information obtained from these initial interviews and hospital records is presented in Table 3 and defined in Table 4.

At the end of the home interview, a set of questionnaires was given to the mothers to be completed prior to the first home observation. (see Table 5 for list of questionnaires given to the mothers). The mothers were informed that a research assistant would contact them when their baby was about 3 months of age, adjusted for the baby's prematurity, to arrange to do the first observation. Observations were arranged at a time that was convenient for the mother and that coincided with a usual feeding and awake period for the infant. Mothers were also informed that, following the first home observation, the researcher would contact them to either invite them to participate in the training sessions or to inform them that they would be given toys for their baby.

The second set of questionnaires was mailed to control-group mothers 4 weeks after the first observation and was given directly to treatment-group mothers on the day of their final session. The second observations were arranged by the research assistant 5 to 7 weeks following the first observation. The third set of questionnaires was mailed to all mothers 5 to 6 weeks following the second observation. The third observation, also arranged by the research assistant,



Table 2  
Categories of Educational Levels

| Mother's Education Group | Criteria  |
|--------------------------|---|
| 1                        | Not completed Grade 12  |
| 2                        | Grade 12 graduate, or Grade 11 plus<br>1 year training course |
| 3                        | Grade 12 plus some college, or tech-<br>nical school graduate |
| 4                        | College graduate  |

Table 3  
Descriptive Statistics of Demographic Variables<sup>a</sup>

| Variable                                   | Treatment<br>(n = 18) |          | Control<br>(n = 17) |          | Total Sample<br>(N = 35) |          |
|--|-----------------------|----------|---------------------|----------|--------------------------|----------|
|  | M                     | (SD)     | M                   | (SD)     | M                        | (SD)     |
| Gestational age<br>(weeks)                 | 32.39                 | (2.45)   | 32.59               | (1.87)   | 32.49                    | (2.16)   |
| Birth weight<br>(grams)                    | 1596.94               | (293.38) | 1749.71             | (248.72) | 1671.14                  | (279.55) |
| Mother's<br>education                      | 2.50                  | (1.10)   | 2.53                | (1.07)   | 2.51                     | (1.07)   |
| Mother's<br>marital status                 | 1.06                  | (0.24)   | 1.12                | (0.49)   | 1.09                     | (0.37)   |
| Mother's work<br>status                    | 1.39                  | (0.50)   | 1.59                | (0.51)   | 1.49                     | (0.51)   |
| Live births                                | 1.44                  | (0.71)   | 1.47                | (0.62)   | 1.46                     | (0.66)   |
| Total number of<br>pregnancies             | 2.00                  | (1.24)   | 2.18                | (1.47)   | 2.09                     | (1.34)   |
| Respiratory<br>distress <sup>b</sup>       | 38.89%                |          | 58.82%              |          | 48.57%                   |          |
| Ponderal Index                             | 2.14                  | (0.26)   | 2.14                | (0.21)   | 2.14                     | (0.23)   |
| Days infant<br>hospitalized<br>after birth | 39.39                 | (27.55)  | 34.29               | (23.83)  | 36.91                    | (25.56)  |
| Range of days<br>hospitalized              | 8 - 129               |          | 10 - 85             |          | 8 - 129                  |          |
| Language in<br>home                        | 1.11                  | (0.32)   | 1.12                | (0.33)   | 1.11                     | (0.32)   |
| Hospital of<br>birth                       | 1.11                  | (0.32)   | 1.29                | (0.59)   | 1.20                     | (0.47)   |
| Adjusted age:<br>Time I                    | 12.78                 | (1.59)   | 13.00               | (2.21)   | 12.89                    | (1.89)   |
| Adjusted age:<br>Time II                   | 19.22                 | (2.05)   | 18.77               | (2.33)   | 19.00                    | (2.17)   |
| Adjusted age:<br>Time III                  | 27.00                 | (2.25)   | 27.00               | (2.69)   | 27.00                    | (2.44)   |
| Mother's age                               | 26.56                 | (4.42)   | 28.59               | (5.56)   | 27.54                    | (5.04)   |

<sup>a</sup> Nonsignificant differences between groups on all variables.

<sup>b</sup> Respiratory distress ranged from transient to severe and nonstandard recording was used by attending physicians.

Table 4  
Definitions of Demographic Variables

| Variable                    | Definition and Source of Information   |
|-----------------------------|--|
| Gestational age             | In weeks. Verified from medical record. Mother's report used as Dubowitz exam not available for all cases.   |
| Birth weight                | In grams. Obtained from medical record.  |
| Mother's education          | By group (see Table 2)   |
| Mother's marital status     | 1 = Married<br>2 = Single  |
| Mother's work status        | 1 = Employed outside home<br>2 = Full time at home   |
| Live births                 | Includes study child. Obtained from medical record.  |
| Total number of pregnancies | Includes study child. Obtained from medical record.  |
| Respiratory distress        | Obtained from hospital record. If respiratory distress, mild to severe, was recorded by the attending physician, infant was included. <sup>a</sup> |
| Ponderal Index              | Calculated using formula:<br>$100 \times W/L^3$ (Walther & Ramaekers, 1982).<br>Information obtained from medical record.                          |
| Days infant hospitalized    | Obtained from medical record.  |
| Language in home            | 1 = English Speaking<br>2 = Other Languages Spoken to Child<br>Obtained from interview with mother.  |
| Hospital of birth           | 1 = Calgary Foothills Hospital<br>2 = Holy Cross Hospital<br>3 = Calgary General Hospital  |
| Adjusted age                | Calculated by: chronological age in weeks minus number of weeks preterm.   |
| Mother's age                | Calculated from mother's date of birth as recorded in medical record.  |

<sup>a</sup> Variations in recording respiratory distress occurred between physicians and between hospitals, creating some ambiguity with this variable.

Table 5  
List of Scales Completed at Time One, Time Two  
and Time Three

| Time | Scales   |
|------|--|
| 1    | LES, <sup>a</sup> SWPS, <sup>b</sup> KIDI <sup>c</sup> |
| 2    | SWPS, KIDI, Mother's Comments                          |
| 3    | SWPS, KIDI   |

<sup>a</sup> Life Experiences Survey

<sup>b</sup> Satisfaction With Parenting Scale

<sup>c</sup> Knowledge of Infant Development Inventory

occurred 7 to 9 weeks following the second observation. The research assistant collected the questionnaires at each observation. Between the second and third observations, control-group mothers were given toys for their infants. For all but three of these mothers, these toys were delivered to the mothers by the researcher. At this time a brief discussion about the mothers' reactions to the project occurred.

Twelve weeks ( $\pm 3$  weeks) adjusted age was chosen as the infant age at the time of the first observation for several reasons. Stern (1974) observed that by age 3 to 4 months, several major social behavioral activities have developed and have become integrated into the infant's play activities. This repertoire includes mature gaze control, social smiling, and a variety of vocalizations. Age, adjusted or corrected for prematurity, was used in order to provide a consistent age comparison between the groups in the present study. Siegel (1983) found that in the early months, use of corrected age was a more accurate predictor of later developmental test scores than uncorrected ages.

#### Measurements Used

##### Naturalistic Observations

##### Observers and General Observation Procedures

The observers were two women with no specific training in the field of psychology. They were both mothers of young children and, as such, were particularly understanding of the realities of parenting an infant. Originally, only one observer was trained, and it was expected that she would complete the observations on the entire sample. Unfortunately, she became ill and resigned this position, making it necessary to train a second observer. (Training procedures are described below.)

The observers were blind to the research hypotheses and were not informed about which dyads received training and which did not. Mothers were specifically asked not to discuss group assignment with the observer and were informed that this was in order to reduce the possibility of observer bias. When questionnaires were sent to mothers, an accompanying letter reminded them not to inform the research assistant of their group assignment (see Appendix A, Letter to Mothers with Questionnaires).

The observer arranged to observe the mother and infant at a time that was convenient for the mother that also coincided with the infant's usual feeding and awake time. If there were preschool siblings they were welcome to be present. When the observer arrived at the mother's home, she recognized verbally to the mother that the mother may feel awkward, but that the mother was to proceed as naturally as possible. The mother was reminded that she was not to interact with the observer. The observer also reassured the mother that she would attempt to be as unobtrusive as possible. The only restrictions placed on the mother were that she remain, as much as possible, in the same room with the infant and that she have the television turned off during the visit.

A feeding session up to a maximum of 10 minutes and a nonfeeding session up to a maximum of 20 minutes were observed and coded. The order of these sessions was varied according to the infant's desire to feed. Feeding consisted of a bottle or breast feed in most cases, but at the third observation a cup and occasionally solid food were offered.

The observer completed a rating scale as soon after the observation period as possible. If it was not appropriate to complete this in the mother's home, it was completed in the observer's vehicle prior to

leaving.

At each observation, the observer collected a set of questionnaires which the mothers had received and completed earlier. If the questionnaires had not been completed, a self-addressed return envelope was left with the mother and she was asked to mail these as soon as possible. The observer was instructed not to read the questionnaires.

When the observer was about to leave, she thanked the mother for allowing her to observe in her home and engaged in brief, friendly conversation before departing. The observer told the mother that the researcher would contact her if study-related questions arose. Often the mother invited the observer to have a "coffee" and seemed eager to interact "mother-to-mother" with the observer.

Following each observation, the observer completed a "Record of Home Observation" (Appendix C). Comments made on this record included the following, if applicable:

1. unusual aspects of the physical environment
2. other persons present (i.e., siblings)
3. general mood in the household, including mother's reactions to the presence of the observer
4. mothers' impressions of the observation period (i.e., was this "typical" of how she would have spent that time had the observer not been present?)
5. infants' state (i.e., infant ill, teething, sleepy)

If the infant fell asleep during the observation, the observation was rescheduled.

#### Behavior Code and Recording Procedures

The observational coding system used was adapted from Crnic,

Ragozin, et al. (1983) for use with an OS-3 Event Recorder. This event recorder, available from Observational Systems, Inc., clocks frequency, duration, and sequence of a variety of events. Collected data can be transferred directly to a host computer for analysis and storage, thus reducing errors due to data handling. As this device is hand-held and battery-operated the observer was able to move freely during the observation. The standard keyboard allowed the observer to key in codes without averting her gaze from the interaction.

A 3-digit code was utilized, with the first digit used to represent mother's vocalizations; the second digit, mother's behavior; and the third digit, the infant's behavior. Eight additional codes which could be recorded simultaneously with the 3-digit codes were also used. These are summarized in Table 6 and behaviorally defined in Table 7. The capabilities of the OS-3 event recorder are such that the data set acquired was in real-time sequence data (Sackett, 1979). This data set contained all possible information about frequencies, durations, and event and time sequences for the code categories measured.

The codes themselves were based on summary measures described by Crnic, Ragozin, et al. (1983). These codes were found to be relevant to the concept of social interaction between mothers and their preterm infants. The codes were reduced, by Crnic, Ragozin, et al., from a larger set of discrete codes on the basis of statistical properties. They have been found useful in observations of mothers and their preterm infants.

#### Training Procedures

Videotapes of naturalistic home-based mother-infant interactions were used to train the observers to use the coding system and the OS-3



Table 6  
Summary of Observational Coding System

| Mother Vocalizations       | Mother Behavior          | Infant Behavior             | Toggles or Simultaneous Codes                       |
|----------------------------|--------------------------|-----------------------------|---|
| 0 Time Out                 | 0 Time out               | 0 Time out                  | T0 Mother within 3 feet of the baby                 |
| 1xx No vocalization        | x1x Smile/laugh          | xx1 Smile/laugh             | T1 Mother looks at baby                             |
| 2xx Turmtaking             | x3x Touch affectionately | xx2 Vocalize                | T2 Mother holding baby                              |
| 3xx Positive vocalizations | x4x Gameplaying          | xx3 Touch mother            | T3 Mother involved in caretaking activity with baby |
| 4xx Negative vocalizations | x5x Demonstrate toy      | xx4 Avert head or body/fret | T5 Baby looks at mother                             |
|                            | x8x Extraneous           | xx9 No action               | T6 Baby eyes closed                                 |
|                            | x9x No action            |                             | T7 Baby cry   |
|                            |                          |                             | T8 Baby plays toys                                  |

Table 7  
Observational Coding System: Codes and Definitions

| Behavior Coded                                       | Definition   |
|--|--|
| <u>Toggles</u>                                       |  |
| T0: Mother within 3 feet of the baby                 | To be turned off if mother leaves room or moves beyond the 3-foot radius of the baby. If baby moves independently away (i.e., crawl or roll), use the "comment" to indicate this.    |
| T1: Mother looks at baby                             | Mother must look at baby for longer than 2 seconds. Brief glances at baby or away from baby are not coded.   |
| T2: Mother holding baby                              | The baby is in the mother's arms, on her lap, or over her shoulder. The mother is actively supporting the baby's weight. Holding may include holding which occurs during caretaking. |
| T3: Mother involved in caretaking activity with baby | The mother may be diaper changing, feeding (bottle, breast, or spoon), adjusting clothing, wiping face, burping, etc.  |
| T5: Baby looks at mother                             | The baby is looking at the mother's face.  |
| T6: Baby eyes closed                                 | The baby is not looking. This may include eyes closed during sleeping. If this occurs longer than 5 minutes, the observation will be discontinued.                                   |
| T7: Baby cries                                       | The baby cries a full, clear cry which lasts longer than 2 seconds. Fretting alone is coded as a baby behavior in Column 3.  |

Table 7 (continued)

| Behavior Coded                | Definition  |
|-------------------------------|---|
| T8: Baby plays toy            | The baby is playing with a toy independently. The toy may have been handed to the baby by the mother, but the baby is now manipulating the toy <i>without encouragement by the mother</i> . (Mother may continue to interact with baby in another way. Playing with a toy which is being demonstrated by the mother is coded as a mother behavior in Column 2. Passively holding toy coded here as well.) |
| <u>Mother's Vocalizations</u> |   |
| 0: Time out                   | Used only to record an actual break in the observation.   |
| 1xx: Mother not vocalizing    | Coded if mother is silent for longer than 2 seconds. Not coded if the silence is a pause in a turn-taking vocalizing situation.   |
| 2xx: Turn-taking vocalization | The mother is vocalizing and allowing for pauses between each utterance. Although the baby may rarely vocalize back, the mother generally behaves as if he/she had.   |
| 3xx: Positive vocalization    | The mother is vocalizing, directed at the infant, but does not allow for pauses. She does not behave as if the infant has "answered" her. A one-word or one-segment vocalization is assumed to be in this category rather than in Turn-taking if no response is anticipated from the baby. Singing to baby is coded here.   |
| 4xx: Negative vocalization    | The mother uses a verbal prohibition that, in some way, communicates "no" to the infant. There may be a change in voice and it may be accompanied by a "negative touch."  |

Table 7 (continued)

| Behavior Coded                    | Definition   |
|-----------------------------------|--|
| <u>Mother's Behavior</u>          |  |
| 0: Time Out                       | The time out code may be used in this column to indicate that the mother has left the room.  |
| x1x: Smiling/laughing             | The mother gives a clear, broad smile and/or a clearly audible laugh involving both a facial and a vocal component. The smile or laugh must be directed at the infant, not, for example, at the camera or another child.   |
| x3x: Touching baby affectionately | This includes the mother touching the baby's body with either her hands or face. A kiss, pat, or rub is included; a tickle is not included here. The touch is for the sake of the touch only. Excluded is touching with an object, or any touching done in the course of holding, supporting, gameplaying, or touching as a part of caretaking.  |
| x4x: Gameplaying                  | This includes playfully moving the baby's body, for example, bouncing on knee, "flying," exercising limbs. This also includes the mother engaging the infant in a "universal" infant game, such as "peek-a-boo," "so-big," or "I'm gonna get ya." Tickling is considered gameplaying. This also includes specific incidents of the mother imitating the infant's behavior (for example, a protruding tongue) or specifically imitating the baby's vocalization. It also includes the mother using exaggerated movements of hands, arms, face or head to obtain the baby's attention. |

Table 7 (continued)

| Behavior Coded           | Definition   |
|--------------------------|--|
| x5x: Demonstrating toy   | This includes the mother making a clear and deliberate attempt to get the baby's attention using a toy or other object. Passively holding a toy out of the baby's visual field is not counted here. This also includes the mother using a different toy or switching from one to two or three, etc., toys to get the baby's attention. |
| x8x: Extraneous          | This includes the mother interacting with another child, the observer, or, for example, the telephone rings or someone is at the door. Any interaction not directed at the infant is coded here.   |
| x9x: No action           | When none of the other codes can be used to describe the behavior, this is used. The toggles may still be active and 'x9x' may be used to 'fill the place' while behaviors are coded in the other columns.   |
| <u>Infant's Behavior</u> |  |
| 0: Time out              | Used to record a break in the observation  |
| xx1: Smiling/laughing    | The baby gives a clear smile or laugh. Does not necessarily have to be directed at the mother.   |
| xx2: Vocalizes           | The baby makes a distinct sound. This does not include non-specific grunts and murmurs, laughter or visceral sounds, for example, a burp, sneeze or cough.   |

Table 7 (continued)

| Behavior Coded                | Definition  |
|-------------------------------|---|
| xx3: Baby touches mother      | This includes the baby actively seeking to touch mother; it does not include a chance touch. The baby does not have to successfully touch the mother. Baby may be holding mother's hand (i.e., in feeding). |
| xx4: Baby averts head or body | This includes when the baby makes a clear attempt to avert head or body. For example, the baby moves head away when food is being offered. Fretting is included here as an attempt to avert.                |
| xx9: No action                | When no other codes are used, this is coded. Toggles may still be active.   |

Note about coding system:

Codes with higher numbers have coding priority. For example, if the mother is smiling AND touching her baby affectionately, the x3x for touching would be coded. Another example, for infant behavior, would be: the baby is smiling AND vocalizing, the xx2 for vocalizing would be coded.

event recorder. These videotapes were acquired during the pilot phase of this study.

The observers and the researcher discussed the behavior observed on the videotapes and arrived at a consensus regarding the coding in relation to the code definitions. At least three different videotaped mother-infant pairs were observed. The observers also had the opportunity to practice coding in the naturalistic home situation during the training period.

Overall, Observer I spent 30 hours in training (excluding time spent obtaining interobserver agreement) and Observer II spent 27 hours in training.

#### Interobserver Agreement

Interobserver agreement was computed by having one observer and the author independently observe and code the same 10-minute segment of videotape. This procedure was done with Observer I and again with Observer II when she was employed. In order to assure agreement between the two observers, interobserver agreement was computed between Observer I and Observer II in a live setting. In this case each observer simultaneously coded the interaction using her own OS-3 recorder. During the data collection phase, interobserver agreement between the observer and the author was intermittently calculated, using both videotaped and live situations in order to monitor the continued quality of the interobserver agreement.

When both the observer and the author coded the same behavior using the same code within the same 10-second interval (or in the preceding or succeeding interval if there was no intervening code), an agreement was counted. If more than one agreement occurred within a 10-second

interval, it was also counted. A disagreement occurred if the observer and the author recorded the same behavior using two different codes. As "no action" was given a separate code, it was included in the calculations as if it were a behavior code.

Percent agreement was calculated by dividing the number of agreements on occurrences (A) by the sum of agreements plus disagreements on occurrences (D):

$$\text{Percent agreement} = \frac{A}{A + D} .$$

Agreement was calculated separately for each digit of the code, and the average of these three different percent agreement calculations was used to obtain the minimum level of 75% agreement set. The formula for this was:

$$\text{Average Percent Agreement} = \frac{\begin{array}{l} \% \text{ Agreement (Mothers' Vocalization)} \\ + \% \text{ Agreement (Mothers' Behavior)} \\ + \% \text{ Agreement (Infants' Behavior)} \end{array}}{3}$$

Before the observer began actual data collection, she had obtained a level of 75% agreement from the average of three different 10-minute videotaped segments.

Data from the "toggle switches" or the 8 codes used simultaneously was not included in the calculation of interobserver agreement. Originally this decision was made because the computer program for the OS-3 was not able to include these data. These 8 simultaneous codes were infrequent and usually of long duration. Interobserver agreement using agreement on occurrence of the behavior could have been inflated



due to the nature of these codes.

Interobserver agreement and the Kappa statistic (Applebaum & McCall, 1983; Cohen, 1960; Hollenbeck, 1978) were also calculated for each of the 17 different behavior codes. Percent agreement was calculated by dividing the number of agreements on the occurrence of the specific code by the number of agreements on that code plus the number of disagreements on that code. For example, if both observers agreed that "infant smiles" occurred 8 times during the same 10-second intervals and Observer I recorded infant smiles in two additional intervals, the percent agreement on the code "infant smiles" would be  $\frac{8}{8+2}$  or 80%. No minimum level of significance was set for the individual codes. If the behavior occurred less than 7 times, no calculations were completed (Harrison, 1973).

Interobserver agreement and the Kappa statistic are reported in Tables 8 and 9.

The frequency of infant behavior was low and interobserver agreement for individual codes was also low. Disagreements on infant behavior occurred between "infant smile/laugh" (xx1) and "infant vocalize" (xx2). These behaviors were difficult to distinguish on the videotapes. As these codes were collapsed to become part of the "infant positive signalling" variable used in the data analyses, the overall interobserver agreement level was considered adequate (86.86%).

#### Dependent Variables Based on Observational Data

Two dependent measures were generated from the coded observational data. These aggregated dependent measures, composed of a number of discrete behaviors, were used in order to investigate the general interactive behavior of the mother and infant. Discrete behaviors

Table 8  
Overall Interobserver Agreement for Behavior Code

| Method                        | Observers<br>Involved | # of Jointly Observed Events<br>Total Number of Intervals | % Agreement       | Kappa |
|-------------------------------|-----------------------|---|-------------------|-------|
|                               |                       |   | $\frac{A}{(A+D)}$ |       |
| <u>Mother's Vocalizations</u> |                       |   |                   |       |
| 1. Videotape                  | I+DP-L                | 57/63   | 90.48             | .81   |
| 2. Videotape                  | I+DP-L                | 62/62   | 100.00            | 1.00  |
| 3. Videotape                  | I+DP-L                | 60/65   | 92.31             | .85   |
| 4. Live                       | I+DP-L                | 55/64   | 85.94             | .73   |
| 5. Videotape                  | II+DP-L               | 60/61   | 98.36             | 1.00  |
| 6. Videotape                  | II+DP-L               | 61/64   | 95.31             | .74   |
| 7. Videotape                  | II+DP-L               | 54/64   | 84.30             | .37   |
| 8. Live                       | I+II                  | 57/61   | 93.44             | .82   |
| 9. Live                       | II+DP-L               | 60/60   | 100.00            | 1.00  |
| 10. Live                      | II+DP-L               | 53/59   | 89.83             | .77   |
| <u>Mother's Behavior</u>      |                       |   |                   |       |
| 1. Videotape                  | I+DP-L                | 53/65   | 81.54             | .78   |
| 2. Videotape                  | I+DP-L                | 47/61   | 77.05             | .65   |
| 3. Videotape                  | I+DP-L                | 55/65   | 84.62             | .73   |
| 4. Live                       | I+DP-L                | 48/61   | 78.69             | .69   |
| 5. Videotape                  | II+DP-L               | 62/78   | 79.49             | .71   |
| 6. Videotape                  | II+DP-L               | 63/75   | 84.00             | .75   |
| 7. Videotape                  | II+DP-L               | 55/72   | 76.39             | .66   |
| 8. Live                       | I+II                  | 53/66   | 80.30             | .71   |
| 9. Live                       | II+DP-L               | 58/65   | 89.23             | .83   |
| 10. Live                      | II+DP-L               | 40/61   | 65.58             | .48   |
| <u>Infant's Behavior</u>      |                       |   |                   |       |
| 1. Videotape                  | I+DP-L                | 57/60   | 95.00             | .79   |
| 2. Videotape                  | I+DP-L                | 51/64   | 79.69             | .53   |
| 3. Videotape                  | I+DP-L                | 59/62   | 95.16             | .86   |
| 4. Live                       | I+DP-L                | 48/61   | 78.69             | .58   |
| 5. Videotape                  | II+DP-L               | 57/66   | 86.36             | .59   |
| 6. Videotape                  | II+DP-L               | 58/67   | 86.57             | .65   |
| 7. Videotape                  | II+DP-L               | 56/65   | 86.10             | .43   |
| 8. Live                       | I+II                  | 56/62   | 90.32             | .78   |
| 9. Live                       | II+DP-L               | 53/68   | 77.94             | .54   |
| 10. Live                      | II+DP-L               | 51/55   | 92.73             | .85   |

Table 8 (continued)

| Method            | Observers<br>Involved | Average % Agreement* |
|-------------------|-----------------------|----------------------|
| <u>Total Code</u> |                       |                      |
| 1. Videotape      | I+DP-L                | 89.01                |
| 2. Videotape      | I+DP-L                | 85.58                |
| 3. Videotape      | I+DP-L                | 90.70                |
| 4. Live           | I+DP-L                | 81.11                |
| 5. Videotape      | II+DP-L               | 88.07                |
| 6. Videotape      | II+DP-L               | 88.63                |
| 7. Videotape      | II+DP-L               | 82.26                |
| 8. Live           | I+II                  | 88.01                |
| 9. Live           | II+DP-L               | 89.06                |
| 10. Live          | II+DP-L               | 82.71                |

\* 75% set as minimum level acceptable for average % agreement.

Table 9  
Interobserver Agreement for Individual Behavior Codes

|                          | Individual Behavior |                  |     |                |                |                |                |     |                |                |                |     |                |                |
|--------------------------|---------------------|------------------|-----|----------------|----------------|----------------|----------------|-----|----------------|----------------|----------------|-----|----------------|----------------|
|                          | 1xx                 | 2xx              | 4xx | x1x            | x3x            | x4x            | x5x            | x8x | x9x            | xx1            | xx2            | xx3 | xx4            | xx9            |
| 1 % Agreement<br>(Kappa) | 81.25<br>(.81)      | 83.78<br>(.81)   | **  | 55.56<br>(.64) | 80.00<br>(.85) | **             | **             | **  | 75.00<br>(.72) | **             | **             | **  | **             | 95.00<br>(.86) |
| 2 % Agreement<br>(Kappa) | **                  | 100.00<br>(1.00) | **  | **             | **             | 64.00<br>(.67) | 80.00<br>(.77) | **  | 50.00<br>(.61) | **             | 53.85<br>(.65) | **  | **             | 76.47<br>(.65) |
| 3 % Agreement<br>(Kappa) | 86.11<br>(.85)      | 85.29<br>(.85)   | **  | 60.00<br>(.69) | **             | **             | 77.78<br>(.86) | **  | 84.09<br>(.77) | **             | 80.00<br>(.86) | **  | **             | 94.00<br>(.86) |
| 4 % Agreement<br>(Kappa) | 81.82<br>(.73)      | 81.82<br>(.73)   | **  | 42.86<br>(.53) | **             | **             | 76.92<br>(.84) | **  | 82.35<br>(.80) | 43.75<br>(.53) | **             | **  | **             | 81.25<br>(.65) |
| 5 % Agreement<br>(Kappa) | 98.36<br>(1.0)      | 98.36<br>(1.0)   | **  | **             | 50.00<br>(.64) | 74.29<br>(.76) | 71.43<br>(.76) | **  | 52.17<br>(.60) | **             | 44.44<br>(.57) | **  | **             | 86.21<br>(.59) |
| 6 % Agreement<br>(Kappa) | 94.92<br>(.74)      | 62.50<br>(.74)   | **  | **             | **             | 66.67<br>(.70) | 83.33<br>(.89) | **  | 82.05<br>(.81) | **             | 56.25<br>(.66) | **  | **             | 88.89<br>(.96) |
| 7 % Agreement<br>(Kappa) | 40.00<br>(.37)      | 83.33<br>(.37)   | **  | **             | **             | 70.97<br>(.73) | 75.00<br>(.61) | **  | 61.11<br>(.60) | **             | **             | **  | **             | 86.89<br>(.26) |
| 8 % Agreement<br>(Kappa) | 91.84<br>(.82)      | 75.00<br>(.82)   | **  | **             | **             | 64.47<br>(.72) | 80.56<br>(.77) | **  | 58.82<br>(.68) | 68.42<br>(.87) | **             | **  | 89.13<br>(.81) | 93.44<br>(.82) |
| 9 % Agreement<br>(Kappa) | 72.72<br>(.77)      | 86.05<br>(.77)   | **  | **             | **             | **             | **             | **  | 59.46<br>(.31) | **             | **             | **  | 89.47<br>(.88) | 94.29<br>(.88) |
| 10 % Agreement           | 100.00<br>(1.00)    | 100.00<br>(1.00) | **  | **             | **             | 85.00<br>(.89) | 83.33<br>(.89) | **  | 85.29<br>(.85) | 55.00<br>(.64) | **             | **  | **             | 71.15<br>(.56) |

\*\* Behavior occurred less than 7 times.

(frequency and duration) were not used as dependent variables because it was the interactive behavior, conceptualized as a whole, that was of particular interest. The first, duration of infant positive signalling, was calculated separately for the feeding (DURIF) and non-feeding interactions (DURINF), and for each of the three observation times. This score was defined as the total duration (D) of "infant vocalize" (xx2), "infant smile/laugh" (xx1), and "infant look mother" (T5). If "infant look mother" occurred jointly with "infant vocalize" or "infant smile/laugh," the duration of that joint event was only included in the calculation once. The score was then expressed as a proportion of the total duration of the interaction.

$$\text{DURINF or DURIF} = (D \text{ xx1} + D \text{ xx2} + D \text{ T5}) - [D(\text{T5} \cap \text{xx1 or xx2})].$$

The ODAP computer programs, available from Observational Systems, Inc., in combination with additional hand calculations, were used to obtain the raw scores.

To quantify mother's responsiveness to her infant, sequential lag analysis (Sackett, 1979) was used. The probability of the mother being positively active given the infant being positively active in the immediately preceding event was calculated (also called "transitional" probability). Mother's positive activity (Mactive) was obtained by calculating the total frequency of "mother smiling," "mother touching baby affectionately," "mother engaging baby in nonobject play," and "mother engaging baby in play with toy." Mother's positive vocalization was only included if it occurred simultaneously with one of these positive behaviors. Infant's positive activity (Iactive) was obtained by

calculating the total frequency of "infant smile/laugh," "infant vocalize," and "infant looks mother." If "infant looks mother" occurred simultaneously with "infant smile" or "infant vocalize," that event was counted once. Hand calculations and the ODAP computer programs were used to obtain these raw scores.

The transitional probability was calculated using the following formula (Bakeman, 1978; Gottman & Bakeman, 1979):

$$p(MA|IA) = \frac{f_{MA \cap IA}}{f_{IA}}$$

where  $p$  = probability of the event (Mother active given Infant active) and  $f$  = frequency of event.

The  $f(MA \cap IA)$  was obtained by manually calculating the number of times the mother became positively active following the infant being positively active. In order to account for the possibility of perseveration of mother's positive behavior, events where the mother was positively active immediately before the infant became positively active or events where the mother and infant were simultaneously active were excluded from this calculation.

The issue of perseveration of a behavior has been raised by Martin, Maccoby, Baran, and Jacklin (1981). They pointed out that one limitation of the typical approach to conditional probability analysis is that only the effect of one partner's behavior on the other partner is considered in the analysis. The effect of the person's behavior on him- or herself is not considered. Martin et al. (1981) contrasted the use of conditional probability analysis using only initiations (not continuations) of behavior and a regression analysis as methods to account for

the tendency of one partner's behavior to persevere over time intervals. They concluded that either technique could be used with confidence as the results are comparable. As the data in the present research were manually calculated, only initiations of positive maternal behavior were used in the calculations (as described above).

The  $p(MA|IA)$  was calculated separately for feeding and nonfeeding interactions and for each of the three observation periods. As the change in the  $p(MA|IA)$  over the three occasions was of interest in this study, the  $z$  of  $p$  (an estimate of the chance expectations that the mother's positive activity would immediately follow the infant's positive signalling) was not entered into the analyses and the actual probabilities were used as dependent measures.

#### Ratings of Mother-Infant Interaction

The Interaction Rating Scale (IRS) developed by Field (1977, 1980) for use with mothers and their preterm infants was used to obtain more global information about the interaction between the mother and her infant. The IRS was chosen because it was developed for use with a preterm population and contains items applicable to the research hypotheses being examined. Field used the IRS in a laboratory setting and rated the mothers after 3 minutes of face-to-face or feeding interactions. Inter-rater reliability, reported by Field, and based on 120 videotaped, 3-minute interactions, ranged from .98 to .81 (Field, 1980) for the individual items.

In this study, the IRS was completed by the observer following a 10-minute feeding and a 20-minute nonfeeding interaction which occurred in the naturalistic home environment. Given the differences in length

of observation time and situation, the IRS items required specific clarification. The definitions used for the individual IRS items are included with a sample of the IRS in Appendix C.

The observer was trained to use the IRS using videotapes and naturalistic home observations. Training included discussion and clarification of individual items until a consensus was reached between the observer and the author. This training occurred in conjunction with the training in the behavioral observation system (above).

Following the training period, inter-rater agreement was established, initially between the author and Observer I and subsequently between the author and Observer II, and between Observers I and II. Both videotaped and live interactions were used. For the Feeding section of the IRS, 10-minute feeding interactions were observed and rated, and for the Face-to-Face or Nonfeeding section of the IRS, 20-minute interactions were used. In order to establish reliability, a total of 15 nonfeeding and 18 feeding interactions was observed and rated. Inter-rater reliabilities for the Feeding and Nonfeeding sections of the IRS are summarized in Tables 10 and 11.

The summary scores of the IRS were used as dependent measures. Specifically, four dependent measures were obtained from each IRS completed for each subject. These four measures were:

1. Mother's Nonfeeding IRS Summary Scores (MNFIRS), calculated by adding all 10 items of this section and dividing by 10. The MNFIRS provides a measure of maternal sensitivity and responsiveness. Behaviors rated include mother's head orientation, facial expressions, contingency of vocalizations and responsiveness, and appropriateness of game playing.



Table 10  
Inter-rater Reliability on the Interaction Rating Scale:  
Feeding Interaction Measures

|                        | # of Agreements<br>(Total Rated = 18) | Reliability |
|------------------------|---------------------------------------|-------------|
| <u>Infant Measures</u> |                                       |             |
| State <sup>a</sup>     | 17                                    | .94         |
| Physical Activity      | 17                                    | .94         |
| Head Orientation       | 12                                    | .67         |
| Gaze Behavior          | 15                                    | .83         |
| Persistence            | 15                                    | <u>.83</u>  |
| Total: 4               |                                       | .82         |
| <u>Mother Measures</u> |                                       |             |
| Feeding Position       | 18                                    | 1.00        |
| State                  | 17                                    | .94         |
| Physical Activity      | 14                                    | .78         |
| Head Orientation       | 17                                    | .94         |
| Gaze Behavior          | 18                                    | 1.00        |
| Contingent Response    | 15                                    | .83         |
| Timing Bottle Removal  | 13                                    | .72         |
| Burping                | 18                                    | 1.00        |
| Persistence            | 15                                    | <u>.83</u>  |
| Total: 9               |                                       | .89         |

<sup>a</sup> Infant state omitted from the total score calculation.

Table 11  
Inter-rater Reliability on the Interaction Rating Scale:  
Nonfeeding Interaction Measures

|                              | # of Agreements<br>(Total Rated = 15) | Reliability |
|------------------------------|---------------------------------------|-------------|
| <u>Infant Measures</u>       |                                       |             |
| State <sup>a</sup>           | 15                                    | 1.00        |
| Physical Activity            | 10                                    | .67         |
| Head Orientation             | 12                                    | .80         |
| Gaze Behavior                | 14                                    | .93         |
| Facial Expressions           | 14                                    | .93         |
| Fussiness                    | 13                                    | .87         |
| Vocalizations                | 15                                    | <u>1.00</u> |
| Total: 6                     |                                       | .86         |
| <u>Mother Measures</u>       |                                       |             |
| State                        | 15                                    | 1.00        |
| Physical Activity            | 14                                    | .93         |
| Head Orientation             | 14                                    | .93         |
| Gaze Behavior                | 13                                    | .87         |
| Silence During Gaze Aversion | 14                                    | .93         |
| Facial Expressions           | 15                                    | 1.00        |
| Vocalizations                | 13                                    | .87         |
| Infantized Behavior          | 12                                    | .80         |
| Contingent Response          | 15                                    | 1.00        |
| Gameplaying                  | 13                                    | <u>.87</u>  |
| Total: 10                    |                                       | .92         |

<sup>a</sup> Infant state omitted from total score calculation.

2. Infant's Nonfeeding IRS Summary Scores (INFIRS), calculated by adding all items, except Infant State, and dividing by 6. Infant state (for example, drowsy or alert) was omitted as it was thought to reflect an uncontrollable or unpredictable behavior, in contrast to the other items which were expected to change with intervention. The INFIRS provides a measure of infant orientation and "signalling" to mother. Behaviors rated include infant's gaze at mother, facial expressions, and vocalizations.
3. Mother's Feeding IRS Summary Score (MFIRS), calculated by adding all 9 items of this section and dividing by 9. The MFIRS is similar to the MNFIRS rating, although included are ratings of the mother's responsiveness to the infant's feeding.
4. Infant's Feeding IRS Summary Score (IFIRS), calculated by adding all items, except Infant State, and dividing by 4. The IFIRS is similar to the INFIRS, with the addition of a rating of persistence of feeding.

## Other Measures

### Life Experiences Survey (LES)

The Life Experiences Survey (LES), developed by Sarason, Johnson, and Siegel (1978), provides an assessment of life stresses. The LES has been related to mothers' sensitivity to their preterm infants (Crnic, Greenberg, et al., 1983). Test-retest reliability was reported to be .63 and .64 for the total scale (Sarason et al., 1978). The total score (LESTOT) was used as a descriptive measure only and was given to the mothers to complete with Set I of the questionnaires.

### Satisfaction With Parenting Scale (SWPS)

The Satisfaction With Parenting Scale (SWPS), developed by Ragozin, Basham, Crnic, Greenberg, and Robinson (1982), assesses maternal attitude to parenting and general satisfaction with the maternal role. The SWPS was included with all three sets of questionnaires. Ragozin et al. reported alpha coefficients of .48, .61, and .67 for the three subscales. They suggested that these alpha levels may have been somewhat depressed due to the limited number of items in the scale. The total score from the SWPS was used as a dependent measure in this study. A copy of the SWPS is included in Appendix D.

### Knowledge of Infant Development Inventory (KIDI)

The Knowledge of Infant Development Inventory (KIDI), developed by MacPhee (1983), assesses a person's knowledge of parental practices, developmental processes, and infant norms. One purpose of the KIDI, as stated by MacPhee, is to evaluate parent education programs. MacPhee, using a group of parents (N=226), reports a test-retest reliability of

$r(58) = .92$  for the total score.

The KIDI was included with all three sets of questionnaires to the mothers. The total score was used as a dependent measure in this study. A copy of the KIDI is included as Appendix D.

#### Mothers' Comments

Mothers in both the control group and the treatment group were asked to complete a "Comments" questionnaire which was included with Set II of the questionnaires. This was used to obtain descriptive information regarding mothers' responses to the training sessions. Although the questions for the two groups are differently worded to reflect differences in the treatment and control group experiences, some comparison information was obtained. This questionnaire was developed by the author and internal reliability has not been tested. Copies of these are included in Appendix D.

#### Summary

A summary of all dependent variables is given in Table 12.

### Interaction Coaching Procedures

#### Setting and Physical Arrangements

Arrangements for mothers and infants to participate in coaching sessions were made initially by telephone, and a letter (see Appendix A) was sent to confirm the arrangements. Mothers and infants arrived at the Child Development Lab, University of Calgary, at a time most convenient for the mother and infant. It was anticipated that, at the time chosen, the infant would be alert, rested, and generally content, although it was recognized that this may not always be possible to

Table 12  
Summary of Dependent Variables

| Variable | Description   |
|----------|---|
| INFIRS   | Infant's nonfeeding Interaction Rating Scale, Total Score.  |
| MNFIRS   | Mother's nonfeeding Interaction Rating Scale, Total Score.  |
| DURNF    | Duration of the infant's positive signalling during nonfeeding interactions.  |
| TPNF     | Mother's responsivity to the infant's positive signalling during nonfeeding interactions calculated using transitional probability formula. |
| IFIRS    | Infant's feeding Interaction Rating Scale, Total Score.   |
| MFIRS    | Mother's feeding Interaction Rating Scale, Total Score.   |
| DURF     | Duration of the infant's positive signalling during feeding interactions.   |
| TPF      | Mother's responsivity to the infant's positive signalling during feeding interactions calculated using transitional probability formula.    |
| SWPS     | Satisfaction With Parenting Scale, Total Score.   |
| KIDI     | Knowledge of Infant Development Inventory, Total Score.   |

predict.

Siblings, if there were any, were welcome, and child-care arrangements were made for them in a waiting area equipped as a playroom. Mothers were encouraged to arrive early for the session in order to allow these siblings the opportunity to adjust to the playroom and the child-care provider before the mother left for the coaching session. If the mother preferred, she made her own child-care arrangements and was reimbursed for the costs of the child care.

Sessions were no longer than 40 minutes and were scheduled twice weekly for 4 weeks.

The Child Development Lab consisted of a spacious carpeted room equipped with two large armchairs, a small table, a shelf of infant toys, an infant seat, and an infant walker. There was a one-way vision mirror along one wall, and colorful posters on the remaining walls. Video cameras were recessed behind glass panels and were unobtrusive.

#### Trainer

The trainer (and researcher) had completed a Master of Educational Psychology degree and had been employed as a child psychologist for 4 years. Her previous employment included considerable experience with counselling and training parents of preschool children. She was a Certified Psychologist in the Province of Alberta.

#### Sessions

The interaction coaching sessions occurred within a didactic model, meaning that a major focus was instruction by the trainer to the mother. However, the nature of this coaching was such that the individual style

and the concerns of the mother needed to be considered. In order to do this, a part of each session involved the trainer empathically discussing with the mother her concerns about and reactions to the coaching. There was no standard "curriculum" for these sessions, although general guidelines, outlined below, were followed.

#### Session One

In the first session, the purpose and procedures of the coaching sessions were explained to the mother and the ear-piece microphone demonstrated.

The mother was asked to describe times when she felt particularly close to her baby. She was then asked to describe times when her baby seemed "distant" or when she and her baby did not seem to be "in tune" with each other. This was seen as an awareness activity to allow the mother to identify differences in interactions and to discuss what she and her baby were doing during these times.

The trainer then described the purpose of these coaching sessions as being a way to help the mother identify and possibly increase the "in-tune" times. The trainer presented a modified version of Field's (1983) model of an activation band and discussed how some babies may have a range within which they can accept stimulation. The trainer also discussed how it has been found by others that there may be ways to help mothers be more aware of when their baby is at the outer limits of this band. Also, mothers were told that there were some things mothers can do that might help their babies stay more frequently within this band. It was important that the trainer present this information in such a way that the mother felt that this information would add to skills she already possessed as a mother rather than having the mother



feel she had been inadequate.

The structure of the training sessions was outlined briefly to the mother. The mother and baby were then videotaped during a 15-20 minute unstructured interaction. The mother was instructed to interact with her baby "as she would at home," recognizing that the mother may feel somewhat uncomfortable in this strange situation. The trainer explained to the mother that during the next session this videotape would be viewed and discussed. She was also told that activities that mothers use which may facilitate social interaction would be described and examples shown during the next sessions.

A brief opportunity to try the ear-piece microphone was offered. The ear-piece microphone used was an adapted two-way communication system purchased from Radio Shack for approximately \$150.00.

The trainer and mother discussed how the mother felt about the upcoming sessions and what the mother might hope to gain from participation. Any questions the mother had were encouraged.

### Session Two

During session two, the trainer again discussed the concept of a band of arousal and then described specifically maternal activities that have been found to increase infant gazing at mother and infant vocalizing. Imitation, exaggerated facial expressions, or "infantizing," repetition of phrases, becoming silent during infant pauses, and modulating arousal during game playing were briefly explained.

The videotape of the previous session was viewed. The trainer preselected specific examples of the mother's activities to highlight. Examples of the mother engaging in the activities described above were pointed out. The trainer also pointed out examples of the baby going

beyond the outer limits of the "band" of arousal and discussed with the mother some possible alternative behaviors she might like to try.

The trainer explained to the mother that in the next six sessions the mother and baby would be on the opposite side of the one-way mirror during the 20-minute activity session. She was told that the trainer would be making comments, via the ear-piece microphone, and that these comments would be very similar to the comments made about the videotape. The mother would have an opportunity to discuss how she reacted to these comments after each activity session.

The trainer attempted to make comments in a manner that was both nonthreatening and left the mother with the option not to follow the suggestion without embarrassment or feelings of guilt (Bromwich & Parmelee, 1979).

### Sessions Three to Eight

Bromwich and Parmelee (1979) recommended a set of guidelines for infant intervention program staff. These guidelines were used to identify aims and to set the climate for the interaction coaching sessions. In the social-affective domain, mothers were encouraged to be responsive to their baby's behavioral cues, initiate social games and show positive affect. In the cognitive-motivational/play domain, mothers were encouraged to actively stimulate their infant's interest in the environment utilizing materials and activities appropriate to the infant's capabilities, interests and attention span. In the language area, mothers were encouraged to experiment with sounds by responding to the infant's vocalizations, to talk to the infant in a focused manner and to make the interactions enjoyable by using reciprocal language. Respect was maintained for the mother's individual

style and goals. Mothers were offered information about interaction principles with positive reinforcement regarding their behavior towards their infant. During the procedures described below, these guidelines were maintained.

Each of sessions 3 to 8 began with a 10-minute talk time. During this time, the trainer asked the mother questions regarding her relationship with her baby and encouraged the mother to share her experiences and concerns. The trainer attempted to respond in a warm, empathic manner.

These talk times were designed to give the mother the opportunity to discuss her concerns and priorities for the session and to help her establish a sense of trust with the trainer. The trainer also used these times to become aware of the mother's strengths and individual style as a parent. Specific behaviors and actions of the mother that appeared to be particularly enjoyable for the infant were identified.

A maximum 20-minute activity time followed the talk time. During this time the mother and baby were on one side of the one-way vision mirror. The mother wore an ear-piece microphone and was able to hear the trainer's voice. The trainer was situated on the opposite side of the one-way mirror. The mother was asked to behave "as she would at home." She was told that she could feed the baby, play with toys, talk, play games, etc. If the baby fell asleep the session was discontinued. Discontinued sessions were not repeated.

The trainer actively reinforced mutually pleasurable interactions between the infant and mother. In order to do this, the trainer made suggestions aimed at helping the mother to accurately read the baby's behavioral cues and to be responsive to them. For example, if the baby

gazed at the mother and put out his tongue, the mother was encouraged to imitate this, or if the baby laughed and looked away while the mother was playing "I'm gonna get you," the mother was encouraged to wait until the baby again looked expectantly at the mother before she began another round of this game. A further aim of the trainer's suggestions was to help the mother initiate positive social interaction and social games with her baby (i.e., turn-taking in vocalizing). Specific behaviors that were reinforced and examples of the trainer's interventions are detailed with the Intervention Summary Form in Appendix C.

A final 10-minute talk time concluded each session. During this time the mother was asked to identify what she found most and least useful during the activity session. She was also asked to describe how she might be able to use this information in her interactions with her baby at home. In the following session she was asked to discuss if she did use that information at home and to describe any changes she observed.

During the eighth and final session, this final talk time focussed on the total coaching experience. The mother was invited to discuss what she found useful in the total experience. She was encouraged to be specific rather than general in her comments to allow her to identify specific behaviors which were helpful in her relationship with her infant. During this final session, arrangements for further follow-up were discussed and good wishes extended for the future.

#### Notes and Videotapes

Notes were made about all training sessions (see Intervention Summary Form, Appendix C) and all sessions were videotaped. Videotapes were retained only until they were reviewed and detailed notes made.

To retain all of the videotapes, at least 150 hours of videotape would have been required and this was not practical for this study. Examination of the notes indicated that, for sessions three to eight, the trainer intervened approximately once per minute.

#### Problems Encountered with Interaction Coaching Procedures

The major problem encountered during the coaching procedures was related to arrangements to attend the sessions. Almost all mothers were very keen to attend but had some concerns about transporting their infants. Eleven of the 18 trained mothers attended all 8 sessions within the designated 4 to 5 week period. Six of the mothers attended 6 or 7 of the sessions, and one mother attended only 4 sessions. For the total sample of 18 dyads, 126 coaching sessions were conducted (Mean of 7.0 sessions per dyad). Sessions were cancelled by the mothers for a variety of reasons. The major reason for cancelling sessions was illness of the infant. Four of the mothers worked on a part-time, on-call basis and they were asked to come to work, necessitating rescheduling or cancelling the session. Other reasons for cancellation included a death in the family, moving into a new house, or the arrival of unexpected company. One mother (who attended 4 sessions only) had four other children, and her infant was on an infant monitor at home.

Another problem occurred with the random assignment to groups. Although all mothers were initially willing to participate in the coaching sessions, when invited to do so, two mothers refused. One of these mothers was scheduled to be hospitalized for surgery (which did not occur during the study period) but volunteered to participate in the control group. The second mother returned to work fulltime and felt she did not have the time to participate in the coaching. She also

agreed to remain in the control group. In both of these cases, the matched alternate mother and infant participated in the coaching.

During the actual sessions there were very few problems. Occasionally the infant would become excessively fussy or drowsy, and the activity portion of the session was discontinued. As mothers were encouraged to care for their infant as they would at home, infants were fed, changed, cuddled, and rocked as the mother felt appropriate, making the need to discontinue a session a rare occurrence. Technical problems that arose were minor and easily repaired.

Child-care arrangements for older siblings were made by employing mature university students to care for the children in a playroom near the Child Development Lab. In one situation, a sibling was involved in an accident in this playroom which resulted in some disruption to the coaching session.

These problems are described here in order to convey some of the practical difficulties involved in an intervention-oriented study such as this one.

### Statistical Design and Analyses

In experimental design, this research constitutes a set of planned comparisons. Each planned comparison utilized a univariate repeated measures design with one covariate (Number of Days Infant Spent in Hospital After Birth). Each univariate planned comparison consists of a  $2 \times 3$  (Group  $\times$  Time) factorial, with repeated measures on Time. In total, 10 dependent measures were analysed (see Table 12 for Summary of Dependent Variables).

A double MANCOVA, one for repeated measures and one for multiple

dependent variables, could have been executed. The MANCOVA with multiple dependent variables (10) was not performed primarily because the differences between the groups were expected to be small. The omnibus MANCOVA for repeated measures effects was replaced by a priori planned comparisons or trend analysis, one for each dependent variable. Hertzog and Rovine (1985) stated that "routine use of the MANOVA omnibus test for repeated-measures effects may be overly conservative" (p. 793) and that "in situations where statistical power is critical (i.e., small sample sizes, small mean differences, large error variance), one should identify and opt for the more powerful statistical test" (p. 793). In this research it was possible to identify, a priori, planned comparisons or specific hypotheses to be tested, one for each dependent variable, allowing the statistical tests to be directly linked to the hypotheses of interest (Hertzog & Rovine, 1985).

The general hypothesis examined here was that the treatment group would improve on all 10 dependent measures over three occasions (pre-treatment, posttreatment, and 2-month follow-up). Specifically, a linear hypothesis suggested a positive effect of treatment between the first, second, and third occasions (TIME 1  $\rightarrow$  TIME 2  $\rightarrow$  TIME 3). Alternatively, a quadratic hypothesis posited a positive effect of treatment between TIME 1 and TIME 2, with a possible negative effect between TIME 2 and TIME 3 (follow-up period with no treatment).

The three occasion measures of each dependent variable were transformed, using orthogonal polynomial contrasts, into two dependent variables, representing linear and quadratic trends. These two orthogonal polynomial contrasts were then used as dependent variables in an analyses of covariance, one for each of the original 10 dependent

measures. The significance level (using an F-test approximation) of the linear and quadratic contrasts was then determined and reported. Hertzog and Rovine (1985) recommended the approach used as "particularly useful if there is reason to expect that the pattern of change will be restricted to a subset of polynomial terms. Single df tests for trend can detect small but reliable lower-order (e.g., linear) trends in the data that would be 'washed out' if hypothesis and error sums of squares are pooled over a large number of non-significant higher-order terms" (p. 797). Tabachnick and Fidell (1983) also recommend a planned comparison approach when it is possible to specify, prior to data collection, highly explicit alternative hypotheses. They point out that these "planned comparisons provide a powerful alternative to the practice of omnibus F tests followed by post hoc comparisons" (p. 43).

Pearson Product Moment Correlations were computed in order to examine the relationships between the dependent variables. These correlations are reported.

The number of days the infant was hospitalized was identified and used as a covariate in order to account for the degree of illness experienced by the infant (Minde et al., 1985).

The SPSS program was used to obtain means, standard deviations, and intercorrelations, and to complete single df comparisons.

For two dependent variables, DURIF and TPF, an arcsine transformation was used:

$$A = 2 \arcsine \sqrt{p} .$$

(Arcsine = twice the angle, measured in radians, whose trigonometric sine equals the square root of the proportion being transformed.)

This transformation is discussed by Cohen (1975). It was used because,



for these two variables, the original proportions fell primarily in the upper and lower ends (i.e.,  $<.25$  and  $>.75$ ). A nonlinear transformation, of which arcsine is most common, is recommended in this situation "in order to achieve a unit of measurement which is more nearly linearly related to other variables" (Cohen, 1975, p. 255).

Data were missing for two dyads at the third observation period. In one coached dyad, the family unexpectedly moved out of town and, in the second, a control group dyad, the mother returned to work full-time and chose not to continue in the study. The mean of the raw scores for groups and variable was used to replace this missing data and thus allow the statistical analyses to proceed with no missing cells.

### Hypotheses

The hypotheses investigated are listed below. For each of the hypotheses, the effects of Group  $\times$  Time linear and quadratic trends were examined.

1. There will be a significant difference between the treatment and control groups, in favor of the treatment group, on (a) the Infant's Nonfeeding Interaction Rating Scale Summary Scores (INFIRS) and (b) the Infant's Feeding Interaction Rating Scale Summary Scores (IFIRS). These effects will be observable (a) immediately following treatment and (b) 6-8 weeks following treatment.
2. There will be a significant difference between the treatment and control groups, in favor of the treatment group, on (a) the Mother's Nonfeeding Interaction Rating Scale Summary Scores (MNFIRS) and (b) the Mother's Feeding Interaction Rating Scale

Summary Scores (MFIRS). These effects will be observable

(a) immediately following treatment and (b) 6-8 weeks following treatment.

3. There will be a significant difference between the treatment and control groups, in favor of the treatment group, on (a) the Duration of Infant's Positive Signalling during Nonfeeding Interactions (DURNF) and (b) the Duration of Infant's Positive Signalling during Feeding Interactions (DURF). These effects will be observable (a) immediately following treatment and (b) 6-8 weeks following treatment.
4. There will be a significant difference between the treatment and control groups, in favor of the treatment group, on (a) the Mother's Responsivity to the Infant's Positive Signalling during Nonfeeding Interactions (TPNF) and (b) the Mother's Responsivity to the Infant's Positive Signalling during Feeding Interactions (TPF). These effects will be observable (a) immediately following treatment and (b) 6-8 weeks following treatment.
5. There will be a significant difference between the treatment and control groups, in favor of the treatment group, on the Satisfaction With Parenting Scale, Total Score (SWPS). These effects will be observable (a) immediately following treatment and (b) 6-8 weeks following treatment.
6. There will be a significant difference between the treatment and control groups, in favor of the treatment group, on the Knowledge of Infant Development Inventory (KIDI). These effects will be observable (a) immediately following treatment and (b) 6-8 weeks following treatment.

## CHAPTER IV

### RESULTS

The purpose of this study was to investigate the effects of short-term interaction coaching with mothers of preterm infants.

#### Descriptive Statistics

The means and standard deviations of the summary dependent variables under study are shown in Table 13. The means and standard deviations of the individual observation codes which contributed to these final summary scores are shown in Tables 14 and 15.

Of interest were changes in the mean proportion of specific codes over time. In the nonfeeding situation, mothers held their infants less at TIME 3 than at TIME 1. Infants played more with toys and looked less at their mothers at TIME 3 than at TIME 1. Infants almost never cried and mothers almost never used negative vocalizations with their infants. In the feeding situation, mean proportions of the codes were relatively stable over time and between groups.

The means and standard deviations for the Life Experiences Survey (LES) are presented in Table 16. Treatment group mothers appeared to report more positive responses on the total scale than control group mothers. As the LES was found to be uncorrelated with the majority of the summary dependent variables, it was not used as a covariate in the tests of the research hypotheses.

Table 13  
Descriptive Statistics of Summary Dependent Variables

|                                | Treatment<br>(n = 18) |                  |                  |                  | Control<br>(n = 17) |                   |                  | Total Sample<br>(N = 35) |                   |  |
|--------------------------------|-----------------------|------------------|------------------|------------------|---------------------|-------------------|------------------|--------------------------|-------------------|--|
|                                | TIME 1<br>M (SD)      | TIME 2<br>M (SD) | TIME 3<br>M (SD) | TIME 1<br>M (SD) | TIME 2<br>M (SD)    | TIME 3*<br>M (SD) | TIME 1<br>M (SD) | TIME 2<br>M (SD)         | TIME 3*<br>M (SD) |  |
| <u>Nonfeeding Variables</u>    |                       |                  |                  |                  |                     |                   |                  |                          |                   |  |
| INFIRS                         | 2.20 (.37)            | 2.27 (.22)       | 2.27 (.23)       | 2.07 (.41)       | 2.12 (.30)          | 2.13 (.33)        | 2.14 (.39)       | 2.20 (.27)               | 2.20 (.29)        |  |
| MFIRS                          | 2.38 (.26)            | 2.46 (.22)       | 2.53 (.26)       | 2.32 (.26)       | 2.38 (.16)          | 2.39 (.26)        | 2.35 (.26)       | 2.42 (.19)               | 2.46 (.26)        |  |
| DURINF                         | .37 (.14)             | .35 (.18)        | .34 (.16)        | .33 (.22)        | .32 (.17)           | .27 (.17)         | .35 (.18)        | .34 (.17)                | .30 (.16)         |  |
| TPNF                           | .29 (.09)             | .25 (.06)        | .22 (.08)        | .22 (.11)        | .28 (.08)           | .21 (.08)         | .26 (.10)        | .27 (.07)                | .21 (.08)         |  |
| <u>Feeding Variables</u>       |                       |                  |                  |                  |                     |                   |                  |                          |                   |  |
| IFIRS                          | 2.31 (.50)            | 2.08 (.47)       | 2.25 (.49)       | 2.41 (.41)       | 2.43 (.50)          | 2.14 (.55)        | 2.36 (.46)       | 2.25 (.51)               | 2.20 (.51)        |  |
| MFIRS                          | 2.41 (.24)            | 2.50 (.24)       | 2.39 (.29)       | 2.51 (.23)       | 2.55 (.14)          | 2.56 (.22)        | 2.46 (.24)       | 2.53 (.20)               | 2.47 (.27)        |  |
| DURIF                          | .30 (.29)             | .32 (.27)        | .34 (.31)        | .41 (.29)        | .55 (.31)           | .42 (.26)         | .35 (.29)        | .43 (.31)                | .38 (.29)         |  |
| TPF                            | .15 (.17)             | .13 (.13)        | .16 (.15)        | .16 (.11)        | .14 (.13)           | .12 (.01)         | .15 (.14)        | .13 (.13)                | .14 (.13)         |  |
| <u>Mother's Questionnaires</u> |                       |                  |                  |                  |                     |                   |                  |                          |                   |  |
| SWPS                           | 37.56 (5.48)          | 38.39 (4.83)     | 38.72 (4.28)     | 36.35 (5.00)     | 35.94 (4.15)        | 37.00 (4.64)      | 36.97 (5.21)     | 37.20 (4.61)             | 37.89 (4.48)      |  |
| KIDI                           | 75.46 (9.58)          | 80.36 (8.54)     | 81.65 (7.61)     | 73.61 (7.84)     | 74.71 (9.12)        | 77.66 (11.45)     | 74.56 (8.70)     | 77.61 (9.16)             | 79.71 (9.73)      |  |

\* Two cases missing and cell means were used as raw data.

Table 14  
Descriptive Statistics of Observation Codes: Nonfeeding Situation

| Variables                          | Treatment<br>(n = 18) |                  |                  | Control<br>(n = 17) |                  |                  | Total Sample<br>(N = 35) |                  |                  |
|------------------------------------|-----------------------|------------------|------------------|---------------------|------------------|------------------|--------------------------|------------------|------------------|
|                                    | Time 1<br>M (SD)      | Time 2<br>M (SD) | Time 3<br>M (SD) | Time 1<br>M (SD)    | Time 2<br>M (SD) | Time 3<br>M (SD) | Time 1<br>M (SD)         | Time 2<br>M (SD) | Time 3<br>M (SD) |
| Mother within 3 ft of Baby         | .971 (.037)           | .978 (.029)      | .980 (.040)      | .970 (.039)         | .962 (.047)      | .996 (.016)      | .971 (.038)              | .971 (.039)      | .985 (.031)      |
| Mother Looks at Baby               | .905 (.103)           | .931 (.068)      | .928 (.164)      | .902 (.105)         | .932 (.074)      | .958 (.083)      | .903 (.102)              | .932 (.070)      | .943 (.130)      |
| Mother Holds Baby                  | .595 (.250)           | .473 (.236)      | .303 (.254)      | .676 (.314)         | .454 (.316)      | .384 (.229)      | .636 (.283)              | .464 (.274)      | .342 (.242)      |
| Mother Caretaking Baby             | .185 (.285)           | .198 (.267)      | .045 (.095)      | .134 (.176)         | .193 (.245)      | .166 (.322)      | .160 (.232)              | .196 (.253)      | .104 (.239)      |
| Baby Cries                         | .007 (.024)           | .000 (.000)      | .000 (.000)      | .002 (.008)         | .000 (.000)      | .000 (.000)      | .004 (.018)              | .000 (.000)      | .000 (.000)      |
| Baby Plays with Toy                | .112 (.193)           | .249 (.196)      | .486 (.280)      | .069 (.175)         | .311 (.298)      | .461 (.181)      | .090 (.183)              | .279 (.249)      | .474 (.234)      |
| Baby Looks at Mother's Face        | .333 (.168)           | .287 (.201)      | .164 (.132)      | .266 (.223)         | .234 (.125)      | .193 (.145)      | .300 (.197)              | .261 (.168)      | .178 (.137)      |
| Mother Vocalizes Negatively        | .000 (.000)           | .000 (.000)      | .000 (.001)      | .000 (.000)         | .000 (.000)      | .000 (.000)      | .000 (.000)              | .000 (.000)      | .000 (.001)      |
| Mother Vocalizes Positively        | .826 (.140)           | .853 (.140)      | .756 (.253)      | .698 (.200)         | .744 (.175)      | .829 (.139)      | .762 (.182)              | .800 (.165)      | .791 (.208)      |
| Mother Smiles at Baby              | .082 (.119)           | .044 (.049)      | .052 (.070)      | .086 (.130)         | .033 (.040)      | .034 (.038)      | .084 (.123)              | .039 (.044)      | .043 (.057)      |
| Mother Shows Toy to Baby           | .252 (.188)           | .242 (.118)      | .191 (.085)      | .141 (.132)         | .202 (.123)      | .273 (.145)      | .196 (.169)              | .223 (.120)      | .231 (.123)      |
| Mother Touches Baby Affectionately | .087 (.096)           | .037 (.041)      | .020 (.020)      | .059 (.104)         | .050 (.046)      | .027 (.021)      | .073 (.099)              | .043 (.043)      | .023 (.021)      |
| Mother Plays Game with Baby        | .178 (.093)           | .178 (.104)      | .208 (.109)      | .153 (.120)         | .198 (.131)      | .198 (.155)      | .166 (.106)              | .187 (.117)      | .203 (.132)      |
| Baby Smiles                        | .055 (.048)           | .070 (.067)      | .114 (.181)      | .033 (.041)         | .048 (.045)      | .076 (.075)      | .044 (.045)              | .060 (.058)      | .095 (.079)      |
| Baby Vocalizes                     | .086 (.090)           | .052 (.055)      | .097 (.078)      | .084 (.112)         | .050 (.038)      | .063 (.043)      | .085 (.099)              | .051 (.047)      | .080 (.065)      |
| Baby Touches Mother                | .010 (.030)           | .028 (.067)      | .010 (.015)      | .011 (.020)         | .029 (.075)      | .004 (.010)      | .028 (.070)              | .007 (.013)      | .077 (.096)      |
| Baby Averts Head or Frets          | .069 (.093)           | .029 (.033)      | .029 (.039)      | .085 (.101)         | .064 (.056)      | .028 (.050)      | .077 (.096)              | .046 (.049)      | .028 (.044)      |

Table 15

## Descriptive Statistics of Observation Codes: Feeding Situation

|                                    | Treatment<br>(n = 18) |                  |                  | Control<br>(n = 17) |                  |                  | Total Sample<br>(N = 35) |                  |                  |
|------------------------------------|-----------------------|------------------|------------------|---------------------|------------------|------------------|--------------------------|------------------|------------------|
|                                    | Time 1<br>M (SD)      | Time 2<br>M (SD) | Time 3<br>M (SD) | Time 1<br>M (SD)    | Time 2<br>M (SD) | Time 3<br>M (SD) | Time 1<br>M (SD)         | Time 2<br>M (SD) | Time 3<br>M (SD) |
| Mother within 3 ft of Baby         | .954 (.088)           | .966 (.056)      | .977 (.035)      | .964 (.057)         | .964 (.051)      | .968 (.049)      | .959 (.073)              | .965 (.053)      | .973 (.042)      |
| Mother Looks at Baby               | .884 (.154)           | .962 (.054)      | .928 (.211)      | .890 (.138)         | .937 (.059)      | .936 (.138)      | .887 (.144)              | .949 (.057)      | .932 (.176)      |
| Mother Holds Baby                  | .907 (.235)           | .838 (.283)      | .537 (.481)      | .864 (.257)         | .737 (.385)      | .687 (.392)      | .886 (.243)              | .787 (.337)      | .612 (.438)      |
| Mother Caretakes Baby              | .941 (.118)           | .963 (.054)      | .905 (.240)      | .926 (.106)         | .959 (.052)      | .974 (.045)      | .934 (.111)              | .961 (.052)      | .939 (.173)      |
| Baby Cries                         | .000 (.000)           | .006 (.019)      | .000 (.000)      | .004 (.017)         | .000 (.000)      | .007 (.027)      | .002 (.012)              | .003 (.014)      | .003 (.019)      |
| Baby Plays with Toy                | .019 (.081)           | .011 (.045)      | .031 (.087)      | .010 (.041)         | .003 (.014)      | .032 (.095)      | .015 (.064)              | .007 (.033)      | .032 (.090)      |
| Baby Looks at Mother's Face        | .284 (.289)           | .331 (.288)      | .368 (.344)      | .375 (.287)         | .463 (.314)      | .359 (.277)      | .329 (.287)              | .397 (.304)      | .364 (.305)      |
| Mother Vocalizes Negatively        | .000 (.000)           | .000 (.000)      | .000 (.000)      | .000 (.000)         | .001 (.004)      | .000 (.000)      | .000 (.000)              | .000 (.003)      | .000 (.000)      |
| Mother Vocalizes Positively        | .463 (.228)           | .549 (.289)      | .584 (.328)      | .413 (.235)         | .456 (.286)      | .531 (.265)      | .439 (.229)              | .503 (.287)      | .558 (.295)      |
| Mother Smiles at Baby              | .036 (.052)           | .032 (.053)      | .029 (.037)      | .125 (.193)         | .027 (.049)      | .037 (.046)      | .079 (.050)              | .030 (.050)      | .033 (.041)      |
| Mother Shows Toy to Baby           | .005 (.015)           | .005 (.012)      | .007 (.027)      | .000 (.000)         | .002 (.008)      | .012 (.033)      | .003 (.011)              | .003 (.010)      | .010 (.027)      |
| Mother Touches Baby Affectionately | .165 (.212)           | .065 (.070)      | .073 (.129)      | .060 (.098)         | .279 (.131)      | .050 (.062)      | .114 (.172)              | .072 (.105)      | .062 (.102)      |
| Mother Plays Game with Baby        | .070 (.173)           | .011 (.019)      | .034 (.065)      | .012 (.014)         | .011 (.034)      | .016 (.039)      | .042 (.126)              | .011 (.027)      | .025 (.053)      |
| Baby Smiles                        | .001 (.003)           | .003 (.009)      | .011 (.029)      | .030 (.077)         | .004 (.009)      | .002 (.005)      | .015 (.055)              | .004 (.009)      | .007 (.021)      |
| Baby Vocalizes                     | .002 (.004)           | .001 (.003)      | .003 (.005)      | .022 (.050)         | .018 (.032)      | .013 (.019)      | .011 (.036)              | .009 (.024)      | .008 (.014)      |
| Baby Touches Mother                | .020 (.055)           | .037 (.064)      | .011 (.025)      | .054 (.127)         | .099 (.238)      | .054 (.078)      | .036 (.097)              | .067 (.173)      | .032 (.061)      |
| Baby Averts Head or Frets          | .087 (.135)           | .077 (.117)      | .103 (.172)      | .051 (.076)         | .060 (.091)      | .076 (.117)      | .069 (.110)              | .069 (.104)      | .090 (.146)      |

Table 16  
Descriptive Statistics for the Life Experiences Survey (LES)

|           | Treatment<br>(n = 18) |               | Control<br>(n = 17) |               | Total Sample<br>(N = 35) |               |
|-----------|-----------------------|---------------|---------------------|---------------|--------------------------|---------------|
|           | <u>M</u>              | ( <u>SD</u> ) | <u>M</u>            | ( <u>SD</u> ) | <u>M</u>                 | ( <u>SD</u> ) |
| LES POS   | 13.500                | (7.935)       | 10.412              | (9.572)       | 12.000                   | (8.778)       |
| LES NEG   | -7.389                | (5.304)       | -10.588             | (7.665)       | -8.943                   | (6.660)       |
| LES TOTAL | 6.167                 | (9.275)       | -.176               | (13.192)      | 3.086                    | (11.630)      |

### Intervariable Correlations

In order to determine the extent of the relationships among the dependent variables, Pearson Product Moment Correlation coefficients were calculated by use of the SPSS program. The intercorrelations between the 10 summary dependent variables at TIME 1, TIME 2, and TIME 3 are presented in Tables 17, 18, and 19. At TIME 1, INFIRS and MNFIRS were significantly related, as were INFIRS and DURINF. Also at TIME 1, IFIRS was significantly related to MFIRS and DURIF. There was a significant relationship between SWPS and MNFIRS1 and DURINF1. These relationships were not found to be stable over time, as can be seen from the intercorrelations at TIME 2 and TIME 3, presented in Tables 18 and 19. However, at TIME 2, INFIRS continued to be related to MNFIRS and DURINF.

The intercorrelations of the summary dependent variables with the covariate, Days Infant Hospitalized After Birth, are presented in Table 20. At TIME 1, Days Infant Hospitalized was significantly correlated with four of the 10 dependent measures. Days Infant Hospitalized was used as a covariate in the test of the research hypotheses because it was more related to the dependent variables than the other possible covariates, Mother's Education, Ponderal Index, and LESTOT (measuring Life Stress). Mother's education was significantly related to only IFIRS1 ( $p = .006$ ), MFIRS2 ( $p = .02$ ), and KIDI scores at all three times. The correlations between KIDI and Mother's Education are presented in Table 21. These results indicate that mothers who are more highly educated have more knowledge of infant development. The Ponderal Index was not significantly correlated with any of the dependent variables at any time. Significant correlations



Table 17  
Pearson Product Moment Intercorrelations of the Summary Dependent Variables  
at TIME ONE (N = 35)

|          | INFIRS 1 | MNFIRS 1 | DURINF 1 | TPNF 1 | IFIRS 1 | MFIRS 1 | DURIF 1 | TPF 1 | SWPS 1 | KIDI 1 |
|----------|----------|----------|----------|--------|---------|---------|---------|-------|--------|--------|
| INFIRS 1 |          |          |          |        |         |         |         |       |        |        |
| MNFIRS 1 | .341**   |          |          |        |         |         |         |       |        |        |
| DURINF 1 | .547***  | .329*    |          |        |         |         |         |       |        |        |
| TPNF 1   | .117     | -.156    | .258     |        |         |         |         |       |        |        |
| IFIRS 1  | .117     | .198     | .067     | -.122  |         |         |         |       |        |        |
| MFIRS 1  | .059     | .361*    | -.160    | -.227  | .514*** |         |         |       |        |        |
| DURIF 1  | -.090    | .176     | .089     | -.169  | .359*   | .178    |         |       |        |        |
| TPF 1    | -.194    | -.096    | -.143    | .147   | -.147   | .005    | .147    |       |        |        |
| SWPS 1   | .196     | .405**   | .411**   | -.062  | .054    | .147    | -.025   | -.234 |        |        |
| KIDI 1   | .137     | .163     | -.011    | -.119  | .375*   | .077    | .136    | -.146 | .247   |        |

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

Table 18  
Pearson Product Moment Intercorrelations of the Summary Dependent Variables  
at TIME TWO (N = 35)

|          | INFIRS 2 | MNFIRS 2 | DURINF 2 | TPNF 2 | IFIRS 2 | MFIRS 2 | DURIF 2 | TPF 2 | SWPS 2 | KIDI 2 |
|----------|----------|----------|----------|--------|---------|---------|---------|-------|--------|--------|
| INFIRS 2 |          |          |          |        |         |         |         |       |        |        |
| MNFIRS 2 | .345*    |          |          |        |         |         |         |       |        |        |
| DURINF 2 | .376**   | .316*    |          |        |         |         |         |       |        |        |
| TPNF 2   | .002     | -.195    | .264     |        |         |         |         |       |        |        |
| IFIRS 2  | -.213    | .132     | -.088    | .231   |         |         |         |       |        |        |
| MFIRS 2  | .104     | .118     | .301*    | .174   | .241    |         |         |       |        |        |
| DURIF 2  | -.150    | -.035    | -.093    | -.134  | .491*** | .279*   |         |       |        |        |
| TPF 2    | -.216    | -.084    | -.183    | -.259  | .206    | .062    | .232    |       |        |        |
| SWPS 2   | .262     | .176     | .044     | -.151  | -.182   | -.067   | -.145   | .134  |        |        |
| KIDI 2   | -.110    | .289*    | .091     | -.287  | -.054   | .194    | -.042   | .109  | .104   |        |

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

Table 19  
Pearson Product Moment Intercorrelations of the Summary Dependent Variables  
at TIME THREE (N = 35)

|          | INFIRS 3 | MNFIRS 3 | DURINF 3 | TPNF 3 | IFIRS 3 | MFIRS 3 | DURIF 3 | TPF 3 | SWPS 3 | KIDI 3 |
|----------|----------|----------|----------|--------|---------|---------|---------|-------|--------|--------|
| INFIRS 3 |          |          |          |        |         |         |         |       |        |        |
| MNFIRS 3 | .122     |          |          |        |         |         |         |       |        |        |
| DURINF 3 | .169     | .328     |          |        |         |         |         |       |        |        |
| TPNF 3   | -.013    | -.007    | .287*    |        |         |         |         |       |        |        |
| IFIRS 3  | .151     | .023     | .123     | -.316  |         |         |         |       |        |        |
| MFIRS 3  | .108     | .364*    | .079     | .029   | .153    |         |         |       |        |        |
| DURIF 3  | -.391**  | -.227    | -.143    | -.157  | .258    | -.273*  |         |       |        |        |
| TPF 3    | -.039    | -.111    | -.185    | -.140  | .196    | -.308*  | .207    |       |        |        |
| SWPS 3   | .047     | .275*    | .405**   | .254   | -.022   | -.161   | .092    | .163  |        |        |
| KIDI 3   | -.016    | .297*    | .126     | .301*  | .027    | .130    | -.064   | -.224 | .092   |        |

\* p < .05  
\*\* p < .01

Table 20  
Pearson Product Moment Correlations of the Summary Dependent Variables at Three Occasions  
with Days Infant Hospitalized After Birth (N = 35)

|            | INFIRS | MNFIRS | DURINF | TPNF  | IFIRS   | MFIRS | DURIF | DURIF(arc) | TPF   | TPF(arc) | SWPS  | KIDI  |
|------------|--------|--------|--------|-------|---------|-------|-------|------------|-------|----------|-------|-------|
| TIME ONE   | .168   | .309*  | .311*  | .185  | -.421** | .160  | .167  | -.147      | .355* | .250     | -.073 | -.068 |
| TIME TWO   | -.193  | -.166  | .004   | .145  | .078    | -.160 | -.233 | -.208      | .090  | .054     | -.089 | -.102 |
| TIME THREE | -.218  | .372** | .119   | .346* | -.297*  | .074  | -.110 | -.166      | -.096 | -.103    | .057  | -.066 |

\* p < .05

\*\* p < .01

\*\*\* p < .001

were found between SWPS and LESTOT. These are presented in Table 22. These results indicate that mothers who reported experiencing more stress in the previous year were less satisfied as parents.

Across-time correlations are presented for each dependent variable in Tables 23 to 32. Significant relationships, over time, were found for the SWPS and KIDI variables. For the remaining 8 dependent variables, across-time correlation was inconsistent. This result indicates that the mothers' self-report questionnaires were more stable than the observational measures used in this investigation.

#### Tests of Research Hypotheses

For each of the six research hypotheses stated in Chapter III, the following statistical procedures were followed. The three occasion measures of the specified dependent variables were transformed into two polynomial coefficients and a one-way multivariate analysis of covariance was executed on these contrast coefficients. The number of days the infant was hospitalized after birth was used as the covariate in each of the analyses. The approximate F-ratios of the single df linear and quadratic contrasts for the effects of TIME  $\times$  GROUP, and TIME were calculated. The results of these analyses are summarized in Tables 33, 34, and 35. These tables indicate many nonsignificant results. Significant results are discussed for each research hypothesis.

1. No significant difference between treatment and control groups was found on the INFIRS or IFIRS over time (i.e., there was no significant Group  $\times$  Time interaction). There was a marginally significant linear effect of TIME ( $p = .058$ ) on IFIRS, indicating

Table 21

Pearson Product Moment Correlations Between Mother's Education  
and the Knowledge of Infant Development Inventory  
(N = 35)

|                    | KIDI 1 | KIDI 2 | KIDI 3 |
|--------------------|--------|--------|--------|
| Mother's Education | .456** | .358*  | .410** |

\*  $p < .01$

\*\*  $p < .001$

Table 22

Pearson Product Moment Correlations Between the Satisfaction  
with Parenting Scale (SWPS) and the Life Experiences Survey (LESTOT)  
(N = 35)

|        | SWPS 1 | SWPS 2 | SWPS 3 |
|--------|--------|--------|--------|
| LESTOT | .505** | .367*  | .544** |

\*  $p < .01$

\*\*  $p < .001$

Table 23

Pearson Product Moment Correlations Across Time for INFIRS  
(N = 35)

|          | INFIRS 1 | INFIRS 2 |
|----------|----------|----------|
| INFIRS 2 | .022     |          |
| INFIRS 3 | .241     | .301*    |

\*  $p < .05$

Table 24  
Pearson Product Moment Correlations Across Time for MNFIRS  
(N = 35)

|          | MNFIRS 1 | MNFIRS 2 |
|----------|----------|----------|
| MNFIRS 2 | .200     |          |
| MNFIRS 3 | .338*    | .179     |

\*  $p < .05$

Table 25  
Pearson Product Moment Correlations Across Time for DURNF  
(N = 35)

|         | DURNF 1 | DURNF 2 |
|---------|---------|---------|
| DURNF 2 | -.04    |         |
| DURNF 3 | .212    | .276*   |

\*  $p < .05$

Table 26  
Pearson Product Moment Correlations Across Time for TPNF  
(N = 35)

|        | TPNF 1 | TPNF 2 |
|--------|--------|--------|
| TPNF 2 | .113   |        |
| TPNF 3 | -.149  | -.377* |

\*  $p < .05$

Table 27

Pearson Product Moment Correlations Across Time for IFIRS  
(N = 35)

|         | IFIRS 1 | IFIRS 2 |
|---------|---------|---------|
| IFIRS 2 | -.103   |         |
| IFIRS 3 | .485**  | .054    |

\*\* p < .01

Table 28

Pearson Product Moment Correlations Across Time for MFIRS  
(N = 35)

|         | MFIRS 1 | MFIRS 2 |
|---------|---------|---------|
| MFIRS 2 | .417**  |         |
| MFIRS 3 | .263    | .498**  |

\*\* p < .01

Table 29

Pearson Product Moment Correlations Across Time for TPF  
(N = 35)

|       | TPF 1 | TPF 2 |
|-------|-------|-------|
| TPF 2 | .198  |       |
| TPF 3 | .001  | .211  |



Table 30

Pearson Product Moment Correlations Across Time for DURIF  
(N = 35)

|         | DURIF 1 | DURIF 2 |
|---------|---------|---------|
| DURIF 2 | .539*** |         |
| DURIF 3 | -.251   | -.198   |

\*\*\* p < .001

Table 31

Pearson Product Moment Correlations Across Time for SWPS  
(N = 35)

|        | SWPS 1  | SWPS 2  |
|--------|---------|---------|
| SWPS 2 | .854*** |         |
| SWPS 3 | .756*** | .743*** |

\*\*\* p < .001

Table 32

Pearson Product Moment Correlations Across Time for KIDI  
(N = 35)

|        | KIDI 1  | KIDI 2  |
|--------|---------|---------|
| KIDI 2 | .820*** |         |
| KIDI 3 | .778*** | .843*** |

\*\*\* p < .001

Table 33  
NONFEEDING DATA  
Planned Comparisons Using Polynomial Coefficients as Dependent Variables  
(Group by Time with Days Infant Hospitalized as Covariate)

|  | Linear Single df Test |    |         |      | Quadratic Single df Test |    |         |      |
|--|-----------------------|----|---------|------|--------------------------|----|---------|------|
|  | SS                    | df | F       | p    | SS                       | df | F       | p    |
| Infant IRS (INFIRS):                               |                       |    |         |      |                          |    |         |      |
| Time   | .07040                | 1  | .76104  | .389 | .01408                   | 1  | .17458  | .678 |
| Time × Group                                       | .00008                | 1  | .00090  | .976 | .00214                   | 1  | .02658  | .871 |
| Error  | 3.05291               | 33 | -       | -    | 2.66283                  | 33 | -       | -    |
| Mother IRS (MNFIRS):                               |                       |    |         |      |                          |    |         |      |
| Time   | .19875                | 1  | 4.39429 | .043 | .00360                   | 1  | .08387  | .773 |
| Time × Group                                       | .02429                | 1  | .53703  | .468 | .00090                   | 1  | .02097  | .885 |
| Error  | 1.49260               | 33 | -       | -    | 1.41804                  | 33 | -       | -    |
| Duration of Infant's Positive Signalling (DURNF):  |                       |    |         |      |                          |    |         |      |
| Time   | .03856                | 1  | 1.60297 | .214 | .00283                   | 1  | .10160  | .751 |
| Time × Group                                       | .00274                | 1  | .11398  | .737 | .00256                   | 1  | .11398  | .737 |
| Error  | .79390                | 33 | -       | -    | .91935                   | 33 | -       | -    |
| Mother's Responsivity to Infant [p(MA IA)] (TPNF): |                       |    |         |      |                          |    |         |      |
| Time   | .02987                | 1  | 3.13604 | .085 | .02342                   | 1  | 3.76578 | .060 |
| Time × Group                                       | .01325                | 1  | 1.39113 | .246 | .03249                   | 1  | 5.22425 | .028 |
| Error  | .31431                | 33 | -       | -    | .20528                   | 33 | -       | -    |

Table 34  
FEEDING DATA  
Planned Comparisons Using Polynomial Coefficients as Dependent Variables  
(Group by Time with Days Infant Hospitalized as Covariate)

|  | Linear Single df Test |    |         |      | Quadratic Single df Test |    |         |      |
|--|-----------------------|----|---------|------|--------------------------|----|---------|------|
|  | SS                    | df | F       | p    | SS                       | df | F       | p    |
| Infant IRS (IFIRS):  |                       |    |         |      |                          |    |         |      |
| Time   | .46089                | 1  | 3.83946 | .058 | .01866                   | 1  | .06608  | .798 |
| Time × Group   | .18347                | 1  | 1.52844 | .225 | .68895                   | 1  | 2.43870 | .127 |
| Error  | 3.96133               | 33 | -       | -    | 9.32280                  | 33 | -       | -    |
| Mother IRS (MFIRS):  |                       |    |         |      |                          |    |         |      |
| Time   | .00228                | 1  | .04724  | .829 | .09052                   | 1  | 4.15790 | .049 |
| Time × Group   | .01641                | 1  | .33923  | .564 | .04333                   | 1  | .33923  | .564 |
| Error  | 1.59660               | 33 | -       | -    | .71844                   | 33 | 1.99046 | .167 |
| Duration of Infant Positive Signalling <sup>a</sup> (DURF):    |                       |    |         |      |                          |    |         |      |
| Time   | .18101                | 1  | .27187  | .605 | .68702                   | 1  | .27187  | .605 |
| Time × Group   | .00391                | 1  | .00588  | .939 | .56227                   | 1  | 1.46814 | .234 |
| Error  | 21.97156              | 33 | -       | -    | 12.63851                 | 33 | -       | -    |
| Mother's Responsivity to Infant <sup>a</sup> [p(MA IA)] (TPF): |                       |    |         |      |                          |    |         |      |
| Time   | .00826                | 1  | .03132  | .860 | .02497                   | 1  | .15580  | .695 |
| Time × Group   | .28413                | 1  | 1.07749 | .306 | .00049                   | 1  | .00309  | .956 |
| Error  | 8.70211               | 33 | -       | -    | 5.28933                  | 33 | -       | -    |

<sup>a</sup> Results reported are based on arc sine transformed data.

Table 35  
SWPS AND KIDI DATA  
Planned Comparisons Using Polynomial Coefficients as Dependent Variables  
(Group by Time with Days Infant Hospitalized as Covariate)

|              | Linear Single df Test |    |          |       | Quadratic Single df Test |    |         |      |
|--------------|-----------------------|----|----------|-------|--------------------------|----|---------|------|
|              | SS                    | df | F        | p     | SS                       | df | F       | p    |
| SWPS         |                       |    |          |       |                          |    |         |      |
| Time         | 14.62857              | 1  | 2.00149  | .166  | 1.21904                  | 1  | .31236  | .580 |
| Time × Group | 1.18025               | 1  | .16148   | .690  | 5.65900                  | 1  | 1.44986 | .237 |
| Error        | 241.19100             | 33 | -        | -     | 128.78921                | 33 | -       | -    |
| KIDI         |                       |    |          |       |                          |    |         |      |
| Time         | 463.93780             | 1  | 24.02970 | <.001 | 5.39201                  | 1  | .45943  | .502 |
| Time × Group | 19.97844              | 1  | 1.03478  | .316  | 43.45484                 | 1  | 3.70259 | .063 |
| Error        | 637.12582             | 33 | -        | -     | 387.29829                | 33 | -       | -    |

that, regardless of group, IFIRS scores decreased slightly over time.

2. No significant difference between treatment and control groups was found on the MNFIRS or MFIRS over time (i.e., there was no significant Group  $\times$  Time interaction). There was a significant linear effect of TIME ( $p = .043$ ) on the MNFIRS (see Figure 1). It would appear that, for the total group, MNFIRS scores increased over time. There was a significant quadratic effect of TIME ( $p = .049$ ) on MFIRS. It would appear that, particularly for the treatment group, MFIRS scores increased between TIME 1 and TIME 2 and then decreased again between TIME 2 and TIME 3 (see Figure 2).
3. No significant difference between treatment and control groups was found on DURNF or DURF over time (i.e., there was no significant Group  $\times$  Time interaction). In addition, there were no significant differences observed due to TIME on either variable.
4. A significant difference between the treatment and control groups, in favor of the control group, was found on TPNF. Specifically, there was a significant quadratic effect of Group  $\times$  Time ( $p = .028$ ) for TPNF. As can be seen in Figure 3, the treatment group had a significantly higher group mean at TIME 1 when compared to the control group, and that at TIME 3 the group means are equivalent. The linear effects of TIME were marginally significant ( $p = .09$ ), indicating that, for the total sample, TPNF decreased over time. However, a marginally significant quadratic effect of TIME ( $p = .06$ ) was also found. This effect showed that the TPNF scores for the control group increased significantly between TIME 1 and TIME 2, and returned at TIME 3 to slightly below the original TIME 1 level.

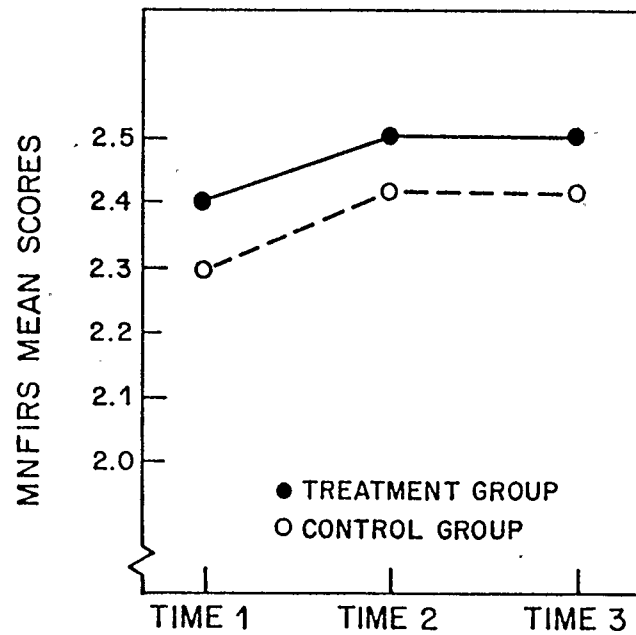


Figure 1. Linear effect of Time ( $p=.043$ ) on MNIFRS scores.

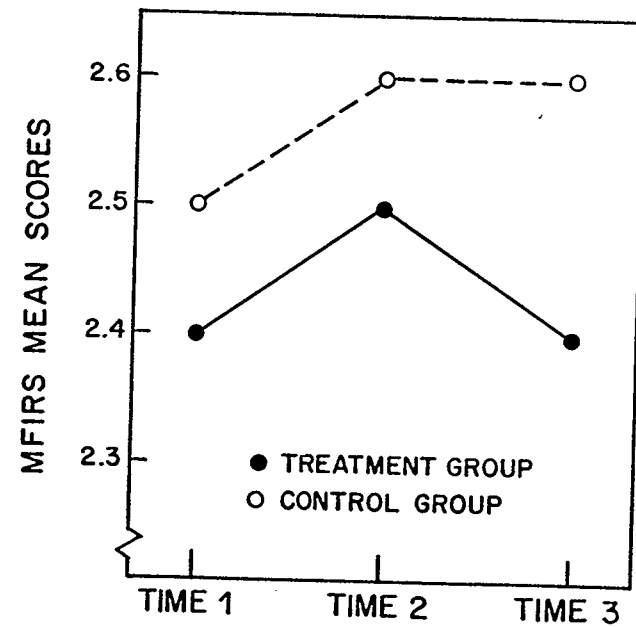


Figure 2. Quadratic effect of Time ( $p=.049$ ) on MFIRS scores.

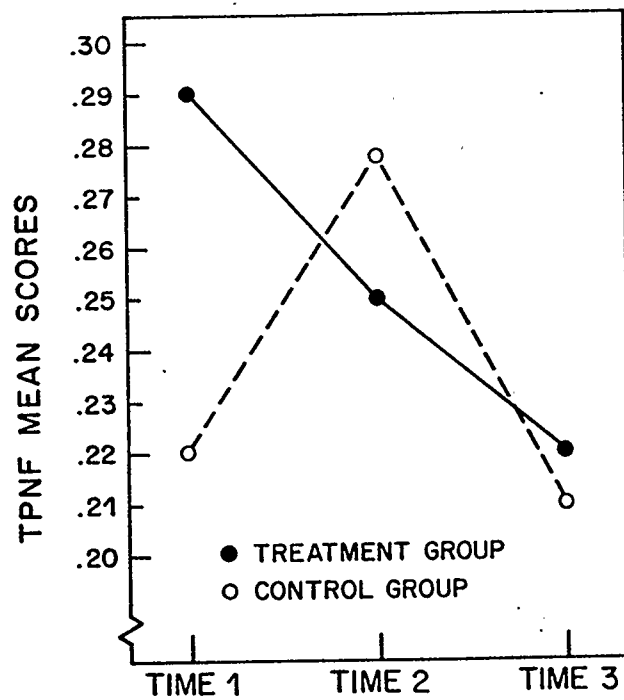


Figure 3. Quadratic effect of Time ( $p=.06$ ) and Group and Time ( $p=.028$ ) on TPNF scores.

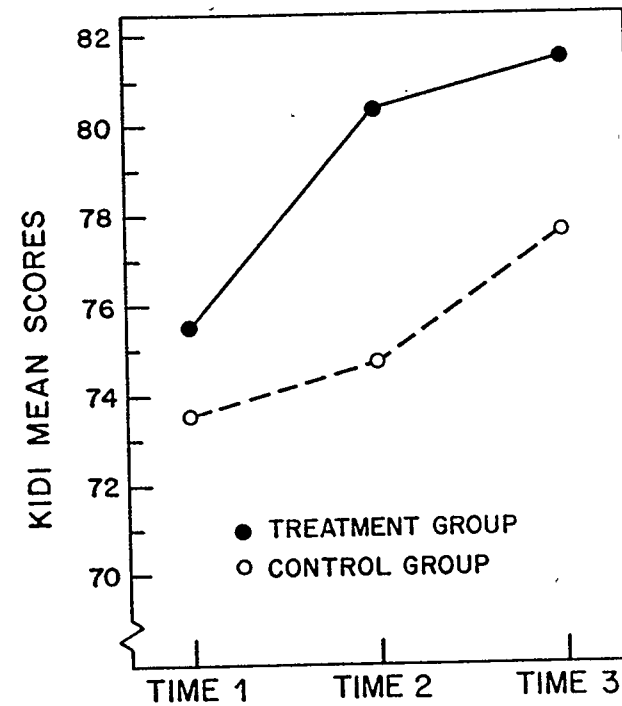


Figure 4. Linear effect of Time ( $p=.001$ ) and Quadratic effect of Group and Time ( $p=.063$ ) on KIDI scores.

No significant differences between treatment and control groups was found on TPF over time. In addition, there were no significant differences observed due to TIME.

5. No significant difference between the treatment and control groups was found on SWPS over time. There were also no significant differences observed due to TIME.
6. A marginally significant difference ( $p = .063$ ) between the treatment and control group, in favor of the treatment group, was found on KIDI. Additionally, a significant linear effect for TIME ( $p < .001$ ) was observed. These results indicate that while both groups significantly improved in Knowledge of Infant Development over time, a significant quadratic effect of Group  $\times$  Time was also observed in favor of the treatment group. This means that the treatment group mothers increased knowledge between TIME 1 and TIME 2 more than between TIME 2 and TIME 3, but at no time did their knowledge decrease (see Figure 4).

#### Other Results

All mothers were asked to complete a 'Mother's Comments' survey prior to the observation after the end of coaching. These results are reported in Table 36 as descriptive information.

The mothers in the treatment group were also asked to describe what they liked "best" and "least" about participating in the course and to make any other comments they wished. These are presented in a shortened form in Table 37.

Mothers in both groups indicated that their interactions with their babies remained "about the same" or "positively increased."



Table 36  
Responses to "Mother's Comments" Scale

|   | Treatment Group<br>(n = 18) | Control Group<br>(n = 16) <sup>a</sup> |
|---|-----------------------------|--|
| Imitate baby's behavior:                      |                             |  |
| Much more frequently                          | 4                           | 1                                      |
| Somewhat more frequently                      | 8                           | 8                                      |
| About the same                                | 6                           | 7                                      |
| Somewhat less frequently                      | 0                           | 0                                      |
| Much less frequently                          | 0                           | 0                                      |
| Repeat phrases when speaking<br>to your baby: |                             |  |
| Much more frequently                          | 2                           | 2                                      |
| Somewhat more frequently                      | 6                           | 6                                      |
| About the same                                | 10                          | 8                                      |
| Somewhat less frequently                      | 0                           | 0                                      |
| Much less frequently                          | 0                           | 0                                      |
| Play games with your baby:                    |                             |  |
| Much more frequently                          | 2                           | 4                                      |
| Somewhat more frequently                      | 6                           | 6                                      |
| About the same                                | 10                          | 6                                      |
| Somewhat less frequently                      | 0                           | 0                                      |
| Much less frequently                          | 0                           | 0                                      |
| Enjoy these games:                            |                             |  |
| Much more frequently                          | 5                           | 8                                      |
| Somewhat more frequently                      | 9                           | 4                                      |
| About the same                                | 4                           | 4                                      |
| Somewhat less frequently                      | 0                           | 0                                      |
| Much less frequently                          | 0                           | 0                                      |
| Give your baby chance to<br>experiment:       |                             |  |
| Much more frequently                          | 7                           | 5                                      |
| Somewhat more frequently                      | 7                           | 7                                      |
| About the same                                | 3                           | 4                                      |
| Somewhat less frequently                      | 0                           | 0                                      |
| Much less frequently                          | 0                           | 0                                      |
| Describe things and label things:             |                             |  |
| Much more frequently                          | 5                           | 3                                      |
| Somewhat more frequently                      | 6                           | 6                                      |
| About the same                                | 7                           | 7                                      |
| Somewhat less frequently                      | 0                           | 0                                      |
| Much less frequently                          | 0                           | 0                                      |

Table 36 (continued)

|  | Treatment Group<br>(n = 18) | Control Group<br>(n = 16) <sup>a</sup> |
|--|-----------------------------|--|
| Baby not interested, do you<br>pause: <sup>b</sup>             |                             |  |
| Much more frequently   | 5                           | 0                                      |
| Somewhat more frequently                                       | 7                           | 2                                      |
| About the same   | 5                           | 12                                     |
| Somewhat less frequently                                       | 0                           | 0                                      |
| Much less frequently   | 0                           | 0                                      |
| Your knowledge of infant and<br>child development has:         |                             |  |
| Increased very much  | 3                           | 3                                      |
| Increased somewhat   | 12                          | 7                                      |
| Stayed about the same  | 3                           | 6                                      |
| Your awareness of your baby's<br>behavior and development has: |                             |  |
| Increased very much  | 5                           | 7                                      |
| Increased somewhat   | 10                          | 7                                      |
| Stayed about the same  | 3                           | 2                                      |
| This awareness of and knowledge<br>about your baby has:        |                             |  |
| Positively influenced your<br>relationship                     | 16                          | 10                                     |
| Not changed your relationship                                  | 2                           | 6                                      |
| Negatively influenced your<br>relationship                     | 0                           | 0                                      |
| Baby is "talking" to you:                                      |                             |  |
| Much more frequently   | 8                           | 10                                     |
| Somewhat more frequently                                       | 6                           | 4                                      |
| About the same   | 4                           | 1                                      |
| Somewhat less frequently                                       | 0                           | 1                                      |
| Much less frequently   | 0                           | 0                                      |
| Baby is smiling and laughing:                                  |                             |  |
| Much more frequently   | 13                          | 14                                     |
| Somewhat more frequently                                       | 1                           | 0                                      |
| About the same   | 4                           | 1                                      |
| Somewhat less frequently                                       | 0                           | 1                                      |
| Much less frequently   | 0                           | 0                                      |

Table 36 (continued)

|   | Treatment Group<br>(n = 18) | Control Group<br>(n = 16) <sup>a</sup> |
|---|-----------------------------|--|
| Baby is fretting or crying:                           |                             |  |
| Much more frequently                                  | 0                           | 1                                      |
| Somewhat more frequently                              | 0                           | 1                                      |
| About the same  | 9                           | 6                                      |
| Somewhat less frequently                              | 6                           | 6                                      |
| Much less frequently                                  | 3                           | 2                                      |
| Your relationship with your baby<br>is:               |                             |  |
| Much more positive                                    | 4                           | 5                                      |
| Somewhat more positive                                | 5                           | 7                                      |
| About the same  | 9                           | 4                                      |
| Somewhat less positive                                | 0                           | 0                                      |
| Much less positive                                    | 0                           | 0                                      |
| Trainer made comments which were:                     |                             |  |
| Very helpful  | 13                          |  |
| Somewhat helpful                                      | 5                           |  |
| Not particularly helpful                              | 0                           |  |
| Not helpful at all                                    | 0                           |  |
| Opportunity to talk before and<br>after sessions was: |                             |  |
| Very helpful  | 13                          |  |
| Somewhat helpful                                      | 5                           |  |
| Not particularly helpful                              | 0                           |  |
| Not helpful at all                                    | 0                           |  |
| Viewing the videotape was:                            |                             |  |
| Very helpful  | 13                          |  |
| Somewhat helpful                                      | 5                           |  |
| Not particularly helpful                              | 0                           |  |
| Not helpful at all                                    | 0                           |  |
| Preferred the course to be: <sup>c</sup>              |                             |  |
| 3 or more sessions longer                             | 3                           |  |
| 1 or 2 sessions longer                                | 1                           |  |
| Length satisfactory                                   | 11                          |  |
| 1 or 2 sessions shorter                               | 0                           |  |

Table 36 (continued)

|   | Treatment Group<br>(n = 18) | Control Group<br>(n = 16) <sup>a</sup> |
|---|-----------------------------|--|
| If a friend interested in<br>course, would you: |                             |  |
| Strongly recommend it                           | 10                          |  |
| Recommend it                                    | 8                           |  |
| Not recommend it                                | 0                           |  |
| Strongly not recommend it                       | 0                           |  |

<sup>a</sup> One control group mother did not complete this scale.

<sup>b</sup> One treatment group mother did not respond to this question.

<sup>c</sup> Three mothers did not respond to this question.

Table 37  
Treatment Group Mothers' Reactions to Coaching Sessions

| Question  | Examples of Written Responses   |
|---|---|
| What did you like best about participating in this course?  | <ul style="list-style-type: none"> <li>• I learned things like when (my baby) is looking at something to let her hold it, taste it . . . I would have never brought it close to her if it were at a distance.</li> <li>• Baby seemed to enjoy coming/gave us an outing.</li> <li>• Enjoyed watching the video/more aware of baby's responses.</li> <li>• Having someone giving me reaffirming comments and helpful suggestions.</li> <li>• Being able to talk and bounce my ideas off a warm, sensible lady.</li> <li>• Having the time to play with my child.</li> </ul>   |
| What did you like least about participating in this course? | <ul style="list-style-type: none"> <li>• Wasn't anything I didn't like/everything was ok.</li> <li>• Would have liked to meet with some of the other moms and babies, watch each other's videos and exchange ideas.</li> <li>• The inconvenience of having to get there.</li> <li>• Transportation was at time difficult.</li> <li>• Coming to the university—some days it was not great for the baby.</li> </ul>   |
| Other comments?   | <ul style="list-style-type: none"> <li>• Don't feel relationship has changed—still love her except learned a few different things to do with her.</li> <li>• After taking part in the course, I mainly feel that most of the things I was doing with my baby have been reinforced by the approval and encouragement of the trainer. So I find myself doing more of it and getting more enjoyment from it.</li> <li>• Felt I had a good rapport and lots of positive feelings about (my baby) before the course, but the affirmation of those feelings, encouragement, and little hints really served to strengthen it.</li> </ul> |

None of the mothers indicated that their interactions became more difficult during the time between the first and second observation periods.

The informal comments of the treatment group mothers were, for the most part, very positive. The "least liked" aspect of the course was the necessity to make arrangements to get themselves and their infant to the university. Mothers in the treatment group more frequently thought the increased awareness of and knowledge about their babies positively influenced their relationships (Question 11). These treatment group mothers frequently reported positively about the new information they obtained and about the positive feedback they received.

## CHAPTER V

### SUMMARY AND DISCUSSION

The findings of the current study regarding the efficacy of short-term interaction coaching with mothers of preterm infants do not support the hypotheses that mother-infant interaction would be enhanced as a result of participation in coaching. However, these results do demonstrate changes in the infants and mothers over time. The results of this investigation do support the hypothesis that mothers' knowledge of infant development would increase with participation in coaching.

To be discussed are the effects of time on the ratings of infant and maternal behavior, the quadratic effect of group on the measure of mothers' responsiveness during the nonfeeding interactions and the effects of time and group on the knowledge of infant development measure. The research hypotheses that were not confirmed will be discussed in general terms and the limitations of this study presented. Conclusions will be drawn and the implications of this study for future research delineated.

#### Ratings of Infant and Maternal Behavior

For three of the four comparisons made using Interaction Rating Scale (IRS) scores, the effects of TIME were significant.

Examination of the Infant IRS scores for the Feeding interactions would indicate that the infants were rated less positively over time.

The four behaviors rated for Infant IRS Feeding interactions were physical activity (squirming to relaxed), head orientation (frequent to rare head aversion), gaze behavior (seldom to frequently looks at mother), and persistence in feeding (frequent to rare rejection of nipple). Ramey, Zeskind, and Hunter (1981) and Bakeman and Brown (1980) described preterm infants as being generally more difficult to feed than full-term infants. Crnic, Ragozin, et al. (1983) found that interactional differences between preterm and full-term dyads persisted across the infant's first year. Specifically, they found that global ratings indicated that both the mothers and preterm infants were less positive with each other and enjoyed their interactive time less at 12 months than at earlier observation periods. It may be, in the present study, that feeding difficulties, present at 12 weeks adjusted age, continued as the infants matured. On the other hand, with the infants' increased awareness of their environment, the infants may have been more easily distracted from the feeding situations by, for example, the presence of an observer or by the mothers' behavior. Barrera et al. (1986), for example, found that infants engaged in less smiling and eye contact with the mother at 16 months than at 4 months. The rating scale used in the present study may not have been sufficiently sensitive to measure the qualitative changes in the infants' interactive styles over the time period the infants were observed.

Corresponding to the negative linear effect of time on the Infant IRS scores during feeding is the significant quadratic effect of time on Maternal IRS scores during feeding. These results indicate that, for all mothers, global ratings of interaction increased between 12 and 18 weeks adjusted age and then decreased again between 18 and 26 weeks.



The Crnic, Ragozin, et al. (1983) study which demonstrated the persistence of the less satisfying interactions of mother-preterm infant dyads may have been reaffirmed by this current result, and further observations would be necessary to understand the long-term implications of this.

Regarding the IRS Feeding results, it is important to remember that this is a 3-point scale with 3 as the most optimal score and 1 as the least optimal. The range of mean scores obtained with the sample studied is small (2.1 to 2.6) and is in the upper or optimal end of the scale. This would indicate that many of the dyads rated were interacting positively initially and significant changes observed over time may be more due to changes in the infants' feeding behavior than to the interaction patterns per se.

Contrasting the Maternal IRS Feeding scores with the Maternal IRS Nonfeeding scores, it would appear that all mothers were more positively engaged with their infants over time, with no reciprocal positive change observed in the infants. Again there may be a number of explanations for this change and cautious interpretations are offered. The mothers' sensitivity and responsivity to the infants may indeed have increased over time in this play-oriented situation. On the other hand, these scores were again in the optimal end of the range for the IRS scores (2.3 to 2.5) and may reflect, for example, the mothers' increased familiarity with being observed. Taken together, the IRS results are inconclusive.

### Mothers' Responsiveness During Nonfeeding Interactions

The significantly positive change in maternal behavior over time noted by the global ratings of the nonfeeding interactions was not confirmed by the lag sequential analysis results. Mothers' smiling, affectionate touching, and game-playing, with or without vocalizations, in response to infants' smiling, vocalizing, and gaze at mother were measured by obtaining the transitional probability of this situation occurring. The quadratic effect of Group and Time obtained by analyzing these transitional probabilities was surprising. The mothers in the treatment group had an unexplained higher initial responsiveness than the mothers in the control group. This initial level gradually declined over time to the point that at TIME 3, the responsiveness, as measured in this study, was equivalent for both groups. The pattern for the control group was significantly different in that there was an initial lower level of responsiveness which peaked at TIME 2 and then returned at TIME 3 to that initial lower level. At no time did the control group's responsiveness score reach the high level of the treatment group's initial score. Several speculative explanations are offered to attempt to explain this finding. As concluded by previous investigators, mothers and their preterm infants may have been involved in a circular interaction pattern in which the maternal activity was to a large extent counterproductive and not "in tune" with the infants' cueing behavior. This apparent asynchrony may have continued and, particularly in the treatment group, become more persistent over time.

Alternatively, the approach used to measure and analyze maternal responsiveness may not have captured the essence of the interactions between mothers and their infants. The initial differences between

the groups on this measure may have masked any possible effects of the coaching procedures. It is interesting to consider that between TIME 1 and TIME 3 many of the infants became mobile (learned to crawl). There may be a shift in maternal responsiveness that occurs with this increased infant independence and this shift may not be accounted for by the measures used. Further, Bakeman and Brown (1980) have noted that frequencies of discrete behaviors or sequences of acts may be less effective measures of early interaction than more general or global measures.

Mothers' responsiveness to the infant was the measure of interest in this study, and thus the infants' responsiveness to the mother was not examined directly. It is possible that infants who signalled more frequently may have had mothers with a similar probability of responding as infants who signalled less frequently.

To summarize, participation in interaction coaching did not appear to positively influence maternal responsiveness to infant signalling. The significant quadratic effect obtained is confusing and explanations offered are speculative.

#### Knowledge of Infant Development

As predicted, mothers' scores on the Knowledge of Infant Development Inventory (KIDI) tended to increase ( $p = .06$ ) with participation in the coaching sessions. Additionally, all mothers' KIDI scores increased significantly over time. That this was the only significantly positive effect of the coaching session may reflect the didactic nature of the coaching procedures. MacPhee (1983) suggested that knowledge

of developmental norms and processes may affect parental behavior. Parents with increased knowledge might, for example, be more likely to structure an environment that is "matched" to the infant's level of understanding or they might be better equipped to interpret observations of the infant's behavior more realistically.

The impact of the mothers' increased knowledge of infant development may be most appropriately evaluated in behavioral terms longitudinally. The question arises then: Will this increased knowledge affect future parent-child relations? MacPhee (1983) and others (Field, Widmayer, Stringer, & Ignatoll, 1980; Hunt & Paraskevopoulos, 1980) have implied that a solid base of knowledge could have an important influence on parent-child relations. Further to this suggestion that gains may be more evident over a longer period of time, Barrera et al. (1986) found that preterm infants did not seem to benefit from environmental enrichment until after 1 year of corrected age. They argued that this "may reflect either their neurological immaturity or the time it takes for parents to become comfortable with their infants" (p. 28).

### General Discussion

Of the six research hypotheses investigated, five were not confirmed. Mother-preterm infant interaction did not appear to be enhanced during the study period by involvement in the coaching sessions. Interaction was observed over a short period of approximately 12 to 15 weeks and it may be that changes in naturalistic, home-based behaviors do not become evident in that short time period. Coached

changes which have been demonstrated in a laboratory setting (Field, 1977) or a hospital setting (Martin, 1985) may not be easily transferred to a home setting. It may be that the coaching techniques themselves were not successful and that an alternative coaching procedure would have had a positive effect on the dependent measures. It is also interesting to speculate about the natural resiliency of mother-infant interaction and about the mothers' and infants' abilities to adapt to each other. This self-adjusting nature within dyads may contribute to mutual adaptation over time without intervention. Crnic, Ragozin, et al. (1983) have pointed out the need to examine mother-infant interaction longitudinally if the contribution of social-environmental factors in infancy to later developmental outcomes is to be identified. The possible long-term influences of this study are yet to be examined.

The outcomes from this study may be limited by several factors not identified above. The sample size was limited and, although the number of days the infant was hospitalized was used as a covariate in an attempt to account for the infants' levels of illness, there were considerable variations in the infants' conditions. This may have inadvertently biased the results. The dyads involved in the study were, for the most part, not experiencing interactional difficulties and were at moderate biological risk. Mothers participated in the study out of interest not perceived need. Mothers with concerns about their interactions with their infants, or with very sick infants, may have been more directly influenced by a course such as this one.

Fathers and siblings were not directly included in the study. Bronfenbrenner (1977) and Belsky (1981, 1984) have cogently argued that the broader ecological system has a significant impact on

interaction patterns and needs to be considered when studying family relationships. In this exploratory study, mother-infant relationships were isolated from the environmental context of the family for practical purposes, but the broader system should be included to gain a clearer picture of the interactions.

Infant development was not measured. During the first year of life, traditional measures of infant development lack predictability and stability (Lewis, 1973; McCall, 1979). These measures, therefore, were not thought to contribute to this investigation and were not included as dependent variables. Ordinal scales (i.e., Uzgiris & Hunt, 1975) and/or habituation measures (i.e., Fagan, 1982) may offer increased predictability and measures such as these may be useful in future investigations. Further longitudinal work with these infants may demonstrate differences in development between the two groups.

There were practical concerns which may also have influenced, to some extent, the outcomes of this study. For example, mothers employed outside of their homes were more often observed with their infants during evening or weekend hours. A question arises regarding optimal observation times with these dyads. If there were siblings in a family, these children were often present during the observation and this may have influenced interaction patterns observed. Family crises arose. For example, two mothers became pregnant, and one mother's father died between the first and third observation times. These events may have significantly influenced the study results. With a small sample size such as the one in the present study, it is not practical to try to statistically control for factors such as these. It is assumed that with random assignment to groups, these events were balanced between

the groups, but this assumption may not have been justified with this sample.

One confounding factor which may have attenuated differences between the groups was the amount of contact the control group mothers had with the researcher and observer. This contact may have served as a form of intervention for this group. The control group mothers had direct contact with the researcher or observer at least 5 times each. Several control group mothers shared their enthusiasm for participating in the study with the researcher when the toys were delivered. They stated that they enjoyed having someone else show an interest in them and their baby and related that they had "learned so much" from completing the questionnaires!

### Conclusions and Implications

This study attempted to demonstrate that coaching mothers in their interactions with preterm infants would enhance the relationships between them. Within the context of a transactional theoretical model, it was hypothesized that, through coaching, mothers' sensitivity and responsivity to their infants' cues would increase, which would in turn affect the infants' behaviors which would then influence the mothers' subsequent responses to their infants. This hypothesis was not realized during the study period; however, the long-term impact of this experience remains to be investigated. Beckwith and Cohen (1984) have clearly stated "that the optimality of the early social interactions did not influence later test performance unless these experiences were maintained over time" (p. 264). Werner and Smith (1982), in summarizing the results of their 20-year longitudinal study of vulnerable children

from Kauai, noted that the ability to elicit predominantly positive responses from the environment over an extended period of time contributed significantly to positive outcomes for the children studied.

Examining the outcomes of this study, one could speculate that, over time, the mothers' increased knowledge of infant development will be integrated with the mothers' behaviors to help create and/or maintain optimal early social experiences for the infants. This may in turn influence later developmental outcomes for these infants.

Speculation about the longitudinal outcomes of this study leads to a discussion of implications for future research. The current study must be considered exploratory. The findings are suggestive rather than conclusive. Further research could include:

1. A longitudinal study of the developmental outcomes for this sample of children.
2. An examination of the broader family and social network, and the transactional relationships within this network.
3. Variations to the intervention model used. For example: group vs. individual coaching; increased use of videotaped feedback; initiating intervention in the hospital and continuing through to the home; including father and siblings in the training.
4. A comparison sample of full-term infants. The question arises regarding how mother - full-term infant dyads would respond to the coaching and what developmental patterns would be evident with this group.
5. Comparing the effects of a laboratory/centre-based intervention with a home-based intervention.
6. Identifying a group of mothers and infants who are experiencing



problems rather than using a random sample of volunteers. The concern has been raised by several investigators that the "disturbed" interactions typically observed between preterm infants and their mothers may be appropriate, functional adjustments to having a preterm infant. Caution regarding intervention into social interactions has been recommended. It may be more appropriate to design interventions for parents with identified or perceived needs (Fraiberg, 1980).

In conclusion, continued observation of mother-preterm infant dyads appears to be warranted. The impact of intervention on naturalistic, home-based interactions has not been fully explored, and there may be important implications for the developing child and family to be identified in further observations of this group.

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APPENDIX A

COPIES OF CORRESPONDENCE



THE  
UNIVERSITY  
OF CALGARY

2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4

FACULTY OF EDUCATION  
Department of Educational Psychology

Telephone (403) 284-5651

Dear \_\_\_\_\_:  
(Parent's name)

Your physician will be giving you this letter. We would like to get your permission to contact you to explain a research project we are conducting and to ask you if you would be willing to participate in this project. The purpose of the project is to obtain information about how mothers and preterm babies 'communicate' with each other and about how they form a relationship.

If you are willing to have us contact you when you and your baby are at home, please sign the bottom part of this letter and return it to the nurse's office. All we are asking you to do is to give your permission for Mrs. Deborah Parker-Loewen to contact you to explain the project in detail and to request your participation in the project. We are looking forward to meeting with you and discussing our project.

Please feel free to contact Deborah Parker-Loewen at 284-6283 if you would like more information before signing this form.

Sincerely,

*Deborah Parker-Loewen*

Deborah Parker-Loewen

*H. Lytton*

Dr. Hugh Lytton

I am willing for Deborah Parker-Loewen to contact me to explain the research project she is conducting and to ask me if I am willing to participate.

Signed: \_\_\_\_\_

Please print your:

Name \_\_\_\_\_

Address \_\_\_\_\_

Phone # \_\_\_\_\_

Baby's Birthday \_\_\_\_\_

Baby's Due Date \_\_\_\_\_



THE  
UNIVERSITY  
OF CALGARY

2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4

FACULTY OF EDUCATION  
Department of Educational Psychology

Telephone (403) 284-5651

Dear Dr.

For your information, the mother of your patient, \_\_\_\_\_, (child's name) has consented to participate in the research project described in the attached abstract. This project has been approved by the Conjoint Ethics Committee of the Faculty of Medicine, University of Calgary, and the Foothills Hospital and is being funded by Health and Welfare Canada.

The neonatologists at Foothills Hospital, in particular, Dr. D. McMillan, Chairman of the Nursery Management Committee, requested that the child's physician be informed when a mother has consented to participate in this project. If you have any concerns about this mother or baby participating in the project described below, please contact Deborah Parker-Loewen at 284-6283 within one week. \_\_\_\_\_ has been fully informed (Mother's name) of the nature of her participation and has voluntarily consented to be involved.

If you wish to receive information about the results of this study, please return the bottom portion of this letter.

Thank you for your interest in this matter.

Sincerely,

Dr. Hugh Lytton  
Principal Investigator

Mrs. Deborah Parker-Loewen  
Graduate Student

---

Return to: Deborah Parker-Loewen  
Department of Educational Psychology  
University of Calgary  
2500 University Drive, N.W.  
Calgary, Alta. T2N 1N4

Yes, I would like to receive information about the results of the research project: Effects of Short-term Interaction Coaching with Mothers of Preterm Infants.

Name: \_\_\_\_\_

Address: \_\_\_\_\_

## Effects of Short-Term Interaction Coaching with Mothers of Preterm Infants

This study proposes to examine the effects of eight 40-minute interaction coaching sessions on the mother-infant interaction patterns of preterm mother-infant dyads. Preterm infants (born less than 37 weeks gestation and birth weight 1,000 to 2,000 grams), adjusted age 3 months ( $\pm 3$  weeks), and their mothers will be randomly assigned to one of two groups, a treatment group (to receive training) and a no-treatment group (to receive toys for the infant).

It is hypothesized that short-term interaction coaching will positively influence mother-infant interaction and help promote more harmonious, synchronous interactions in this high-risk group. It is further hypothesized that this training will influence infant development at age two.

Naturalistic home observations and ratings of maternal behavior will be used to measure mother-infant interaction. Mother's life stress, attitude to parenting and knowledge of child development will be assessed to provide information about possible moderator variables. At age two years, infants' developmental status and mother-child interaction will be measured.

During training sessions, in a "living-room" equipped laboratory, the mother will be asked to interact with her infant "as she would at home." A trainer will offer facilitative suggestions via an ear-piece microphone to the mother from the opposite side of a one-way mirror.

Post-training observations, two-month follow-up observations and a follow-up when the child is two years old are planned to determine the effect of training, by comparison with the control group.

The results of this study will, it is hoped, provide useful information for clinicians interested in a prevention-oriented intervention focussed on parent-child interaction.

University of Calgary  
Department of Educational Psychology  
Hugh Lytton, Ph.D.  
Deborah Parker-Loewen, M.Ed.  
284-5652 or 284-6283

Information Sheet for Mothers Invited to Participate  
in Coaching Sessions

Dear

Here is some information that might help you find your way around the university when you come for the coaching sessions.

There is a map attached and the Education Building is marked. The Child Development Lab, where the sessions will be held, is in Room 286 of the Education Block (not the Tower). After the first session finding this room won't be difficult.

There are parking meters in Parking Lot 33 and a few in 31E (although 31E is part of a current construction project). Lot 32D is often available, but you may find it a long walk carrying your baby.

If you find parking to be difficult at the time you come for sessions, I can try to arrange a special permit for you to park in the assigned lots.

These are the dates and times we have arranged for your sessions. If you are not able to come to a session, please contact me as soon as possible and we will reschedule that session. We want to have the babies in the coaching sessions to be of a similar age so when we reschedule, we'll try to stay within the four weeks of your sessions.

| <u>Session #</u> | <u>Date</u> | <u>Time</u> |
|------------------|-------------|-------------|
| 1. _____         | _____       | _____       |
| 2. _____         | _____       | _____       |
| 3. _____         | _____       | _____       |
| 4. _____         | _____       | _____       |
| 5. _____         | _____       | _____       |
| 6. _____         | _____       | _____       |
| 7. _____         | _____       | _____       |
| 8. _____         | _____       | _____       |

I'm looking forward to getting to know you and your baby during these sessions. Please call me if you have any questions or concerns.

Sincerely,

My office phone: 284-6283 or  
Mon. am/Wed. am: 284-5652  
(Secretary will take a message  
and I'll call back.)

Deborah Parker-Loewen

DP-L/td



THE  
UNIVERSITY  
OF CALGARY

2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4

FACULTY OF EDUCATION  
Department of Educational Psychology

Telephone (403) 284-5651

Dear

I am sending you this set of questionnaires for you to complete and return to Gail. Gail will be contacting you soon to arrange to come to your house for the next observation. Gail does not know if you have been coming to the training sessions or not. It is important that she not have this information, so that she is kept "unbiased". I would appreciate you not mentioning to Gail if you are coming for training or receiving toys.

Please give the completed questionnaires to Gail. If you have any questions, don't hesitate to call me or leave a message at the General Educational Psychology office (284-5651) and I'll get back to you.

Thank you again for your continued interest in this project.

Sincerely,

Deborah Parker-Loewen  
Graduate Student

My Office Phone: 284-6283  
General Office: 284-5651

DP-L/td  
Enclosure



2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4

FACULTY OF EDUCATION  
Department of Educational Psychology

Telephone (403) 284-5651

Dear

I am sending you this set of questionnaires for you to complete and return to Liliane. Liliane will be contacting you soon to arrange to come to your house for the next observation. Liliane does not know if you have been coming to the training sessions or not. It is important that she not have this information, so that she is kept "unbiased." I would appreciate you not mentioning to Liliane if you are coming for training or receiving toys.

Please give the completed questionnaires to Liliane. If you have any questions, don't hesitate to call me or leave a message at the General Educational Psychology office (284-5651) and I'll get back to you.

Thank you again for your continued interest in this project.

Sincerely,

Deborah Parker-Loewen  
Graduate Student

My office phone: 284-6283  
General Office: 284-5651

DP-L/td  
Enclosure



APPENDIX B

CONSENT FORM SIGNED BY MOTHERS  
PRIOR TO PARTICIPATING IN STUDY

# \_\_\_\_\_

Title of Project: Effects of short-term interaction coaching  
with mothers of preterm infants

---

## CONSENT FORM

I, \_\_\_\_\_, consent to myself and my baby,  
(Mother's name)

\_\_\_\_\_, being included in a study to obtain  
(Baby's name)

information about how mothers and preterm babies communicate with each other. I understand that I will be interviewed, asked to complete sets of questionnaires and that an observer will come to my home and observe my baby and me together. This will occur no more than three times. I also understand that I will be offered toys for my baby or the opportunity to participate in eight training sessions. Whether I receive toys or training will be decided on a random basis. I understand I will be contacted when my baby is two years old regarding a second phase of this study. I understand that information about my baby's medical history will be obtained from the records at Foothills Hospital, Calgary General Hospital or Holy Cross Hospital.

I am volunteering to participate in this study and I realize I am free to withdraw at any time. I understand that my physician, \_\_\_\_\_,  
(Physician's name)  
has no objections to my participation in this study. I have been informed that the information obtained in the study will be confidential and that my name or other identifying information will not be released. I further understand that I will be told of the findings of the study.

\_\_\_\_\_  
(Signed: Mother's name)

\_\_\_\_\_  
(Witness)

\_\_\_\_\_  
(Date)

For further information contact:

Hugh Lytton, PhD. or Deborah Parker-Loewen  
Department of Educational Psychology  
University of Calgary, Calgary, Alberta  
Phone: 284-5652 or 284-6283

APPENDIX C

FORMS USED TO OBTAIN INFORMATION  
ABOUT MOTHERS AND INFANTS

# \_\_\_\_\_

Initial Interview Forms (adapted from Lytton, 1980):

Date: \_\_\_\_\_

Interviewer: \_\_\_\_\_

## I. Demographic Information

1. Name of Child \_\_\_\_\_  
Surname Given Names

2. Male/Female \_\_\_\_\_

3. Date of Birth \_\_\_\_\_

4. Address of Child \_\_\_\_\_

5. Name of Father \_\_\_\_\_

6. Name of Mother \_\_\_\_\_

7. Date of Birth: Father \_\_\_\_\_

8. Date of Birth: Mother \_\_\_\_\_

9. Other children in Family and/or Household:

| Name  | Sex   | Date of Birth |
|-------|-------|---------------|
| _____ | _____ | _____         |
| _____ | _____ | _____         |
| _____ | _____ | _____         |

10. Present and/or previous occupation of Father \_\_\_\_\_

11. Present and/or previous occupation of Mother \_\_\_\_\_

12. Highest academic level - Father \_\_\_\_\_

Special Training \_\_\_\_\_

13. Highest academic level - Mother \_\_\_\_\_

Special Training \_\_\_\_\_

14. Country of birth - Father \_\_\_\_\_

15. Country of birth - Mother \_\_\_\_\_

## II. Prenatal History

1. Any complications in pregnancy (high blood pressure, anaemia, German measles, nerves): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. Child was preterm by \_\_\_\_\_ weeks.
3. Birth induced \_\_\_\_\_
4. (If induced) By drug/by rupturing membrane (using anaesthetic)  
\_\_\_\_\_
5. Presentation was: normal/breech/otherwise abnormal
6. Caesarean: pre-arranged/during labor
7. Any other complications \_\_\_\_\_
8. Weight of the child at birth \_\_\_\_\_
9. Weight at discharge from NICU \_\_\_\_\_
10. Black or blue (cyanosed) immediately after birth but soon recovered/  
blue later (only if diagnosed by physician) \_\_\_\_\_  
\_\_\_\_\_
11. Jaundiced: first noticed on \_\_\_\_\_th day; definitely faded by  
\_\_\_\_\_th day; no treatment given/treatment given \_\_\_\_\_  
\_\_\_\_\_
12. Respiratory trouble (slow to breathe): immediately after birth but  
responded within a few minutes/serious difficulty in getting breathing  
going, needed a lot of reviving/respiratory distress (breathing  
difficulties after 1st day) \_\_\_\_\_  
\_\_\_\_\_
13. Child born at Foothills or transferred to NICU from another hospital  
\_\_\_\_\_

14. Mother stay in same hospital \_\_\_\_\_
15. Visiting infant in NICU: how often \_\_\_\_\_
16. How long did you stay when you visited the NICU? \_\_\_\_\_
17. Activities during visit: (bathing/feeding infant; talking with staff)  
\_\_\_\_\_  
\_\_\_\_\_
18. During infant's stay in NICU, in isolette how long? \_\_\_\_\_  
\_\_\_\_\_
19. How was the infant fed in NICU? (breast milk, gavage, bottle)  
\_\_\_\_\_
20. How long was infant in NICU? \_\_\_\_\_
21. Other conditions not mentioned \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### III. Additional Information

1. Illnesses of infant since birth: serious \_\_\_\_\_  
other \_\_\_\_\_
2. Weight gain \_\_\_\_\_
3. How are you feeding the baby? (breast/bottle) Why? \_\_\_\_\_  
\_\_\_\_\_
4. Does the baby feed well/lazy/vomit milk? (Describe feeding)  
\_\_\_\_\_
5. Sleep patterns of infant \_\_\_\_\_  
\_\_\_\_\_
6. Have you felt quite well since the baby was born or have you frequently  
felt tired and upset? \_\_\_\_\_

6. \_\_\_\_\_
7. Have you worked since the baby was born? \_\_\_\_\_
8. Do you plan to go back to work? \_\_\_\_\_
- \_\_\_\_\_
9. How did your baby's early delivery affect you? (were you 'ready' for the baby? were you still working?) \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
10. How do you think this event has affected your relationship with your husband? (closer, difficult to talk about it) \_\_\_\_\_
- \_\_\_\_\_
11. How do you feel, in general, about your baby now that s/he is home with you? \_\_\_\_\_
12. How did you feel about her/him when s/he was in the hospital? \_\_\_\_\_
- \_\_\_\_\_

Project ID#: \_\_\_\_\_

Date Record Examined: \_\_\_\_\_

Examined by: \_\_\_\_\_

HOSPITAL RECORDS

Name: \_\_\_\_\_

Birthdate: \_\_\_\_\_

Hospital: \_\_\_\_\_

Hospital ID#: \_\_\_\_\_

A. Maternal History:

Age: \_\_\_\_\_

Gravidy: \_\_\_\_\_

Parity: \_\_\_\_\_

Complications of pregnancy: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_B. Labor and Delivery Record:

Born same hospital or transferred? \_\_\_\_\_

Induction: \_\_\_\_\_

Duration of labor: \_\_\_\_\_

Mode of delivery: \_\_\_\_\_

Mode of presentation: \_\_\_\_\_

Apgar scores: \_\_\_\_\_ and \_\_\_\_\_

Forceps: \_\_\_\_\_

Complications of labor and delivery: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_C. Neonatal History:

Birth weight (in grams): \_\_\_\_\_

Birth length (in cm): \_\_\_\_\_

Gestational Age: a) Dubowitz exam: \_\_\_\_\_

b) Mother's dates: \_\_\_\_\_



Hemoglobin levels: (Lowest level) \_\_\_\_\_

Bilirubin levels: (Highest level) \_\_\_\_\_

Treatment for high Bilirubin: (Type/Length) \_\_\_\_\_

Respiratory Distress: (Note cause) \_\_\_\_\_

Respirator: \_\_\_\_\_

Time on respirator: \_\_\_\_\_

Diagnoses (take all info given): \_\_\_\_\_

Other Comments: \_\_\_\_\_

Feeding: Breast milk? (Note EBM or BBM) \_\_\_\_\_

Gavage? (If yes, how long?) \_\_\_\_\_

Length of stay in hospital: \_\_\_\_\_

Age at discharge: \_\_\_\_\_

Home with special equipment? (List) \_\_\_\_\_

Other conditions not mentioned: \_\_\_\_\_

Record of Home Observation

Observer: \_\_\_\_\_

Family Name: \_\_\_\_\_

Date of Observation: \_\_\_\_\_

Time of Observation: \_\_\_\_\_

Date data transferred to host: \_\_\_\_\_

IRS completed and attached: \_\_\_\_\_

Observation notes:

Intervention Summary Form

ID#: \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Session #: \_\_\_\_\_

Trainer: \_\_\_\_\_

| Trainer's Direction                                   | Examples  |
|---|---|
| 1) Mother to imitate baby's behavior or vocalizations | <ul style="list-style-type: none"><li>• Try saying that sound back to her.</li><li>• He's really telling you a story (Mom imitating).</li><li>• He's really making a variety of sounds for you to imitate.</li><li>• Neat! You're really copying what she says.</li></ul>   |
| 2) Mother to repeat her phrases                       | <ul style="list-style-type: none"><li>• She is really smiling while you repeat what you are saying.</li><li>• You're repeating yourself lots of times.</li></ul>  |
| 3) Mother silent during infant gaze aversion          | <ul style="list-style-type: none"><li>• You can tell when she looks away like that that she's had enough for now.</li><li>• You are sitting quietly while (baby's name) is sucking on the bottle and gazing away.</li><li>• Try talking when she looks at you and not talking when she looks away.</li><li>• Try waiting until she looks at you before you do it again (playing "drop" game).</li><li>• I notice when he looks away you just wait and when he looks back you go "hi there." That's great!</li></ul> |

Intervention Summary Form (continued)

| Trainer's Direction                                      | Examples  |
|--|---|
| 4) Mother to decrease non-contingent "attention-getting" | <ul style="list-style-type: none"> <li>• When she pulls back like that it seems like she's saying she's had enough—try pausing for a bit.</li> <li>• That seemed a bit frustrating.</li> <li>• She doesn't seem too sure about you doing that.</li> <li>• He lets you know when he's had enough.</li> </ul> |
| 5) Mother to increase gameplaying                        | <ul style="list-style-type: none"> <li>• She seems to be getting frustrated with that game.</li> <li>• Try playing pat-a-cake.</li> <li>• He might like "peek-a-boo" in the mirror.</li> <li>• That's a neat game. He really likes that.</li> </ul>   |
| 6) Mother to respond contingently to infant's behavior   | <ul style="list-style-type: none"> <li>• (Baby looking at stick) Try giving her the stick she is looking at.</li> <li>• You're really letting her experiment with that. That's good!</li> <li>• You're giving her a chance to try it for herself. Great!</li> </ul>   |

APPENDIX D

QUESTIONNAIRES COMPLETED BY MOTHERS

ID# \_\_\_\_\_

Date: \_\_\_\_\_

151

Rated by: \_\_\_\_\_

## INTERACTION RATING SCALES (IRS)

Definitions used by Parker-Loewen/Lytton in naturalistic home observations of mothers with their preterm infants.

NOTE: The observed Non-Feeding, Face-to-Face Interactions were 20 minutes in length and Feeding Interactions were 10 minutes in length.

FACE-TO-FACE INTERACTIONS (20 minutes, home-based):INFANT RATINGS

- A.\* State rating (1.00)
1. predominantly drowsy (very sleepy, drops off to sleep) ☐
  2. somewhat drowsy (closes eyes)
  3. predominantly alert
- B. Physical Activity (.67)
1. frequent squirming/arching of back (>10 minutes)
  2. occasional squirming/arching of back (<10 minutes)
  3. relaxed body with cycling of limbs toward mother (no squirming/arching of back) ☐
- C. Head Orientation (.80)
1. frequent head aversion (almost always looking away - intention not considered)
  2. occasional head aversion
  3. rare head aversion (almost always looks at mom) ☐
- D. Gaze behavior (.93)
1. seldom looks at mother (almost always looking at something besides mother)
  2. sometimes looks at mother (occasionally looks at mother)
  3. frequently looks at mother (almost constantly looks at mother) ☐
- E. Facial expressions (.93)
1. frequent pouting or cry face (>½ of time)
  2. bland expression (quiet but not smiling)
  3. occasional smiling or "contented" expression (considerable smiling) ☐
- F. Fussiness (.87)
1. frequent fussing or crying (>½ time)
  2. occasional fussing (<½ time)
  3. no fussing (none) ☐
- G. Vocalizations (1.00)
1. no vocalizations (no)
  2. a few vocalizations (< 5 min.)
  3. several vocalizations (> 5 min.) ☐
- \*Infant Face-to-Face Rating = Total/6 (.86) ☐

MOTHER RATINGS

|  |                          |
|--|--------------------------|
| A. State rating (1.00)   |                          |
| 1. predominantly depressed or anxious looking  | <input type="checkbox"/> |
| 2. somewhat depressed or anxious looking   | <input type="checkbox"/> |
| 3. alert and attentive   |                          |
| B. Physical activity (.93)   |                          |
| 1. minimal activity or overly active (almost no activity or very overly active)  | <input type="checkbox"/> |
| 2. moderate activity (slightly overly active)  |                          |
| 3. some activity (appropriately active)  |                          |
| C. Head Orientation (.93)  |                          |
| 1. frequent head aversion ( $> \frac{1}{2}$ time)  | <input type="checkbox"/> |
| 2. occasional head aversion ( $< \frac{1}{2}$ time)  | <input type="checkbox"/> |
| 3. infrequent head aversion (almost never)   |                          |
| D. Gaze Behavior (.87)   |                          |
| 1. seldom looks at infant ("never" looks at infant)  | <input type="checkbox"/> |
| 2. sometimes looks at infant (e.g., baby on hip)   | <input type="checkbox"/> |
| 3. constantly looks at infant ("always" looks at infant)   |                          |
| E. Silence during infant gaze aversion (.93)   |                          |
| 1. rarely quiet when infant looking away (trying to get infant's attention - active)   | <input type="checkbox"/> |
| 2. sometimes quiet when infant looking away (keeps talking gently - not overly attention seeking)                                    |                          |
| 3. usually quiet when infant looking away (usually quiet)  |                          |
| F. Facial expressions (1.00)   |                          |
| 1. flat or tense expressions   | <input type="checkbox"/> |
| 2. alternately flat or tense and contented   | <input type="checkbox"/> |
| 3. frequent smiling or "contented" expression (smiling)  |                          |
| G. Vocalizations (.87)   |                          |
| 1. constant, non-contingent talking or no talking (non-contingent $> \frac{1}{2}$ )  | <input type="checkbox"/> |
| 2. moderate amount of talking and somewhat contingent ( $< \frac{1}{2}$ con-contingent)  | <input type="checkbox"/> |
| 3. contingent talking and sensitive pacing of vocalizations (contingent most of the time)  |                          |
| H. Infantized behaviors (.80)  |                          |
| 1. never imitative of infant or no simplified behaviors (never imitative or simplified)  | <input type="checkbox"/> |
| 2. sometimes imitative and some simplified behaviors   |                          |
| 3. frequent imitative and simplified behaviors (almost all times in interacting with infant)   |                          |
| I. Contingent responsivity (1.00)  |                          |
| 1. rarely responds in kind or with short latency to infant behaviors (never - also includes when infant has few behaviors)           | <input type="checkbox"/> |
| 2. sometimes responds in kind or with short latency to infant behaviors  |                          |
| 3. often responds in kind or with short latency to infant behaviors (all behaviors, including demonstrate toy if baby looking at it) |                          |
| J.* Gameplaying (.87)  |                          |
| 1. rarely plays infant, age-appropriate games (never)  | <input type="checkbox"/> |
| 2. sometimes plays infant, age-appropriate games ( $< \frac{1}{2}$ of time)  | <input type="checkbox"/> |
| 3. often plays infant, age-appropriate games ( $> \frac{1}{2}$ of time)  |                          |
| *(includes games with toys)  |                          |
| Mother Face-to-Face Rating = Total/10   (.92)  |                          |

FEEDING RATINGS (10 minutes, home-based)INFANT RATINGS

- A.\* State Rating (.94)
1. predominantly drowsy (very sleepy)
  2. somewhat drowsy (eyes closed)
  3. predominantly alert (eyes open)
- B. Physical activity (.94)
1. frequent squirming
  2. occasional squirming
  3. relaxed body, molding to mother
- C.\* Head orientation (.67)
1. frequent head aversion
  2. occasional head aversion
  3. rare head aversion
- \*(whether intentional or not)
- D.\* Gaze behavior (.83)
1. seldom looks at mother
  2. sometimes looks at mother
  3. frequently looks at mother
- \*(any part of mother)
- E. Persistence in feeding (.83)
1. frequent rejection of nipple (>5 times)
  2. occasional rejection of nipple (<5 times)
  3. rare rejection of nipple (never)

\*Infant Feeding Rating = Total/4 (.82)

MOTHER RATINGS

- A. Feeding position (1.00)
- (note whether baby is held on right (1) or left (2) side)
1. holds baby in lap position (or in infant seat)
  2. holds baby with head cradled
  3. holds baby with head and legs cradled
- B. State rating (.94)
1. predominantly depressed or anxious looking
  2. somewhat depressed or anxious looking
  3. alert and attentive
- C. Physical activity (.78)
1. overly active (very active)
  2. moderate activity
  3. minimal activity (appropriately active)
- D. Head orientation (.94)
1. frequent head aversion (> ½ of time)
  2. occasional head aversion (< ½ of time)
  3. infrequent head aversion (almost never)
- E. Gaze behavior (1.00)
1. seldom looks at infant (never)
  2. sometimes looks at infant
  3. constantly looking at infant
- F. Contingent vocalization (.83)
1. frequent vocalization during sucking (constant)
  2. occasional vocalization during sucking (quiet talking while sucking)
  3. rare vocalization during sucking (never or once)



- G. Timing of bottle removal (.72)
1. frequently initiated by mother (100% initiated by mother) ☐
  2. occasionally initiated by mother (baby and mother)
  3. rarely initiated by mother (baby 100% or no removal in time observed)
- H. Burping (1.00)
1. frequent burping (> 3 times burped) ☐
  2. occasional burping (2-3 times burped)
  3. rare burping (0-1 times burped)
- I. Persistence of feeding by mother (.83)
1. persistence in feeding as infant rejects bottle (tries to get baby to eat more/especially at end of feeding) ☐
  2. some persistence in feeding as infant rejects bottle (trying to get "started"/brief persistence)
  3. little persistence in feeding as infant rejects bottle
1. Mother Feeding Rating =  $\frac{\text{Total}}{9}$  (.89) ☐

## NOTE:

1. \*In calculating Infant Face-to-Face and Feeding overall ratings, the Infant State Ratings (items "A"), have been omitted from the calculations. The "State rating" was thought to represent a dimension of infant behavior which differed from the other infant behaviors rated. Drowsiness or alertness may influence, for example, facial expression, but measure the "state" of the infant rather than the infant's response in the interaction with his or her mother.

2. The items are as given by Field (1980) and the clarifications following the items have been used by Parker-Loewen for the described research. These descriptions were developed during the pilot/observer-training phase of this study and were used throughout for the ratings.

3. The numbers in parentheses are the inter-rater agreements (calculated using:  $\frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}}$  obtained from 15 Face-to-Face Interactions and 18 Feeding Interactions, each observed and rated by two independent observers.

Satisfaction With Parenting Scale (SWPS)

Dear \_\_\_\_\_

Below are questions about you, your child, and the rest of your family. We would like to know how all of you are getting on these days.

In the questions, 'child' always refers to \_\_\_\_\_, not to any other children. For each question, please circle or fill in the answer which best describes your situation. Feel free to add comments, and if you do not wish to answer a question, leave it blank.

Today's Date \_\_\_\_\_

Questions:

1. How many professional persons (nurses, doctors, social workers, etc.) could you talk to if you have a problem with your child?

1. 0-1 person
2. 2 people
3. 3-4 people
4. 5-8 people
5. More than 8 people
7. Other (please explain) \_\_\_\_\_

2. How satisfied are you with this situation?

1. Very dissatisfied (I wish things were very different)
2. Somewhat dissatisfied (I would like some changes)
3. Somewhat satisfied (OK for now; pretty good)
4. Very satisfied (I'm really pleased)
7. Other (please explain) \_\_\_\_\_

3. If sometime you were to have bad or angry feelings about your child, how many people could you talk to about this?

1. 0-1 person
2. 2 people
3. 3-4 people
4. 5-6 people
5. More than 6 people
7. Other (please explain) \_\_\_\_\_

4. How satisfied are you with the availability of people like this?
1. Very dissatisfied (I wish things were very different)
  2. Somewhat dissatisfied (I would like some changes)
  3. Somewhat satisfied (OK for now; pretty good)
  4. Very satisfied (I'm really pleased)
  7. Other (please explain) \_\_\_\_\_
- 
5. If you were to have a minor problem with your child, how many people (friends or family) could you talk to, whose advice you trust?
1. 0-1 person
  2. 2 people
  3. 3-4 people
  4. 5-6 people
  5. More than 6 people
  7. Other (please explain) \_\_\_\_\_
- 
6. How satisfied are you with this situation?
1. Very dissatisfied (I wish things were very different)
  2. Somewhat dissatisfied (I would like some changes)
  3. Somewhat satisfied (OK for now; pretty good)
  4. Very satisfied (I'm really pleased)
  7. Other (please explain) \_\_\_\_\_
- 
7. How do you feel about the chores that are part of childcare (feeding, bathing, and changing diapers, etc.)?
1. I really don't enjoy that part of having a child.
  2. I mostly don't enjoy those things, but sometimes I do.
  3. It's OK.
  4. I have mixed feelings—I enjoy some things and I don't enjoy others.
  5. I mostly enjoy those things, but sometimes I don't.
  6. I really enjoy those things—there's nothing I don't like.
  7. Other (please explain) \_\_\_\_\_
- 
8. Sometimes mothers have doubts that they are doing the right things with their children. Do you ever have doubts?
1. Frequently
  2. Sometimes
  3. Hardly ever, seldom
  4. Never
  7. Other (please explain) \_\_\_\_\_
-

9. Many mothers have mixed feelings about their children. Do you find your child irritating?
1. Frequently
  2. Sometimes
  3. Hardly ever, seldom
  4. Never
  7. Other (please explain) \_\_\_\_\_
- 
10. Have you ever been sorry you had the child?
1. Frequently
  2. Sometimes
  3. Hardly ever, seldom
  4. Never
  7. Other (please explain) \_\_\_\_\_
- 
11. How much of the child's care are you doing yourself?
1. Someone else does most of it.
  2. The work is shared equally.
  3. I get a good deal of help (I do about 60-75% myself).
  4. I get a little help (I do about 80-90% myself).
  5. I do everything myself (95-100%).
  7. Other (please explain) \_\_\_\_\_
- 
12. How satisfied are you with the amount of childcare you are doing?
1. Very dissatisfied (I wish things were very different)
  2. Somewhat dissatisfied (I would like some changes)
  3. Somewhat satisfied (OK for now; pretty good)
  4. Very satisfied (I'm really pleased)
  7. Other (please explain) \_\_\_\_\_
- 
13. How much of the housework and/or care of other children are you doing yourself?
1. Someone else does most of it.
  2. The work is shared equally.
  3. I get a good deal of help (I do about 60-75% myself).
  4. I get a little help (I do about 80-90% myself).
  5. I do everything myself (95-100%).
  7. Other (please explain) \_\_\_\_\_
-

14. How satisfied are you with this amount of household responsibility?
1. Very dissatisfied (I wish things were very different)
  2. Somewhat dissatisfied (I would like some changes)
  3. Somewhat satisfied (OK for now; pretty good)
  4. Very satisfied (I'm really pleased)
  7. Other (please explain) \_\_\_\_\_
- 
15. How much time do you get for yourself each day? Do not count time working, sleeping, or in school.
1. None or less than  $\frac{1}{2}$  hour.
  2. Between  $\frac{1}{2}$  and 1 hour.
  3.  $1\frac{1}{2}$  to 3 hours
  4.  $3\frac{1}{2}$  to 5 hours
  5. More than 5 hours
  7. Other (please explain) \_\_\_\_\_
- 
16. How satisfied are you with the amount of time you get to yourself?
1. Very dissatisfied (I wish things were very different)
  2. Somewhat dissatisfied (I would like some changes)
  3. Somewhat satisfied (OK for now; pretty good)
  4. Very satisfied (I'm really pleased)
  7. Other (please explain) \_\_\_\_\_
- 
17. About how much time were you away from your child in the past two weeks, for social reasons (for example, going to movies or sporting events; visiting friends)?
1. None at all or less than 1 hour
  2. Between 1 and 3 hours
  3. 4 to 9 hours
  4. 10 to 25 hours
  5. More than 25 hours
  7. Other (please explain) \_\_\_\_\_
- 
18. How satisfied are you with the amount of time you were away?
1. Very dissatisfied (I wish things were very different)
  2. Somewhat dissatisfied (I would like some changes)
  3. Somewhat satisfied (OK for now; pretty good)
  4. Very satisfied (I'm really pleased)
  7. Other (please explain) \_\_\_\_\_
-

19. These days, what are your overall feelings toward your child?

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---

---

ID \_\_\_\_\_

DATE \_\_\_\_\_

## KNOWLEDGE OF INFANT DEVELOPMENT INVENTORY

INSTRUCTIONS: Please read carefully before starting.

This questionnaire asks you about normal infant development and health care. Each item describes what might be the behavior of a typical infant or what could affect a baby's growth and behavior. You are asked to mark each item as to whether you agree with the statement, disagree with it, or are not sure of the answer.

Please answer each question based on your knowledge of infants in general. In other words, we want to know how you think most babies act, how they grow, and how to care for them. Please be sure to check only one answer for each item.

Please mark for each of the following whether:

(A) you agree; (B) you disagree; or (C) you are not sure of the answer.

1. The parent just needs to feed, clean and clothe the baby for it to turn out fine.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
2. A baby needs to be seen by a doctor every few months in the first year of life.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
3. A two-year-old who is two or three months behind other two-year-olds is retarded.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
4. Children often will keep using the wrong word for awhile, even when they are told the right way to say it (like "feet not footses").  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
5. The baby should not be held when he (she) is fed because this will make the baby want to be held all of the time.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
6. If a nine-month-old wants a snack, give it nuts, popcorn or raisins.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
7. Babies do some things just to make trouble for the parent (like crying a long time or soiling their diapers).  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
8. The same thing may make an infant cry one time and laugh another (like a large dog or playing "I'm-gonna-getcha").  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
9. If you punish your child for doing something naughty, it's okay to give him (her) a piece of candy to stop the crying.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
10. You must stay in the bathroom when your baby is in the tub.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
11. In general, babies cannot see and hear at birth.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
12. Babies understand only words they can say.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
13. If a baby is shy or fussy in new situations, it usually means that there is an emotional problem.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
14. Talking to the baby about things he (she) is doing helps the baby's development and later competence.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_



15. Shots (immunizations) can wait until one year because babies have natural protection from illness for the first year.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
16. The two-year-old who says "no" to everything and tries to boss you around means it and is just trying to get you upset.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
17. The way an infant is brought up will have little effect on its intelligence.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
18. A baby with colic can cry for 20 or 30 minutes at a time, no matter how much you try to comfort him (her).  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
19. Fathers are naturally clumsy when it comes to taking care of babies.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
20. All infants need the same amount of sleep.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
21. The young infant usually has 5 to 7 feedings a day.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
22. The infant has little effect on how the parent cares for and plays with it, at least until the baby gets older.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
23. Taking care of a baby can leave the parent feeling tired, frustrated or overwhelmed.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
24. Putting a soft pillow in the crib is a good, safe way to help the baby sleep better.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
25. The newborn can see a face six feet away as well as an adult can.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
26. A young brother or sister may start wetting the bed or thumbsucking when the new baby arrives in the family.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
27. New foods should be given to the infant one at a time, with 4-5 days between each one.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
28. The two-year-old's sense of time is different from an adult's.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
29. One's IQ (intelligence) score stays the same from infancy through childhood.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_

30. Most premature babies end up being abused, neglected, or mentally retarded.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
31. If a baby is fed evaporated milk, he (she) needs extra vitamins and iron.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
32. Some healthy babies spit out almost every new food until they get used to it.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
33. The baby's personality (individuality) is set by 6 months of age.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
34. A three-month-old wets his (her) diapers about 10 times a day.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
35. A child is using rules of speech even when he (she) says words and sentences in an unusual or different way (like "I goed to town" or "What the dollie have?").  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
36. Some mothers do not get really involved with their infants until the baby starts to smile and look at them.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
37. The way the parent responds to the baby in the first few months of life determines whether the child will grow up to be happy and well-adjusted, or moody and a misfit.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
38. The newborn's toes fan out when you stroke the bottom of its foot.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
39. Children learn all of their language by copying what they have heard adults say.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
40. When a baby less than 12 months old gets diarrhea, the parent should stop feeding the baby solids and give it a little sugar water or flat cola.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
41. An infant may stop paying attention to what is going on around him (her) if there is too much noise or too many things to look at.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
42. Some normal babies do not enjoy being cuddled.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
43. If a baby has trouble making a BM, give it warm milk.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
44. The more you comfort your crying baby by holding and talking to it, the more you spoil him (her).  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_

45. A frequent cause of accidents for one-year-olds is pulling something like a frying pan, a tablecloth, or a lamp down on top of them.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
46. Baby girls are fragile and sick more often, so they need to be treated more carefully than boys.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
47. A good way to teach your child not to hit is to hit back.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_
48. Some days you need to discipline your baby; other days you can ignore the same thing. It all depends on the mood you're in that day.  
(A) Agree \_\_\_\_\_ (B) Disagree \_\_\_\_\_ (C) Not Sure \_\_\_\_\_

Each of the following asks you about the age at which infants can do something. If you think the age is about right, check "Agree". If you don't agree, then decide whether a Younger or Older infant could do it. If you aren't sure of the age, check "Not Sure".

49. Most babies can sit on the floor without falling over by 7 months.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
50. A baby of 6 months will respond to someone differently depending on whether the person is happy, sad or upset.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
51. Most two-year-olds can tell the difference between a make-believe story on TV and a true one.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
52. Infants usually are walking by about 12 months of age.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
53. An eight-month-old acts differently with a familiar person than with someone not seen before.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
54. A baby is about 7 months old before he (she) can reach for and grab things.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
55. A two-year-old is able to reason logically, much as an adult would.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
56. A one-year-old knows right from wrong.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
57. An infant of 3 months often will smile when he (she) sees an adult face.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
58. Most infants are ready to be toilet trained by one year of age.  
(A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_

59. An infant will begin to respond to his (her) name at 10 months.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
60. Babies begin to laugh at things around 4 months of age.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
61. Five-month-olds know what "no" means.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
62. A four-month-old, lying on his (her) stomach can lift his (her) head.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
63. Babbling ("a-bah-bah" or "bup-bup") begins around 5 months.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
64. One-year-olds often cooperate and share when they play together.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
65. An infant of 12 months can remember toys he (she) has watched being hidden.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
66. The baby usually says his (her) first real word at 6 months.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
67. Infants have depth perception by 6 months of age (can tell that they are on a high place).  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_
68. Two-month-olds can tell some speech sounds apart.  
 (A) Agree \_\_\_\_\_ (B) Younger \_\_\_\_\_ (C) Older \_\_\_\_\_ (D) Not Sure \_\_\_\_\_

Please circle the best single answer for the following:

69. The best way to deal with a one-year-old who keeps playing with breakable things in the living room is to:
- a. keep him (her) in a playpen and out of everything.
  - b. slap the baby's hand whenever he (she) touches something.
  - c. tell the child "No!" and expect him (her) to obey you.
  - d. put the things out of reach until the child is older.
  - e. Not Sure.
70. Select the most appropriate game for a one-year-old:
- a. Stringing small beads.
  - b. Cutting out shapes with scissors.
  - c. Rolling a ball back and forth with an adult.
  - d. Sorting things by shape and color.
  - e. Not Sure.

71. The average newborn sleeps a total of:
- a. 22 hours a day.
  - b. 17 hours a day.
  - c. 12 hours a day.
  - d. 7 hours a day.
  - e. Not Sure.
72. If a two-year-old doesn't get his (her) way and has a temper tantrum, which of the following would be the best way to avoid future problems with tantrums?
- a. Give the child a new toy.
  - b. Ignore the temper tantrum.
  - c. Spank the child's bottom.
  - d. Let the child have his (her) own way.
  - e. Not Sure.
73. Altogether, the average newborn cries about:
- a. 1-2 hours out of every 24.
  - b. 3-4 hours out of every 24.
  - c. 5-6 hours out of every 24.
  - d. 7-8 hours out of every 24.
  - e. Not Sure.
74. An eight-month-old is most likely to be scared by:
- a. dreams.
  - b. large animals.
  - c. being alone in the dark.
  - d. an unfamiliar person wearing a mask.
  - e. Not Sure.
75. The best way to bring down a baby's fever is:
- a. by putting a cold cloth on the forehead.
  - b. by putting extra clothes on the baby.
  - c. by giving Tylenol drops.
  - d. by giving the baby lots of Vitamin C.
  - e. Not Sure.

COMMENTS:

MOTHER'S NAME: \_\_\_\_\_

ID # \_\_\_\_\_

DATE: \_\_\_\_\_

MOTHER'S COMMENTS:

Please choose the answer you feel best represents your thinking.  
Try not to select an answer only because you think it is what the trainer  
would like you to say.

1. Compared to before the course, do you think you imitate your baby's behavior:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

2. Compared to before the course, do you think you repeat the phrases you use when speaking to your baby: (For example: Aren't you cute? Aren't you cute?)

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

3. Compared to before the course, do you think you are aware of when your baby wants to talk with you or play with you:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

4. Compared to before the course, do you think you play games with your baby:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

5. Compared to before the course, do you think you and your baby enjoy these games:

\_\_\_\_\_ much more  
\_\_\_\_\_ somewhat more  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less  
\_\_\_\_\_ much less

6. Compared to before the course, do you think you give your baby the chance to experiment with something he (or she) seems interested in:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

7. Compared to before the course, do you think you describe things and label things for your baby:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

8. Compared to before the course, when your baby doesn't seem interested in what you are doing with him (or her) do you think you pause:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

9. Compared to before the course, do you think your knowledge of infant and child development has:

\_\_\_\_\_ increased very much  
\_\_\_\_\_ increased somewhat  
\_\_\_\_\_ stayed about the same

10. Compared to before the course, do you think your awareness of your baby's behavior and development has:

\_\_\_\_\_ increased very much  
\_\_\_\_\_ increased somewhat  
\_\_\_\_\_ stayed about the same

11. Compared to before the course, do you think this awareness of and knowledge about your baby has:

\_\_\_\_\_ positively influenced your relationship with your baby  
\_\_\_\_\_ not changed your relationship with your baby  
\_\_\_\_\_ negatively influenced your relationship with your baby

12. Compared to before the course, do you think your baby is "talking" to you:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

13. Compared to before the course, do you think your baby is smiling and laughing:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

14. Compared to before the course, do you think your baby is fretting or crying:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently



15. Compared to before the course, do you feel your relationship with your baby is:

\_\_\_\_\_ much more positive  
\_\_\_\_\_ somewhat more positive  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less positive  
\_\_\_\_\_ much less positive

16. Within the course, did you think the trainer was making comments which were:

\_\_\_\_\_ very helpful  
\_\_\_\_\_ somewhat helpful  
\_\_\_\_\_ not particularly helpful  
\_\_\_\_\_ not helpful at all

17. Within the course, did you think the opportunities to talk with the trainer before and after the coaching sessions were:

\_\_\_\_\_ very helpful  
\_\_\_\_\_ somewhat helpful  
\_\_\_\_\_ not particularly helpful  
\_\_\_\_\_ not helpful at all

18. Within the course, did you think viewing the videotape of you and your baby was:

\_\_\_\_\_ very helpful  
\_\_\_\_\_ somewhat helpful  
\_\_\_\_\_ not particularly helpful  
\_\_\_\_\_ not helpful at all

19. Would you have preferred the course to be:

\_\_\_\_\_ 3 or more sessions longer  
\_\_\_\_\_ 1 or 2 sessions longer  
\_\_\_\_\_ the length was satisfactory  
\_\_\_\_\_ 1 or 2 sessions shorter

20. If a friend with a young baby was interested in taking this course would you:

- ☐ strongly recommend it
- ☐ recommend it
- ☐ not recommend it
- ☐ strongly not recommend it.

21. What did you like best about participating in this course?

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22. What did you like least about participating in this course?

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23. Please make any other comments you have about this course and about your participation below:

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MOTHER'S NAME: \_\_\_\_\_

ID # \_\_\_\_\_

DATE: \_\_\_\_\_

MOTHER'S COMMENTS:

Please choose the answer you feel best represents your thinking.  
Try not to select an answer only because you think it is what the researchers would like you to say.

1. Compared to when Gail observed you and your baby the first time, do you think you imitate your baby's behavior:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

2. Compared to when Gail observed you and your baby the first time, do you think you repeat the phrases you use when speaking to your baby: (For example: Aren't you cute? Aren't you cute?)

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

3. Compared to when Gail observed you and your baby the first time, do you think you are aware of when your baby wants to talk with you or play with you:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

4. Compared to when Gail observed you and your baby the first time, do you think you play games with your baby:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

5. Compared to when Gail observed you and your baby the first time, do you think you and your baby enjoy these games:

\_\_\_\_\_ much more  
\_\_\_\_\_ somewhat more  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less  
\_\_\_\_\_ much less

6. Compared to when Gail observed you and your baby the first time, do you think you give your baby the chance to experiment with something he (or she) seems interested in:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

7. Compared to when Gail observed you and your baby the first time, do you think you describe things and label things for your baby:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

8. Compared to when Gail observed you and your baby the first time, when your baby doesn't seem interested in what you are doing with him (or her) do you think you pause:

\_\_\_\_\_ much more frequently  
\_\_\_\_\_ somewhat more frequently  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less frequently  
\_\_\_\_\_ much less frequently

9. Compared to when Gail observed you and your baby the first time, do you think your knowledge of infant and child development has:

\_\_\_\_\_ increased very much  
\_\_\_\_\_ increased somewhat  
\_\_\_\_\_ stayed about the same

10. Compared to when Gail observed you and your baby the first time, do you think your awareness of your baby's behavior and development has:
- ☐ increased very much
  - ☐ increased somewhat
  - ☐ stayed about the same
11. Compared to when Gail observed you and your baby the first time, do you think this awareness of and knowledge about your baby has:
- ☐ positively influenced your relationship with your baby
  - ☐ not changed your relationship with your baby
  - ☐ negatively influenced your relationship with your baby
12. Compared to when Gail observed you and your baby the first time, do you think your baby is "talking" to you:
- ☐ much more frequently
  - ☐ somewhat more frequently
  - ☐ about the same
  - ☐ somewhat less frequently
  - ☐ much less frequently
13. Compared to when Gail observed you and your baby the first time, do you think your baby is smiling and laughing:
- ☐ much more frequently
  - ☐ somewhat more frequently
  - ☐ about the same
  - ☐ somewhat less frequently
  - ☐ much less frequently
14. Compared to when Gail observed you and your baby the first time, do you think your baby is fretting or crying:
- ☐ much more frequently
  - ☐ somewhat more frequently
  - ☐ about the same
  - ☐ somewhat less frequently
  - ☐ much less frequently

15. Compared to when Gail observed you and your baby the first time, do you feel your relationship with your baby is:

\_\_\_\_\_ much more positive  
\_\_\_\_\_ somewhat more positive  
\_\_\_\_\_ about the same  
\_\_\_\_\_ somewhat less positive  
\_\_\_\_\_ much less positive