THE DEVELOPMENT OF MATERNAL ATTACHMENT

FROM FETAL AFFILIATION TO INFANT INTERACTION

by

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A THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF NURSING AT DALHOUSIE UNIVERSITY
JUNE 1984

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ABSTRACT

This study was designed to examine the relationship between maternal fetal attachment and maternal child attachment during the early postpartum period. Attachment during pregnancy was measured by the Maternal Fetal Attachment Scale (MFA) (Cranley, 1981). Mother infant attachment was assessed by the Nursing Child Assessment Feeding Scale (NCAFS) (Barnard, 1978) and the Funke Mother-Infant Interaction Assessment tool (FMII) (Funke-Furber, 1978). Thirty two women completed the MFA during their 35th to 40th week of pregnancy and were then observed and rated while they fed their babies on the second and third postpartum day. The findings demonstrated positive and significant relationships between the MFA and the NCAFS (r=.73, p=.001) and between the MFA and the FMII (r=.69, p=.001).

In order to examine the validity of the assumption that the instruments used (MFA, NCAFS & FMII) were measuring aspects of attachment as defined by attachment theory, the Attachment History Questionnaire was formulated and administered prenatally. No significant associations were found between the woman's relationship with her husband/partner, her mother, her father, her friends or her experience with early separation from parents and results on any of the attachment/interaction instruments. Sample, instrument and design limitations make this finding inconclusive.

ACKNOWLEDGEMENTS

I wish to express my thanks and appreciation to all those who have supported me throughout the planning and implementation of this study. To my principal advisor, Dr. Judith Ritchie, for her expertise, standards and sensitivity. With her care and understanding I have grown to expect more of myself. To Jean Hughes for her practical advice and for her attention to detail in pursuit of excellence. To J.B. Garner for his skill, objectivity and sense of humor.

I wish to express special thanks to the women who took part in the study for sharing their time and themselves. It was through the conscientious effort of the nurses in the two hospitals involved that data collection was possible.

Thanks are extended to Mrs. M. Harnish for her help with data analysis and Bernadette Purcell for her time and endless patience in the preparation of the final draft.

To my dearest friends who have shared their homes and their intellect and who have listened so patiently. In particular, Saul and Babs Pytka, Debbie Kaetz, Mary Cann and Heather Laskey.

I dedicate this work to my husband, Hy, and my children, Susanna and Michael, without whom I would not be possible and to whom I am most securely attached.

CHAPTER I

THE PROBLEM

Background and Problem Statement

Maternal child attachment has received much attention in the last fifteen years as the quality of that relationship has been related to the child's emotional and cognitive growth and physical well being (Ainsworth, 1982; Blumberg, 1974; Bowlby, 1969; Brazelton, 1982; Clarke-Stewart, 1973; Eyres, Barnard, Bee & Hammond, 1980; Klaus & Kennell, 1976, 1982; Mercer, 1977; Tronick, 1982; Trowell, 1982). Emphasis has been placed on identifying the origins of attachment and determining means of promoting its development. There is evidence to suggest that maternal attachment may have its origins in pregnancy and may be influenced by variables originating in the woman's own childhood and social network (Arbeit, 1975; Ballou, 1978; Benedek, 1970; Bibring, Dwyer, Huntington & Valenstein, 1961; Bowlby, 1969; Cohen, 1979; Grimm, 1967; Leifer, 1977, 1980; Lumley, 1980a, 1980b; Mercer, Hackley & Bostrom, 1982; Rubin, 1967).

It is generally assumed that a high degree of maternal fetal attachment is desirable and has a positive effect on the maternal child relationship. Little attention has been placed on the attachment process itself, how it develops and how indicators of attachment during one period are related to attachment behaviors during other periods of maternal and

child development. Although it is assumed that there is a relationship between affiliation with and affection for the unborn child and maternal child attachment, little is known about this relationship. It is not known whether affective involvement during pregnancy stimulates and prepares mothers to react responsively and sensitively to the adaptive needs and social capabilities of the newborn.

Purpose

The attachment process is of particular importance to nurses who have close personal contact with mothers throughout the maternity cycle, in prenatal classes, in antenatal care facilities, during labor and delivery and the early postpartum period. Studies indicate that specific nursing intervention designed to enhance attachment during pregnancy (Carter-Jessop, 1981) and during the postpartum period (Anderson, 1981; Dean, Morgan & Towle, 1982; Furr & Kirgis, 1982; Reiser, 1981; Stainton, 1981) can positively affect maternal child interaction. A better understanding of the attachment process might make it possible to assess its development along a continuum and to identify variables which may impede or enhance this development.

The purpose of this study was to examine the relationship between maternal fetal attachment and mother infant attachment during the early postpartum period.

Theoretical Framework

Attachment theory is based on the concept that the

affectional tie between mother and infant develops out of species specific response patterns. These patterns of behavior ensure that the infant will be cared for and that the species will, therefore, survive (Campbell & Taylor, 1979). Attachment refers to a hypothetical construct reflecting the quality of affectional ties between parent, especially the mother, and the infant. The affection and commitment a woman feels for her infant enables her to care for him and to make personal adjustments necessary for the daily care of her baby (Sugarman, 1977). An early system of affective interaction, in turn, provides a foundation upon which the child establishes a sense of identification with culture, family and other individuals (Bowlby, 1969; Brazelton, Koslowski & Main, 1974) and begins preparation for the complex affective communication system necessary in our society (Als, 1982).

The term attachment was first introduced by Bowlby (1958, 1969) to describe the nature of the child's affiliation for its mother. Bowlby's early study of human relationships was influenced by his desire to explain the psychological responses of grief and loss experienced by British soldiers who had lost friends in the First World War (Newcombe & Lerner, 1982). In an attempt to determine the origins of this behavior, Bowlby focused his attention on the problems of separation anxiety, mourning, defense and subsequently the nature of the child's tie to its mother

(Bowlby, 1940, 1952, 1958, 1969). Bowlby drew upon psychoanalytic, biological and ethological concepts thus fostering a multidisciplinary approach to the study of attachments (Parkes & Stevenson-Hinde, 1982). Observational studies demonstrated the importance of the maternal variable in the growing maternal child relationship (Ainsworth, 1969; Ainsworth & Bell, 1969; Brazelton et al., 1974; Brazelton, Rubenstein & Pederson, 1972; Klaus, Jerauld & Kreger, 1972).

Maternal interaction with her newborn had been recognized as an important process (Caplan, 1954; Rubin, 1961, 1963; Sander, 1962). Studies have found associations between the incidence of child battering (Elmer & Gregg, 1967) and failure to thrive (Shaneen, Alexander, Truskowsky & Barbero, 1968) in premature infants who had been separated from their parents. Findings by Klaus and Kennell (1970) also indicated the possibility of long term repercussions of early mother infant separation. These and similar findings stimulated interest in the concept of critical periods in the development of maternal attachment.

Animal studies of maternal behavior supported the emphasis on the early newborn period as a critical time for the development of attachment (Rosenblatt, 1978). Although this time period may be important, a number of complex variables have been associated with the development of human attachment behavior (Curry, 1982; Grossman, Thane & Grossman, 1981; Klaus & Kennell, 1982; Peterson & Mehl,

1978; Sugarman, 1977; Svejda, Campos & Emde, 1980; Trowell, 1982). In light of both infant and maternal variables, the possibility that an irreversible critical time period exists for human mothers seems improbable or at least controversial (Campbell & Taylor, 1979; Elliot, 1983; Klaus, 1978; Lamb, 1982a, 1982b).

There are many variables which may potentially affect the development of a mother's relationship with her child. How a mother responds to her infant is derived from a long history of interpersonal relationships with her family and also from an absorption of values and practices of her culture (Bowlby, 1969). The way in which an individual's attachment behavior becomes organized within her personality influences the pattern of affectional ties she makes during her life (Bowlby, 1980). A woman's ability to nurture her infant is dependent to some degree on her experiences of being nurtured. The importance of the generational nature of patterns of attachment is accentuated by information that indicated that parents who had difficulty nurturing their children were often not well nurtured themselves (Delozier, 1982; Kempe & Kempe, 1978). A woman's relationship with her mother has been associated with her ability to establish a relationship with her child (Arbeit, 1975; Deutsch, 1945; Leifer, 1977; Monagham & Buckfield, 1981; Rubin, 1967; Shereshefsky & Yarrow, 1973). Childhood experiences with separation from parents have also been associated with

maternal attachment (Frommer & O'Shea, 1973).

One of the major challenges in the study of attachment has been the abstract developmental nature of the construct itself. Attachment cannot be quantitatively measured. Degrees of attachment, therefore, are operationalized and measured indirectly by noting behavior and the results of that behavior. In general, activities designated as attachment behaviors are those that promote social interaction (Ainsworth, 1982; Bowlby, 1969; Campbell & Taylor, 1979; Lewis & Lee-Painter, 1974). There is no one behavior or group of behaviors that alone constitutes evidence of attachment since the expression of affective ties between mother and her child varies with the developmental level of her child (Ainsworth, 1982). Individual mothers also use different modes of communication as they interact with their babies (Parke, 1975).

Caplan (1959) emphasized the need to differentiate between attitudes towards pregnancy and attitudes towards the fetus in assessing the developing maternal child relationship. A number of studies have assessed maternal fetal attachment but within a more general assessment of adaptation to pregnancy (Funke-Furber, 1978; Josten, 1981, 1982; Mercer, Hackley & Bostrom, 1982). Studies that have focused on quantifying maternal fetal attachment were not designed to associate maternal fetal attachment behaviors with maternal child interaction (Cranley, 1981; Lumley,

1983). There is a need to understand all parts of the attachment process in order to facilitate its healthy growth and development and to intervene effectively when problems arise (Trowell, 1982). When greater emphasis is placed on the organization of attachment behavior, the significance and stability of that behavior can be better understood (Stroufe & Waters, 1977). Assessment of variables that may affect the development of attachment also become more meaningful when viewed along the continuum of developing attachment.

Review of the Literature

Development of Maternal Attachment During Pregnancy

Theoretical accounts of the psychology of pregnancy refer to the growing awareness and affection for the fetus during pregnancy (Arbeit, 1975; Ballou, 1978; Benedek, 1970; Bibring, Dwyer, Huntington & Valenstein, 1961; Deutsch, 1945; Leifer, 1977; Pines, 1976; Rubin, 1976; Tanner, 1969). From a psychoanalytic perspective, Deutsch (1945) described the early relationship with the fetus. She noted that "by tender identification, by perceiving the fruit of her body as part of herself, the pregnant woman is able to transform the parasite into a beloved being" (p. 139). Bibring and others (1961), from a similar perspective and process, explained this early love relationship as being narcissistic in quality. Love for the self gradually evolved into love for the separate being as separateness became more real

through pregnancy and childbirth. The development of affective ties to the fetus appeared to evolve in an orderly sequence with little attachment evident in early pregnancy (Leifer, 1977).

Quickening, the perception of fetal movement, represents a significant turning point in the woman's developing relationship with her unborn child (Ballou, 1978; Pines, 1972; Rubin, 1976; Tanner, 1969). During the last trimester, the fetus develops characteristic rest-activity patterns (Dierker, Pallay, Sorokin & Rosin, 1982). These patterns change as the fetus develops and mothers are often able to recognize them and respond to them in an increasingly synchronized fashion (Rubin, 1972). The infant's interactive experience with maternal auditory and kinesthetic cues may also set the stage for enhancing the meaning of synchronous rhythms between mother and infant after birth (Brazelton, 1982; Liley, 1972).

Women develop feelings of attachment to varying degrees through pregnancy. Some women have expressed an affiliation for the fetus and have perceived the fetus as a real person as early as the first trimester (Leifer, 1977; Lumley, 1980). Lumley's study (1980, 1982, 1983) was designed to determine how women imagine the fetus during pregnancy, to explore the development of maternal attachment and to examine whether patterns of attachment during pregnancy were predictive of factors in the postpartum period. Thirty

women took part in the longitudinal study from the first trimester of pregnancy to 12 weeks after birth. During each trimester, the women were asked to describe the fetus and to draw this image. They were also asked whether or not they considered the fetus to be a "real person". Lumley reported that the 9 participants, who perceived the fetus "to be a real person" in the first trimester, expressed a greater awareness of the fetus. Eight of the 9 women, compared to only 19% of the rest of the sample (p=.001) felt that the fetus could affect the mother in major or minor ways. They also predicted that they would feel more grief and distress if they were to have a miscarriage than the rest of the sample (p=.05). The degree to which loss is felt has been related to the degree of attachment felt for a lost object (Bowlby, 1980; Kennell, Slyter & Klaus, 1970). Lumley interpreted these findings as an indication of early attachment. The "late attachers" (37%) had not developed an attachment to the fetus by mid-pregnancy, but all but two had done so by 36 weeks of pregnancy. Lumley's study found no significant relationships between attachment during pregnancy and maternal satisfaction after birth or successful breastfeeding at 12 weeks.

Maternal Fetal Attachment Behaviors

Leifer (1977), in a longitudinal interview study from the first trimester until 2 months postpartum, determined that 19 pregnant women engaged in a variety of behaviors

that served to heighten the reality of the baby. Leifer noted that these behaviors represented affective involvement as well as mechanisms for interaction with the fetus. Early in pregnancy, some of the women initiated lengthy conversations with their husbands about the child. Choosing a name was seen as particularly important in establishing the identity of the unborn child. The fetus was often called by a pet name. During the second trimester, some of the women had imaginary conversations with the fetus in response to fetal movement. They talked affectionately or endearingly reprimanded when the fetus moved quickly or offered it food that the mother was eating.

Arbeit (1975) explored the relationship between mother and unborn child, gathering data during multiple interviews with 30 primiparous women during their last trimester of pregnancy. The women also completed a differentiation scale designed to compare their perceptions of the fetus as separate from themselves. Interview material that related to the emerging perception of the fetus as a child, highlighted a wealth of mutual interaction which may take place between mothers and their unborn children. Some of the women described that they had made changes in their eating and activity patterns in response to the perceived needs of the fetus. Some women in Arbeit's study talked and sang to the fetus. They attributed human characteristics and intentions to it, using fantasy to facilitate the interactive process.

Women may project familial characteristics onto their unborn children through the identification process (Sholder, 1981). Fantasy is said to facilitate the conceptualization of the fetus as an individual and to allow women to attach psychologically to the idea of a child (Benedek, 1970; Rubin, 1972). Thus an image formed can be responded to affectively as if it were real (Horowitz, 1978).

Measurement of Maternal Fetal Attachment

The maternal fetal relationship has been assessed by determining attitudes towards the fetus (Robson & Moss, 1976), differentiation of the fetus from the self (Arbeit, 1975), perception of the fetus (Lumley, 1980) and the developmental level of the mother in relation to the tasks of pregnancy (Josten, 1981). Maternal fetal attachment is not conducive to the observation method believed to be the best way of analyzing attachment behavior (Moss, 1965) due to the private and imaginative nature of much of the interaction.

Maternal Fetal Attachment Scale. Cranley (1981) developed a Likert-type scale to measure the extent to which women participate in behaviors that indicate affective involvement and interaction with the fetus. Aspects of the maternal fetal attachment behavior system explored by this scale include: differentiation of self from fetus, interaction with the fetus, attributing characteristics and intentions to the fetus, giving of the self and roletaking.

Validity and reliability. In developing the scale, Cranley obtained a list of statements that women make about themselves and their unborn children, from the literature and through consultation with other clinicians and childbirth educators. The items were then given to a group of experts in the field of maternal child health for evaluation. A group of pregnant women also reviewed the items for their understandability and appropriateness. Thus an attempt was made to incorporate content validity into the instrument design.

The scale was administered to 71 primiparous and multiparous women between their 35th to 40th week of pregnancy. Cronbach's alpha determined for the total score was .85. The subscales had alphas ranging from .52 to .75.

Validity was examined by performing subscale-subscale and subscale-total score intercorrelations. Correlations between each subscale and the total score were positive (r=.61 to .83). Correlations between the subscales were also positive (r=.29 to .60). These correlations indicated that the scale was measuring aspects of the construct of maternal fetal attachment as described by Cranley.

Results of the analysis of the Maternal Fetal Attachment Scale scores also supported the concept that women do engage, to varying degrees, in behaviors indicative of attachment. Seventy-eight percent of the women reported that they, at times, engaged in behaviors represented on the

scale. Thirty-two percent noted that they did so most of the time. "Giving of the self" behaviors were the most common, while "interaction with the fetus" were the least.

In an attempt to establish external criterion validity for the instrument, scores on the Maternal Fetal Attachment Scale were correlated with scores on Broussard's Neonatal Perception Inventory I (NPI I) (Broussard, 1979) administered to the subjects on the third postpartum day. The relationship found between maternal fetal attachment and the mothers' perceptions of their infants after birth was almost non-existent (r=.01). It has been noted that the NPI I may be measuring a mother's realistic concerns for her baby rather than her attitude (Palison, 1981). Findings by Mercer and others (1982) report no significant correlations between NPI I scores and the presence of identified attachment behaviors in the early postpartum period.

Related findings. No significant relationship was found between Maternal Fetal Attachment scores and age, number of pregnancies or socio-economic status (Cranley, 1981). Nor was there any significant relationship between maternal fetal attachment and self esteem as measured by the Rosenberg Self-Esteem Scale. Cranley reported that the presence of a strong support system was positively associated with maternal fetal attachment (r=.51). Higher scores were obtained by women who reported that they had more people available to help them and a higher quality of help.

Conversely, women who perceived themselves as having more stress during pregnancy had lower scores on the MFA (r=-.41).These findings are consistent with the literature that indicates that the availability of support is important to the woman's adjustment throughout the maternity cycle (Clark & Affonso, 1976; Leifer, 1977; Mercer et al., 1982). Other studies also report that the presence of support may ameliorate the stressful aspects of pregnancy and childbirth (Caplan, 1959; Marut & Mercer, 1979; Shereshefsky & Yarrow, 1972) and other stressful life events during the childbearing year (Nuckolls, Cassell & Kaplan, 1972).

Maternal Child Attachment Behavior

There are a number of maternal behaviors in the early postpartum period that promote proximity and psychological contact and stimulate social interaction. This period is characterized by the process of discovery as the mother actively seeks to know her child and replaces the prenatal fantasized child with the real one (Gottlieb, 1978; Rubin, 1963). Behaviors include fondling, kissing, cuddling and prolonged gazing at the child (Klaus, Kennell, Plumb & Zuelke, 1970).

As part of the identification and claiming processes, mothers attribute features and characteristics of their newborn babies to other family members. They may project feeling and intent to infant behavior. Eye contact is an important avenue of communication and has been associated with

positive parental attitudes (Robson, 1967). Mothers express an interest in the eyes and attempt to establish eye contact (Als, 1975; Brazelton, Tronick, Adamson, Als & Wise, 1975). The quality of the mother's voice, her ability to moderate tone and her use of animated speech are reflected in her ability to stimulate and thus interact with her baby (Moss, Robson & Pederson, 1969). Maternal touch is also an important vehicle of communication and affection for the young infant (Ainsworth, 1979; Grossman, Thane & Grossman, 1981).

Mothers vary in the degree to which they use different means of communication (Parke, 1975). More important than the mode of communication, however, is her ability to respond sensitively to the infant's signals and cues (Ainsworth, 1982; Barnard & Eyres, 1979; Brazelton, et al., 1972). By analyzing videotaped sessions with mother-infant pairs over the infant's first five months of life, Brazelton and others (1975) noted that positive and satisfying interactions were those in which both partners modified their actions in response to the feedback provided by the other.

Early maternal attachment behaviors are directed towards recognition of the infant's behavioral cues and responding to the attentional interactive capacity of the newborn (Als, 1982). The mother's sensitivity reinforces the infant's ability to formulate meaningful ways of communication (Sander, 1962). Recognition and sensitivity to cues in the early period creates the foundation upon which a

reciprocal relationship is based (Brazelton, 1976, 1982; Klaus & Kennell, 1982).

Measurement of Maternal Child Attachment

A number of instruments and protocols have been developed to assess mother child relationships or interactions (Barnard, 1978a; Carter-Jessop, 1982; Funke-Furber, 1978; Grossman et al., 1981; Josten, 1982; Mercer et al., 1982; Reiser, 1981; Stainton, 1981). Observation is the predominant method of data collection. The main difficulty with the observation method is that of observer interference (Campbell & Stanley, 1963). The development and use of instruments to guide observations within a theoretical framework may reduce the possibility of observer interference (Polit & Hungler, 1978) and provides a quantitative measure of maternal child interaction.

Nursing Child Assessment Feeding Scale. The Nursing Child Assessment Feeding Scale (NCAFS) (Barnard, 1978a) was based on the reciprocity principle incorporated into Barnard's model of parent infant adaptation (Barnard, 1978b). The model identifies parental and infant characteristics that are believed necessary to successful interaction and communication. Parental characteristics include: sensitivity to cues, response to distress, social and emotional growth fostering and cognitive growth fostering. The scale was designed as a guide to the observation and rating of mother infant interaction during a feeding. Behaviors dur-

ing feeding have been found to be representative of behaviors during other periods of maternal interaction during the first few days of life (Osofsky, 1976). The 50 parent items focus on position, kinesthetic, visual and tactile behavior, stimulation and variation in mood and tension. Infant characteristics are clarity of cues and responsiveness to parent. Twenty-six items are identified within these two categories.

Validity and reliability. Items on the Nursing Child Assessment Feeding Scale (NCAFS) were generated by a group of experts in maternal child health and subsequently assigned to subscale headings according to the Barnard Parent Infant Adaptation Model, implying content validity. Concurrent validity was assessed by comparing 300 scores on the feeding scale with scores on the Nursing Child Assessment Teaching Scale (Barnard, 1978c) and the Home Observation for the Measurement of the Environment (HOME) (Caldwell, 1978). The teaching scale is a guide to the observation and rating of maternal child interaction during a teaching episode. The HOME was designed to measure aspects of the child's animate and inanimate environment during the first three years of life (Snyder & Spietz, 1978). The Nursing Child Assessment Feeding Scale scores were significantly related to both the teaching scale and the HOME ($p < .01$).

Internal consistency for the NCAFS was examined by analyzing 845 feeding observations of children from birth to

12 months (Barnard & Bee, in press). The subscales had positive coefficients of reliability (α = .60 to .69). Cronbach's alpha for the total scale was .83, indicating a more satisfactory level of internal consistency than any of the subscales alone. Factors obtained from factor analysis of feeding scale scores (n=847) were different from the subscales showing that the conceptual grouping did not match the empirical grouping (Bee, 1981). The only available data on test-retest reliability were obtained from a cohort sample of thirty-two parent infant pairs representing every 7th subject admitted to the original Nursing Child Assessment Project (Barnard, 1978d; Bee, 1981). Test-retest reliability was assessed by comparing measures at three month intervals. These measures were not significantly correlated which may reflect developmental changes rather than unreliable measures (Barnard, 1978d).

Related findings. Further data were collected from 845 parent infant pairs rated on the NCAFS. The children's ages ranged from 1 to 15 months. Married mothers had significantly higher scores than unmarried mothers (Newman Keuls Range Test, $p < .05$). There were no racial differences on sensitivity to cues and responsiveness to distress. There were significant differences between blacks and whites on the social/emotional growth fostering and cognitive growth fostering subscales (Newman Keuls Range Test, $p < .05$). Mothers with higher education levels scored higher on the

NCAFS. Younger children also tended to achieve lower scores than older children. Again this may indicate the developmental nature of maternal child interaction.

Funke Mother Infant Interaction Assessment. Funke-Furber (1978) designed and revised a series of instruments to measure maternal adaptation during pregnancy to 6 months postpartum. The Funke Mother Infant Interaction Assessment (FMII) is a guide to the observation of a feeding during the first four days postpartum. It focuses on four aspects of maternal child interaction: eye contact, the mother's degree of acceptance of her infant, physical closeness and the quality and amount of verbal stimulation.

Validity and reliability. Face or content validity for the original FMII was provided by a panel of expert reviewers. The reviewers assessed the items for their applicability and rated them on a five point scale. In order to assess the predictability of prenatal variables and the discriminating quality of postnatal maternal behaviors, the sample of 76 women was systematically reduced to two groups, Group I, adaptive mothers, and Group II, maladaptive mothers. The procedure used was Wards' (1963) method of clustering cases to determine optimum groupings among cases. Three indicators that best discriminated the two groups on the fourth postpartum day were included in the revised assessment tool, thus incorporating further validity into the instrument design.

Related findings. Funke-Furber reported that parity did not appear to have an influence on postnatal interaction variables but that age did. Of the 13 mothers under the age of 20 years, 12 were in the maladaptive group. There were no significant differences between infant state (72 and 124 hours after delivery), as measured by the Brazelton Neonatal Behavioral Assessment Scale (Brazelton, 1973), and maternal scores on the FMII.

Application of Attachment Theory to Nursing Practice

The development of maternal child attachment has long ranging implications for the child and mother. Nurses are in contact with mothers and their children during the formative stages of the developmental cycle and thus have an opportunity to incorporate an understanding of the attachment process into nursing practice and care. Maternal interaction has been shown to be one aspect of the development of attachment that is operational and susceptible to nursing intervention and changes in care practices (Anderson, 1981; Carter-Jessop, 1981; Dean et al., 1982; Furr & Kirgis, 1982; O'Connor, Vietze, Hopkins & Altemeier, 1977; Parke, 1975; Stainton, 1981).

Much attention has focused on early and prolonged maternal child contact with the assumption that the early postnatal period was critical to the development of maternal attachment. Recently, criticism has centered around this emphasis. One argument points out the dangers of relying

too securely on the possibility that child development will be significantly affected by isolated care practices such as early contact (Campbell & Taylor, 1979). The effects of early contact may depend on other, sometimes more powerful, social and psychological conditions (Grossman, Thane & Grossman, 1981). Other arguments refer to the dangers involved in emphasizing this period for parents who are unable to be in close contact with their infants due to infant or maternal factors (Elliot, 1983). Others point to the fact that the importance of the early postpartum period as critical to maternal child attachment has not been established (Campbell & Taylor, 1979; Lamb, 1982a, 1982b). Developing an awareness of the developmental nature of the attachment process encourages nurses to assess and plan nursing care to enhance interaction throughout the maternity cycle and through the early childhood years. Developing means of quantitatively measuring attachment enables nurses to evaluate the effects of certain variables and to support changes in care policies with research based data.

Study Questions

This study considered the following question.

What is the relationship between maternal fetal attachment measured during the last month of pregnancy and maternal child interaction during the first few days postpartum?

There are a number of variables within the framework of attachment theory that may potentially affect the indivi-

dual's ability to develop secure attachments in life. In order to test the validity of the concept that the instruments used are measuring aspects of attachment, the study examined the following subquestions.

a) Is the woman's relationship with her partner, her mother, her father or her friends related to maternal attachment during pregnancy or after birth?

b) Is the woman's experience with childhood separation from parent(s) related to maternal attachment during pregnancy or after birth?

Definition of Terms

Attachment - Hypothetical construct reflecting the quality of affectional ties between parent and infant.

Attachment behaviors - Behaviors that promote proximity or physical or psychological contact and stimulate social interaction.

Maternal fetal attachment - The extent to which a woman engages in behaviors that represent an affiliation for and interaction with her unborn child.

CHAPTER II

METHODOLOGY

Study Design

This exploratory study of the development of attachment was designed to compare and examine attachment behaviors during pregnancy and those during the early postpartum period. Maternal attachment during pregnancy was measured by the Maternal Fetal Attachment Scale (MFA) developed by Cranley (1981, personal correspondence 1982). Maternal infant interaction during the postpartum period was rated on the Nursing Child Assessment Feeding Scale (NCAFS) (Barnard, 1978a) and the Funke Mother Infant Interaction Assessment (FMII) (Funke-Furber, 1978).

The Maternal Fetal Attachment Scale was administered to 32 women during their 35th to 40th week of pregnancy. This time period was chosen because studies indicate that fetal attachment will be highest during the last trimester (Leifer, 1977; Lumley, 1982). At this time, the women were also asked questions concerning their relationships with their husbands/partners, their mothers, fathers and friends and childhood experiences with separation from parents. The women were then observed while they fed their babies, once on the second and once on the third postpartum day. After each observation, they were rated on the NCAFS and the FMII. Mothers were rated on two successive days to take into

account the possibility that interactive behaviors might change from day to day (Stainton, 1981) and to increase the probability of obtaining a rating representative of behavior over the first few days after birth. Two postpartum instruments were used to strengthen the reliability of the behavioral assessment. The Attachment History Questionnaire was administered to examine the validity of the concept that the three instruments (the Maternal Fetal Attachment Scale, the Nursing Child Assessment Feeding Scale and the Funke Mother Infant Interaction Assessment) were measuring aspects of the construct of attachment.

Sample

A convenience sample of 32 women, between their 35th and 40th week of pregnancy were the subjects of this study. Patients of three general practitioners and one obstetrician in a small Nova Scotia town, were asked to participate. The women delivered their babies according to their preference at either of two general hospitals in the community. Pregnant women identified as high or extreme risk (Appendix A) and women whose infants had been previously diagnosed as abnormal were excluded from the study. For these women, fear of losing the child might have inhibited the development of attachment. Four of the original 36 mothers who completed phase 1 of the study during pregnancy were excluded from completing the study. Reasons for their elimination included: move from the area, toxemia and subsequent trans-

fer to a tertiary care center, relinquishment of the infant for adoption and visible infant abnormalities.

The subjects ranged in age from 17 years to 35 years with a mean of 26.7 years. Nine women were primiparas and 23, multiparas. Parity ranged from 1 to 10. The mean number of children for the sample was 2.4 and the mode 2. Fifty percent of the mothers had completed high school (Table 1) while 47.0% of their husbands/partners had (Table 2). Thirty mothers delivered vaginally and 2 by caesarian section. Over 59% or 19 mothers bottle fed while 40.8% (13) breast fed their infants. Only one mother was unmarried. All but three of the mothers had experienced ultrasonography during this pregnancy.

Table 1

Mother's Educational Status

Level Achieved	Number	Percent
Grade School	2	6.3%
Some High School	6	18.8%
High School	8	25.0%
Some College	2	6.3%
College	6	18.8%
Vocational School	8	25.0%

Table 2

Husband/Partner's Educational Status

Level Achieved	Number	Percent
Grade School	3	9.4%
Some High School	9	28.1%
High School	5	15.6%
Some College	2	6.3%
College	7	21.9%
Vocational School	6	18.8%

Procedure

Women who fit the sample criteria were asked by their physicians to participate in a study of mothers and their unborn children and mothers and their babies after birth. The study was described as non-intrusive. Mothers who expressed an interest and agreed to participate had their names referred to the researcher. The researcher contacted these women by phone, introduced herself and explained the procedure (Appendix B). The researcher reconfirmed their willingness to participate in the study and arranged for a home visit. Women who did not have telephones were contacted in person and arrangements were made for a home visit then or at a later date. When arranging a time for the home visit, the researcher explained that the nature of the interview necessitated that there be a private place for the discussion.

In the subject's home, the researcher reintroduced herself and again explained the procedure. All the women continued to express an interest in participating in the study and were asked to sign a consent form (Appendix C) and given a copy of the consent to keep. Demographic data were collected at this time (Appendix D). Data on feeding method and type of delivery were collected during the postpartum contact. These data were obtained to determine the characteristics of the sample.

After demographic data were collected, the researcher interviewed the women following the Attachment History Questionnaire. There were three occasions during which either the subject's husband or mother was present for the interview. Responses to the relevant relationship questions were ascertained during follow-up telephone conversations.

The women were then shown the Maternal Fetal Attachment Scale (Appendix E). They were asked to complete it by making a mark by the response option for each item that best described their behavior. Mothers were told that many people have difficulty filling out questionnaires and were encouraged to ask for help if there was anything that they did not understand.No subject was unable to read the questionnaire although a number asked for further clarification of items. The completed scale was placed in an envelope (identified by code number only) and sealed. Information on the Maternal Fetal Attachment Scale was not viewed until

after the postpartum observations had been made to reduce observer bias.

Women who completed the Maternal Fetal Attachment Scale during pregnancy were approached by the researcher on the second postpartum day and plans were made for the observation of a feeding. Before the feeding, mothers were reminded that they were to feed their babies as they normally would and to try to act as though the researcher were not there. They were asked to indicate to the researcher when they considered the feeding to be over. The observation began when the mother took the baby from the nurse as it was brought from the nursery. Although some mothers kept their babies in their rooms during the day, observations were made on these mothers when the babies were first brought from the nursery in the morning.

Feeding times ranged from 15 to 45 minutes. The observation ended when the mother indicated that the feeding was finished. The observation was then rated on the Nursing Child Assessment Feeding Scale (Appendix G) and the Funke Mother-Infant Interaction Assessment (Appendix H). The procedure was repeated on the third postpartum day. Following the second observation and rating, mothers were shown the scored NCAFS and encouraged to ask questions. Mothers were asked whether they considered the feeding to be a typical one, whether they were uncomfortable during any part of the research and if they had any concerns about the feeding

(Barnard, 1978a). Discussion following the second observation tended to be lengthy and lasted up to an hour.

Instruments

Maternal Fetal Attachment Scale

The Maternal Fetal Attachment Scale (Appendix E) is a Likert-type scale consisting of 24 behavioral items. The scale is divided into five subscales (Appendix F) that represent different aspects of the construct of maternal fetal attachment: differentiation of self from fetus, interaction with fetus, attributing characteristics and intentions to the fetus, giving of the self and roletaking. Each item of the scale is followed by 5 response options ranging from "definitely yes" to "definitely no". Subjects are instructed to indicate the degree to which their behavior corresponds to the behaviors identified in the statements. The items are scored on a scale from 1 to 5, with 5 being the most positive statement. Item number 22 is reversed with "definitely yes" being a 1 and "definitely no" being a 5 (Cranley, personal communication, March 22, 1982). The scale and subscales are scored by adding the scores and dividing by the number of items.

The Maternal Fetal Attachment Scale was chosen for this study because its content and intent are consistent with the theoretical framework upon which this study is based. Although direct observation may be the best way to assess interactional behavior, the private nature of much of this

interaction makes self report a more practical method of gathering data during pregnancy.

Reliability. Coefficients of reliability (∝) were computed for the total scale and each subscale using the 32 sets of scores for each mother who completed the study. Cronbach's alpha for the total MFA was .85, a coefficient similar to that found by Cranley. Coefficient alphas for the subscales ranged from .36 to .74 (Table 3). Variations in subscale alphas may indicate cultural differences between the two sample groups represented in Table 3. Cranley (personal communication, March 22, 1982) also revised the scale by relabelling response options. The original scale had 5 response options from "most of the time" to "never". This alteration permits only a crude comparison of reliability coefficients between the two studies.

Table 3

Cronbach's Alphas: Study Sample and Cranley's (1981) Sample

Scale	No. of Items	Current (n=32)	Cranley's (n=71)
Differentiation	4	.72	.62
Interaction	5	.36	.68
Attribution	6	.65	.67
Giving Self	5	.74	.52
Roletaking	4	.55	.73
MFA	24	.85	.85

Validity. Spearman correlations were performed between each subscale and the total score. All subscales were positively associated with the total scale (r=.62 to .84, p=.001). Correlations between the subscales were also positive (r=.25 to .60) (Table 4).

Table 4

Correlation Matrix*: MFA and Subscales (n=32)

Variables	1	2	3	4	5	6
1. Roletkg	-					
2. Diffslf	.57[a]	-				
3. Interact	.34[d]	.37[c]	-			
4. Attribut	.46[b]	.47[b]	.60[a]	-		
5. Givingslf	.40[c]	.25[d]	.60[a]	.55[b]	-	
6. MFA	.70[a]	.62[a]	.78[a]	.84[a]	.76[a]	-

[a] p=.001 [b] $p < .01$ [c] $p < .05$ [d] N.S.

* Spearman Correlation Coefficients: Two tailed test of significance

Nursing Child Assessment Feeding Scale

The Nursing Child Assessment Feeding Scale (Appendix G) consists of 76 behavioral items, 50 parent and 26 infant. The parent items are divided into subscales according to the Barnard Model of Parent Child Adaptation (Barnard, 1978b): 1) sensitivity to cues, 2) response to distress, 3) social emotional growth fostering and 4) cognitive growth fostering. The infant categories are 1) clarity of cues and 2) responsiveness to parent. The instrument is scored on a

binary scale by a nonparticipant observer, with "yes" and "no" being the only possible answers. It is recommended that observers, trained to use the Nursing Child Assessment Feeding Scale through the Nursing Child Assessment Training Program, achieve an 85% reliability on three out of five observations (Barnard, 1978a). A 92% interrater reliability on five observations was achieved by the researcher and another trained observer 6 weeks prior to the beginning of this study.

This scale was chosen for this study because it takes into consideration a wide range of parent infant interactive behaviors including the sensitivity of a mother's response patterns which is one of the most important aspects of her interaction with her child (Ainsworth, 1979; Brazelton, 1982). This scale also recognizes the infant's role in the interactive process. The scale was designed to measure the quality of maternal infant interaction and not attachment. The behaviors assessed, however, are those that promote proximity, physical or psychological contact and stimulate social interaction. As such, they are assumed to be attachment behaviors. Assessing interaction during the feeding is considered appropriate for this study as interaction is required during the feeding situation and it may be the only time that the infant is awake.

Reliability. The reliability of the NCAFS as an instrument to measure mother newborn interaction was assessed

in several ways. Cronbach's alpha coefficients of reliability were computed for day 2 and day 3 ratings. These calculations are presented in Table 5 with results obtained from ratings of mother-child (1-12 months) pairs (Barnard & Bee, in press). The alphas for both maternal scores was .80, while maternal subscale alphas ranged from .38 to .82 on day 2 and .44 to .84 on day 3. Acceptable levels were established for all but the Cognitive Growth Fostering Subscale. This may be due to the mother's perceptions of the developmental level of the infant. Infant subscales did not achieve significant levels of internal consistency with this newborn sample.

Table 5

Cronbach's Alphas for NCAFS: Present Study (n=32) and n=845* (1-12 mos.)

Scale	No. of Items	n=32 Day 2	n=32 Day 3	n=845
Total Mat.	50	.80	.80	.83
Sens. to Cues	16	.69	.67	.60
Resp. to Dist.	11	.82	.84	.69
Soc/Emo	14	.65	.59	.63
Cognitive	9	.38	.44	.69
Total Inf.	26	.00	.36	.73
Clarity	15	.09	.12	.56
Responsiveness	11	-.35	-.37	.58

* Barnard & Bee, in press

In order to obtain a single rating for each mother, scale and subscale scores for day 2 and day 3 were combined.

Spearman-Brown correlation coefficients were calculated using the combined scores to determine the reliability of the combined scales and subscales (Table 6). Acceptable levels of reliability were obtained for all but the maternal Response to Distress Subscale. This was possibly due to the fact that a mother was scored positively on all items if her child did not experience distress (Barnard, 1978a). If a child did not experience distress on one day but did on the next, the score may be lower on the day she actually responded to the distress.

Table 6

Spearman-Brown Reliability Coefficients for Combined NCAFS and Subscales (day 2 and day 3)

Scale	r
Total Maternal	.90
Sens. to Cues	.90
Resp. to Dist.	.24
Soc/Emo	.82
Cognitive	.84
Total Inf.	.64
Clarity of Cues	.64
Responsiveness	.36

Pearson correlation coefficients were computed to determine test-retest reliability for the maternal NCAFS for day 2 and day 3 (r=.84, p=.001). Infant scores were also significantly correlated for day 2 and day 3 (r=.46, p=.008).

Validity. Spearman correlation coefficients were determined for the combined day 2 and day 3 maternal and subscale scores (Table 7). Correlation coefficients were positive and significant between subscales and the total score except for the Response to Distress subscale. This subscale did not correlate significantly with any other subscale or the combined total score. Again, a less than perfect score on this subscale depended more on the occurance of infant distress than on maternal response with this age group. Thirteen episodes of infant distress were recorded for the 64 feeding scale observations. No infant experienced distress on both days.

Table 7

Correlation Matrix*: NCAFS and Subscales

Variables	1	2	3	4	5
Sens. to Cues	-				
Resp. Dist.	.26[c]	-			
Soc/Emo.	.58[a]	-.00[c]	-		
Cognitive	.52[b]	.15[c]	.61[a]	-	
NCAFS	.88[a]	.33[c]	.80[a]	.77[a]	-

[a] p=.001 [b] p=.003 [c] N.S.

* Spearman correlation coefficients; Two-tailed test of significance

Funke Mother Infant Interaction Assessment (FMII)

The Funke Mother Infant Interaction Assessment (Appendix H) consists of 20 behavioral items, grouped into 4 cate-

gories: 1) eye contact, 2) mother's degree of acceptance of her infant, 3) physical closeness and 4) the quality and amount of verbal stimulation. The scale was designed to assess interaction during a feeding. Items in each category are rated 1 to 5 with 5 representing the most positive example of behavior in that category and 1, the least. Scores in each category are added together for a total score.

The Funke Mother Infant Interaction Assessment was chosen for this study because it was developed to assess the quality of maternal infant interaction and because 3 of the 4 categories of behavior represented were found to be those most valid in assessing maternal adaptation. This scale was also not designed as a measure of attachment but the categories examine the quality of interaction consistent with the definition of attachment behaviors.

Reliability. Interrater reliability on 5 out of 5 observations was achieved at a 95% level six weeks prior to data collection. Difficulty was encountered with category 1, where eye-to-eye contact was presented as being synonymous with en face positioning. This point was clarified with J. Funke-Furber (personal communication, December 14, 1983) as meaning the degree to which a mother positions her baby so that eye contact is possible. This clarification was taken into account during interrater reliability testing.

Cronbach's alphas were calculated for day 2 and day 3 ratings (α=.88 and α=.80 respectively). Pearson coefficients were computed to determine test-retest reliability for the FMII day 2 and day 3 ratings (r=.86, p=.001).

Validity. Spearman correlation coefficients were determined for the combined day 2 and day 3 FMII score (r=.73 to .80) and the combined item scores (r=.36 to .80) (Table 8). All items were positively and significantly related.

Table 8

Correlation Matrix*: FMII and Item Scores

Variable	1	2	3	4	5
1. Eye Contact	-				
2. Acceptance	.61[a]	-			
3. Phys. Close	.48[b]	.50[b]	-		
4. Verbal	.80[a]	.36[c]	.65[a]	-	
5. FMII	.80[a]	.78[a]	.78[a]	.73[a]	-

[a]p=.001 [b]p=.003 [c]p $<$.05

* Spearman correlation coefficients: two-tailed test of significance.

Attachment History Interview Questionnaire

The Attachment History Interview Questionnaire (Appendix I) was developed to determine the quality of the woman's relationships with others and her perception of having experienced childhood separation from her parent(s). The questions were chosen and formulated under the assumption

that they would measure aspects of the individual's social history believed to be important to the development of patterns of attachment (Bowlby, 1969; Frommer & O'Shea, 1973).

Ethical Considerations

Confidentiality

Mothers were informed that the information gathered would be viewed by the nurse researcher only and would not be available to the physician or the nursing staff. They were informed that the data would be identified by code number only and that the list of names and their code numbers would be kept in a place other than the data collection area. When postpartum data were collected, lists that identified individuals were destroyed.

Should any mother have been observed to physically abuse her infant (i.e. slap the neonate) during an observation, this information was to be passed on to the nurse in charge. It was reasoned that concern for the infant's welfare would have been of greater ethical importance than the otherwise strict maintenance of confidentiality. No mother was observed to physically abuse her infant.

Benefits

One of the advantages of the Nursing Child Assessment Feeding Scale is its educational nature. Once interactions had been rated, the information was shared with mothers, thus reinforcing positive behaviors and potentially provid-

ing mothers with new ways of interacting with their babies. Most mothers appeared to be receptive to this information.

Risks

Mothers may have felt uncomfortable being observed while they fed their babies. Knowing that they had the right to decide not to continue as study participants and knowing that the observation would be part of the study might have reduced the possible stress associated with this aspect of the study. A number of mothers expressed that they felt self conscious during the observations, particularly on the first day. All mothers were told that further help in handling or caring for their infants was available from the nursing staff and that the researcher would arrange for that help should they so desire.

Ethical Review

The study was subject to review prior to its initiation by the Thesis Advisory Committee and the Ethics Committee of the Dalhousie Faculty of Graduate Studies. The study was also subject to approval by the Departments of Nursing at the two hospitals involved as well as the ethical review boards and the medical advisory committees. The head nurses and staff nurses were contacted and made aware of the particulars of the study.

Analysis of Data

All data were analyzed using the Statistical Package for the Social Sciences (SPSS) system of computer programs

(Hull, Nie & Norman, 1981; Nie, Hull, Jenkins, Steinbrenner & Bent, 1975). The acceptable level of significance was maintained at $p=.05$, although higher levels of significance were reported where relevant.

In order to obtain one set of scores for each mother on the postpartum interaction instruments, mean scores for the two observations were computed. Mean scores on the maternal and infant sections and the individual subscales of the Nursing Child Assessment Feeding Scale, and the mean score for the two Funke Mother Infant Interaction Assessments were considered as a single set of scores for each mother in the analysis of the data.

Analysis of Study Questions

In order to explore the relationship between maternal fetal attachment and maternal child interaction, Spearman nonparametric correlation coefficients (two-tailed test of significance) were calculated for the Maternal Fetal Attachment Scale and the maternal scores on the Nursing Child Assessment Feeding Scale. MFA scores were correlated with NCAFS maternal subscale scores to assess the degree to which maternal fetal attachment was related to aspects of mother infant interaction as defined by Barnard's Parent Infant Adaptation Model. Scores on the Subscales of the Maternal Fetal Attachment scale were related to total maternal and maternal subscale scores on the NCAFS.

Correlations were performed between the Maternal Fetal Attachment Scale scores and the Funke Mother Infant Interaction Assessment scores to examine the relationship between maternal fetal attachment and mother-infant interaction as measured by this postpartum scale. The relationship between the NCAFS maternal scores and FMII scores were determined to assess the degree to which these postpartum instruments produce similar assessments of mother infant interaction.

In order to determine the relationship between attachment history variables and attachment during pregnancy and after birth, Spearman nonparametric correlation coefficients were computed between the coded responses to each variable question and the three attachment assessments (MFA, NCAFS and FMII).

Stepwise multiple regression analysis was performed using the attachment history variables to determine which variable or combination of variables provided the most predictive power for each of the attachment scales.

Further Analysis of Data

Student *t*-tests were computed on maternal NCAFS and FMII scores to ascertain the probability of there being a significant difference in behavior from day 2 to day 3.

The findings of this study are presented in Chapter III.

CHAPTER III

FINDINGS

Maternal Attachment to the Unborn Child

The pregnant women in this sample engaged, to varying degrees, in behaviors that represent an affiliation for and interaction with their unborn children. The mother's mean score on the Maternal Fetal Attachment Scale (MFA) was 3.6 with a range of 2.7 to 4.4. Average scores for each subscale are presented in Table 9. The degree to which the women reported that they participated in different activities was similar to Cranley's findings (1981). The two subscales that suggested a greater degree of involvement with the fetus had lower means than did the three subscales that related to the mother's personal activities. Percentages of women responding to each option by subscale are presented in Appendix J.

Table 9

Mean MFA and Subscale Scores and Range of Scores

Subscale	Mean Score	Range
Roletaking	4.3	3.3-5.0
Differentiation	4.3	3.0-5.0
Giving of Self	4.1	2.6-5.0
Attributes Charac.	3.1	1.8-4.2
Interaction	3.0	2.6-5.0
MFA	3.6	2.7-4.4

Maternal Infant Interaction

Mothers and their infants displayed a wide variety of interactive behaviors during the early postpartum period. Mothers also varied in the degree to which they participated in the interaction as measured by the NCAFS and the FMII. The mean NCAFS and subscale scores and range of scores are presented in Table 10. Maternal scores ranged from 25 to 44 with a mean of 37.

Table 10

Mean NCAFS and Subscale Scores and Range of Scores

Scale	No. of Items	Mean	Range
Maternal Total	50	37	25-44
Sens. to Cues	16	12	6.5-15.5
Resp. to Distress	11	10.5	8-11
Social/Emotional Growth	14	9.3	5-12
Cognitive Growth	9	5.2	2.5- 7.5
Infant Total	26	15.6	12-17.5
Clarity of cues	15	11.2	8.5-13
Responsiveness	11	4.4	3- 5.5

Items, for which mothers most frequently did not respond sensitively to the infant's cues, were those associated with food intake. Most mothers tried to encourage the infant to eat more by jiggling the nipple and many interrupted the pause phase of the burst-pause sequence. The pressure felt by some mothers to feed their babies more, in contradiction to infant cues, became more evident in follow-up discussions.

The total mean NCAFS and subscale scores were compared with mean scores published for mother infant pairs of different groups and presented in Table 11. Mothers in this study scored generally lower than mothers of older infants but higher than mothers with low education levels, mothers with failure to thrive infants and mothers with premature infants.

All subscales, except the Cognitive Growth Fostering Subscale, contained items for which there was no variance between mothers (Table 12). This may be due to the homogeneity of the sample mothers and/or the age of the infants. The scale was designed to assess interaction between mothers and infants up to 12 months of age. A number of items, such as response to infant vocalization and smiling, were inappropriate for the newborn population.

Table 12

Number of Items with No Variance: NCAFS and Subscales

Scale	Total No. of Items	No Variance Items Day 2	Day 3
Total Mat.	50	11	13
Sens. to Cues	16	1	2
Resp. Dist.	11	6	8
Social/Emotional	14	4	3
Total Infant	26	10	13
Clarity of Cues	15	5	6
Responsiveness	11	5	7

Table 11
Comparative Data on NCA Feeding scale From Several Studies (Bee 1981)

Source of Data	Age	N	Sens.	Resp. Dist.	Soc/ Emo	Cognit.	Total Mat.	Clar.	Resp.	Total Inf.	Total
NCAP cohort, term primips, Barnard Seattle	4 mo	22	13.6	10.2	11.9	6.4	42.1	11.6	7.3	18.9	61
Barnard, NCAST, 1979 learners	4-8 mo	320	13.4	9.8	11.8	6.9	41.9	13.0	7.7	20.7	62.6
Barnard, Pre-matures, Seattle	4 mo	39	12.2	9.9	9.4	4.9	36.4	9.6	4.7	14.3	50.7
Pearson, Hispanic mothers, New Mexico	1 mo	34	13.3	10.7	10.7	5.5	40.2	11.8	5.5	17.3	57.5
Lobo, FTT infants Seattle	4 mo	9	10.6	9.8	10.4	4.8	35.2	10.6	5.6	16.2	51.4
Barkaukas; white, low education, poor, Illinois	6 mo	25	11.1	9.0	10.1	4.6	34.8	12.9	6.3	19.2	54.0
Barkaukas; black, low education, poor, Illinois	6 mo	24	10.6	9.3	8.7	4.0	32.6	12.8	6.0	18.8	50.8
Barnard, Nursing Models study, high risk mothers, Seattle	3 mo	116	13.5	10.5	9.4	5.0	38.4	11.7	6.1	17.8	56.0
Fuller, term primips and multips Nova Scotia	NB	32	12.0	10.5	9.3	5.2	37.1	11.2	4.4	15.6	52.7

The mean FMII and mean category scores are presented in Table 13. This scale also demonstrated a variability between mothers with totals ranging between 11 and 20.

Table 13

Mean FMII and Category Scores and Range of Scores

Scale	Mean	Range
Total FMII	17	11-20
Eye Contact Possible	4.2	2.0-5.0
Acceptance	4.2	2.0-5.0
Physical Closeness	4.1	2.5-5.0
Verbal Stimulation	4.1	2.5-5.0

Maternal Fetal Attachment and Mother Infant Interaction

Analysis of the data revealed that a mother's attachment to her unborn child as measured by the Maternal Fetal Attachment Scale was significantly and positively related to maternal interaction as measured by the maternal subscales of the Nursing Child Assessment Feeding Scale (r=.73, p=.001). Correlations between the MFA subscales and the maternal NCAFS indicated that the reported participation in a variety of prenatal attachment behaviors was more predictive of maternal infant interaction than was any one group of activities.

Table 14

Spearman Correlations* Between MFA and Subscales, NCAFS (Maternal) and Subscales (n=32)

Variables	NCAFS Mat.	Sensit.	Resp. Dest.	Soc/ Emo	Cognit.
ROLETAK	.58[a]	.53[b]	.41[c]	.40[c]	.38[c]
DIFFSLF	.37[c]	.38[c]	NS	NS	.35[c]
INTERACT	.44[c]	.37[c]	NS	NS	.50[b]
ATTRIBUT	.72[a]	.62[a]	NS	.63[a]	.58[a]
GIVINGSL	.52[b]	.44[c]	NS	.44[c]	.42[c]
MFA	.73[a]	.65[a]	NS	.58[a]	.60[a]

[a] $p=.001$ [b] $p < .005$ [c] $p < .05$

* two-tailed test of significance

The MFA and four of its subscales were not significantly related to the Response to Distress subscale of the NCAFS. Only the Roletaking subscale on the MFA was significantly related to the Response to Distress subscale ($r=.41$, $p < .05$). The Differentiation and Interaction subscales were not significantly related to the Social Emotional Growth Fostering subscale of the NCAFS (Table 14).

A mother's attachment to her unborn child as assessed by the MFA was also associated to mother infant interaction as measured by the FMII. Correlations between the MFA and the FMII total and category scores were positive and significant (Table 15). Although total scores on these scales were significantly related to subscale scores on the corresponding scale, significant associations were not evident between some of the subscales. The Roletaking

subscale of the MFA was more closely associated with the total FMII than was the total MFA score. The Interaction subscale, in comparison was related to only one category, Eye Contact, and only moderately to the total FMII (r=.37).

Table 15

Spearman Correlations* Between MFA and Subscales, and FMII and Category Scores (n=32)

Variables	EYE CONT.	ACCEPT.	PHYS. CLOSE.	VERBAL	FMII
ROLETAK	.59[a]	.49[b]	.46[c]	.54[b]	.78[a]
DIFFSLF	.48[b]	NS	.46[c]	NS	.48[b]
INTERACT	.50[b]	NS	NS	NS	.37[c]
ATTRIBUT	.58[a]	NS	.42[c]	.45[c]	.53[b]
GIVINGSL	.51[b]	.44[c]	NS	.44[c]	.48[b]
MFA	.73[a]	.50[b]	.51[b]	.48[b]	.69[a]

[a] p=.001 [b] p < .005 [c] p < .05

* two-tailed test of significance

There was no significant relationship between mother and infant scores on the Nursing Child Assessment Feeding Scale. Infant scores ranged between 12 and 18 with a mean of 15.6. Ten infants received an average score of 16. Feeding method was also not associated with the results on any of the attachment instruments.

Correlations between total and subscale scores on the Nursing Child Assessment Feeding Scale and the Funke Mother Infant Interaction Assessment were positive and significant,

with one exception (Table 16). The Response to Distress subscale was not related to the total FMII or three of the items on the scale. It was only moderately related to the Eye contact category.

Table 16

Spearman Correlations* Between NCAFS (Maternal) and Subscales and FMII Total and Category Scores (n=32)

Variables	Eye cont. poss.	Acceptance	Physical closeness	Verbal stim.	FMII
Sens. to cues	.66[a]	.46[b]	.62[a]	.75[a]	.75[a]
Resp. to dist.	.36[c]	NS	NS	NS	NS
Soc/Emo growth fost.	.52[b]	.43[b]	.61[a]	.59[a]	.65[a]
Cognit. growth fost.	.44[b]	.37[c]	.56[a]	.57[a]	.59[a]
NCAFS Total Maternal	.84[a]	.68[a]	.54[b]	.70[a]	.79[a]

[a] $p=.001$ [b] $p < .01$ [c] $p < .05$

* two-tailed test of significance

Attachment Histories

Frequency distributions computed for the attachment history variables revealed little variation between mothers. Ninety percent (29) of the women had been living with their husbands for the past year. One (3.1%) had no partner at

present. One (3.1%) was married but not living with her husband and one (3.1%) had been living with her husband for less than one year. Subjects responses to the relationship items are presented in Table 17 and further illustrate this low variability pattern.

Table 17

Frequency Distribution: Interpersonal Relationship Variables

	Very Good	Good	Fair	Poor	Very Poor	Deceased Before 12 yrs
Rel. with Partner	84.3% (27)	12.5% (4)	0	0	3.1% (1)	-
Rel. with Mother	81.3% (26)	9.4% (3)	6.3% (2)	0	0	3.1% (1)
Rel. with Father	56.3% (18)	21.9% (7)	12.5% (4)	0	0	9.4% (3)

Almost 92% (29) said they had relatives or friends with whom they discussed personal problems and child related topics. Over 90% had at least one close friend or relative. Six (18.8%) had been separated from one or both parents before they were twelve years old. Two were separated from their mothers and three from their fathers due to death. One was separated from both her parents upon their divorce.

Relationship Between Attachment History Variables and Attachment (Subquestions a and b)

None of the attachment history variables was associated with total scores on any of the attachment instruments. The Roletaking subscale on the MFA was, however, moderately related to three of the attachment variables as shown in Table 18.

Table 18

Spearman Coefficients*: Significant Relationships Between Attachment History Variables and MFA Subscale Roletaking

Variable	r
Relationship to mother	.36
Relationship to father	.40
Separation from parents	.39

$p < .05$

* two-tailed test of significance

Step-wise multiple regression analysis also indicated that no variable or combination of variables significantly predicted attachment behavior during pregnancy or after the infant's birth. Although not reaching statistical significance, the relationship with husband and father were the first two variables entered into the step-wise equation for all attachment instruments.

Further Analysis of Data

Variations in attachment scores from day 2 to day 3.

Two-tailed *t*-tests were performed to examine the probability of there being differences between interaction assessments on day 2 and day 3. The maternal NCAFS scores increased significantly from day 2 to day 3 ($p=.03$). Scores on the FMII were not significantly different on the two days. Infant scores also did not change significantly from one day to the next.

Related findings. During the prenatal interview, mothers offered a wide range of unsolicited information about their relationships with their unborn children. Completion of the Maternal Fetal Attachment Scale seemed to stimulate the subjective assessment and recounting of experiences. It appeared that items which dealt with greater involvement with the fetus produced more discussion and speculation than did those that related to the mother's personal activities. Some of the mothers were surprised to find that other women talked to their unborn children and seemed pleased to know that their behavior was not unusual. The items that referred to attributing characteristics and intentions to the fetus provided the focus for a number of questions and responses. Many thought that their unborn babies could hear and some went on to describe situations during which they felt the baby had responded to a voice or to music. Others described different fetal activity pat-

terns between this pregnancy and a former one. A few attributed activity patterns to the supposed sex of the infant.

Most mothers expressed an aversion to grasping the infant's foot to move it around. Some felt that they might harm the fetus by doing so. Some reported that their husbands poked their abdomens in an attempt to evoke fetal response. A number of the women actually rubbed their abdomens as they spoke about the unborn baby.

After the second postpartum observation, mothers were shown their ratings on the NCAFS and their own and their infant's behaviors were discussed. Most mothers responded by asking questions and expressed interest in the scope of behaviors that occurred. Many mothers felt the items on the NCAFS reconfirmed many of their own intuitive understandings of themselves as mothers and of the importance of their interaction with their infants. One mother felt that her baby had had enough to eat. She felt she had to push him to eat more, however, for fear the nursery nurse would admonish her and feed the baby in the nursery. Another stated that she had been told by a relative that holding and talking to the baby would "spoil" her. Reinforcing the mother's own sensitive assessments of their babies' needs was a central theme of the postpartum discussions.

Mothers seemed to enjoy talking about their babies. Many continued to gently caress their infants, gaze at their faces and smile during these discussions. Mothers who asked

few or no questions tended to be those who scored lower on the postpartum assessments. Use of the NCAFS as reference was particularly helpful in initiating discussion with these mothers. The researcher was able to compliment and praise the mothers for their positive interactive abilities. Focusing on the positive nature of the interaction made it possible to make suggestions and discuss negatively scored items in a supportive manner.

CHAPTER IV

DISCUSSION OF FINDINGS

Maternal Attachment During Pregnancy

Attachment theory is based on the concept that the affective ties between mother and infant develop and change as the relationship evolves and as the infant grows. Studies have recognized that the maternal infant relationship may have its origins in pregnancy and that women assume behaviors and attitudes during pregnancy that may reflect the early development of attachment to the unborn infant (Arbeit, 1975; Bibring et al., 1961; Cranley, 1981; Leifer, 1977; Lumley, 1980).

The women in this study participated in a variety of behaviors indicative of attachment during pregnancy. Mothers were more likely to report behaviors that related to her personal activities than those that suggested greater involvement with the unborn baby. Those items which referred to attributing characteristics and intentions to, and interaction with the fetus provoked more requests for clarification and subjective descriptions of involvement. Nutritional considerations, choosing of a baby's name, changing certain activity patterns during pregnancy, represented well established social expectations of behavior during pregnancy. There were numerable images of young mothers holding infants in the media if not in the woman's close personal

environment, to support the roletaking aspects of maternal fetal attachment.

There was, however, far less apparent social recognition of those behaviors that represent direct involvement with the fetus. While the mothers could quite quickly respond to the dietary item on the MFA, most hesitated over items that referred to their perceptions of or interaction with their unborn babies. Talking to the infant, wondering about its personality, whether it could hear, were activities done alone or in private and often not acknowledged by others. The fact that many women had to think about these items may reflect the lack of importance generally attributed to maternal fetal interaction.

Maternal Infant Attachment

Maternal infant interaction during the postpartum period was characterized by a number of behaviors that promoted proximity and psychological contact and stimulated social interaction. Maternal behavior varied between mothers and this behavior was generally stable from the second to the third postpartum day. As might have been expected, the mothers in this study scored lower on the NCAFS than did mothers of older infants. That they scored higher than mothers with low education levels, mothers with failure to thrive infants and mothers with premature infants provides support for further investigation into the nature of mother infant interaction in high risk situations.

Postpartum Assessments

The positive and significant correlations between maternal NCAFS and FMII scores indicated that the two scales measured similar or related aspects of maternal infant interaction. Although some of the items on the FMII were similar to single items on the NCAFS, the latter scale measured a greater diversity of behaviors. This sensitivity was demonstrated in the finding that indicated a difference between maternal NCAFS scores on day 2 and day 3. Differences for the FMII were not significant.

The Response to Distress subscale of the NCAFS was also not related to the total or 3 item scores on the FMII. This lack of a significant relationship may be due to the nature of the subscale. This lack of discrimination when children show no distress has been noted by other researchers using the scale (Barnard & Bee, in press).

Infant Behavior

The attachment process is an interactive one in which two partners establish and develop synchronized patterns of behavior (Brazelton, 1982). Although the newborn may already be capable of characteristic patterns of behavior, maternal behavior in this study was not related to infant behavior. This finding may be characteristic of the early newborn period during which mothers become acquainted with their infants through a discovery process (Gottlieb, 1978; Rubin, 1963). It may also be influenced by the low level of

internal consistency achieved by this sample on the infant subscales. The developmental nature of infant interactive behavior is most likely responsible for the low scores achieved for this sample of newborns.

Day to day variations in interactive behavior. Significant differences in maternal interactive behavior as measured by the NCAFS may be interpreted in several ways. This scale may, in fact, be measuring real differences in behavior over the first few days. Mothers have been observed to change their interactive behaviors over the first few days postpartum as they become acquainted with their infants and adjust to the postpartum period (Gottlieb, 1978; Rubin, 1963, 1977; Stainton, 1981). Mothers may also have felt more comfortable with the nonparticipant observer on the second day and thus felt more relaxed about interacting with their babies.

Development of Attachment

Findings of this study support the concept that self reported attachment behaviors during pregnancy are reflected in early mother infant interaction. Mother infant interaction was related to a spectrum of behaviors believed to represent affective involvement with the fetus: roletaking, differentiation of the fetus from self, interaction with the fetus, attributing characteristics and intentions to the fetus and giving of the self. It may be that this involvement during pregnancy is a precurser to sensitive interac-

tion soon after birth, or that attachment during pregnancy is reflected in a more sensitive approach to her infant. Affective involvement during pregnancy appeared to stimulate and prepare mothers to react sensitively to their infants.

The subscale Response to Distress on the NCAFS was related to only one of the fetal attachment subscales and not to the total Maternal Fetal Attachment Scale score. This lack of relationship may be influenced by the insignificant correlations between this subscale and the other subscales on the maternal NCAFS (Table 11). Again it may be that this subscale depends more on infant distress than on maternal response, especially for this age group. Not all of the response options for the Response to Distress subscale were appropriate for a newborn. This problem makes the low correlation reasonable.

Maternal Attachment and Attachment History Variables

How a mother relates to her infant is believed to depend on a long history of relationships with others (Bowlby, 1980). A woman's relationships with her mother and her husband have been identified as important to her adjustment to pregnancy and her relationship to her unborn child (Arbeit, 1975; Ballou, 1978; Cranley, 1981; Shereshevsky & Yarrow, 1973). There was no significant association in this study between a mother's relationship with significant others and her attachment to her unborn child or her infant after birth. There are several explanations for this find-

ing. One reason for this finding may be the homogeneous character of the sample. Although the women in the sample varied in educational background, they lived in a community with strong family ties and extended families. Only two of the mothers had not grown up in the community. A small homogeneous community may provide adequate familial support systems that may alleviate the effects of poor individual relationships and parental separation. The homogeneity of the sample population was also reflected in the low variance of responses on the attachment history questionnaire. This particular instrument or method of administration may not have been appropriate or sensitive enough to measure the quality of each mother's attachment history.

Study design may be a contributing factor to the apparent lack of association between social relationships and attachment. Those studies that have found early childhood separation from parents and relationships with parents to be predictive of difficulties in parent child relationships have been retrospective in design (Frommer & O'Shea, 1973; Monagham & Buckfield, 1981). They have identified parents with parenting problems and reviewed their histories for contributing factors. The sample size was also small. Studies that have found associations between the quality of social support and maternal fetal attachment (Cranley, 1981) and maternal role attainment (Mercer et al., 1982), have included larger sample sizes.

In view of these limitations it is interesting to note the positive and significant relationship that existed between the Roletaking subscale of the Maternal Fetal Attachment Scale and a woman's relationship with her mother, father and separation from her parents. This finding was consistent with the roleplaying and modelling aspects of maternal role attainment (Rubin, 1967). Roletaking may be one aspect of prenatal attachment behavior that was most influenced by parental relationships.

Although not statistically significant, the positive association between relationships with fathers and husbands needs further investigation. The husband's role in the attachment process has received increasing attention in recent years (Klaus & Kennell, 1982; Weaver & Cranley, 1983).

The Attachment History Questionnaire was designed to test the validity of the concept that the instruments in this study were measuring aspects of attachment as conceptualized in attachment theory. The findings of the study did not support this. Sample and instrumental limitations, as mentioned above, make this result inconclusive.

Related Findings

The objective assessment of maternal fetal attachment and maternal child interaction stimulated a wealth of subjective responses from mothers. Although some prenatal attachment behaviors received social support, it appeared

that others did not. If, as the findings of this study suggest, participation in these behaviors is a precursor to sensitive mother infant interaction, then it follows that support and encouragement of these activities might enhance the attachment process. The value of this type of nursing intervention has been supported by studies designed to measure the effects of nursing intervention on maternal infant reciprocity (Anderson, 1981; Carter-Jessop, 1981; Dean et al., 1982; Furr & Kirgis, 1982).

Much attention has been focused on educating parents about the mechanics of childbirth and providing situations that support early parent infant contact. Less attention has been directed towards actively helping the individual mother explore her evolving relationship with her child. The administration of attachment/interaction instruments provides a means by which affective involvement can be explored and intuitive responses reinforced.

Summary

The findings of this study support the theoretical framework of developing attachment during pregnancy and the early postpartum period. There was no evidence to support the concept that relationships with others and the experience of childhood separation were associated with prenatal attachment or postpartum interaction as measured in this study. Sample, instrument and design characteristics may have contributed to this finding.

CHAPTER V

OVERVIEW, LIMITATIONS AND IMPLICATIONS

Overview of the Study

This study was designed to examine the association between maternal fetal attachment and early mother infant attachment. Prenatal attachment was measured during the last month of pregnancy. Each mother completed a Maternal Fetal Attachment Scale by indicating the degree to which her behaviors corresponded to behaviors identified on the scale. Postpartum attachment was assessed through nonparticipant observation of two feeding sessions and rated on the Nursing Child Assessment Feeding Scale (Barnard, 1978a) and the Funke Mother Infant Interaction Assessment tool (Funke-Furber, 1978). A significant and positive relationship was found between maternal fetal attachment and mother infant interaction on the second and third day postpartum. No significant relationships were found between attachment history variables and scores on any of the three attachment/interaction instruments.

Limitations

There were a number of limitations which restrict the generalizability of the findings. Some of these limitations are inherent in the study design, instruments and sample. Others are more general and revolve around the difficulties associated with objectively testing subjective experiences.

These limitations in turn point to implications for nursing practice and future research.

1. Although the sample represented women of various ages, parities and educational backgrounds, it was small and from one community. These latter characteristics limit the generalizability of the findings to other groups of mothers.
2. There was no attempt to control for the possible effect that completion of the Maternal Fetal Attachment Scale may have had on subsequent mother child interaction.
3. Although the completed Maternal Fetal Attachment Scales were not viewed until after the postpartum observations were rated, it was possible that familiarity with the researcher affected some women's behavior. It may also be possible that this prenatal interview biased the researcher's postpartum assessment.
4. This study examined attachment during a short though critical time in mother infant development. It is unknown to what extent this early relationship affects the later development of maternal and infant attachment.
5. Although the postpartum interaction instruments appeared to measure attachment behaviors, they were designed to measure the quality of mother infant interaction. It can only be assumed that these behaviors represent affective involvement with the infant.

6. The findings of this study represent a correlation between the objective assessment of attachment behaviors during two periods of development. It is unclear how these objective assessments are related to the subjective experience of attachment.

Implications for Nursing Practice

The findings of this study suggest a number of implications for nurses working with families during the childbearing year. The close personal contact that nurses have with mothers gives them the opportunity to actively support maternal attachment as it develops. Affective involvement and interaction with the unborn child appears to be an important component in the development of maternal infant relationships. This involvement varies between mothers and may be reflected in patterns of early mother infant interaction. Some mothers, however, receive less social support for behaviors that suggest involvement with the unborn baby than for those associated with personal activities during pregnancy. By providing opportunities for mothers to discuss the emotional and behavioral characteristics of the developing maternal relationship in prenatal classes and/or during prenatal clinic visits, nurses can support and encourage interactive as well as personal activity behaviors. Each mother would likely benefit from a chance to explore with others the unique character of her experience in relation to her unborn child. At the same time, she may

be helped to recognize that many of her behaviors and perceptions are not unusual. The Maternal Fetal Attachment Scale may be used to stimulate discussion and provide a framework for the assessment of maternal attachment during pregnancy.

Much attention has been placed on minimizing parent infant separation after birth with the intent of enhancing attachment. It is not enough, however, to provide situations for early and prolonged contact between parents and their infants in hope that interaction will be stimulated. Nurses can utilize various protocols which focus on the mother infant acquaintance process to enhance attachment during the neonatal period. It is important, however, to help a mother identify and appreciate her role in the interaction while helping her to recognize her baby's capabilities.

Use of the Nursing Child Assessment Feeding Scale enables the nurse to focus on the positive things that each mother does with her baby. When nurses focus attention on and compliment mothers for their sensitivity to infant needs and interactive behavior, they may be able to help her feel more confident in her role as mother and in caring for her baby. This type of encouragement can be especially helpful for mothers who have been given conflicting messages and advice from relatives, friends and health care professionals and who feel under pressure to perform to please others.

This discussion may also help the nurse to more fully understand the impact of factors affecting an individual mother's behavior. It also provides an opportunity for the nurse to establish an accepting supportive relationship with the new mother.

Recording and reporting characteristics of mother infant interaction helps nurses to assess behavior and plan continuity of care. The assignment of one nurse to care for both mother and baby reflects a commitment to the mother infant interactional unit. Ideally each family is followed by one nurse during pregnancy, labor and delivery and the postpartum period. Continuity of care can provide a means by which attachment can be assessed and supported along a developmental continuum. The influence of various birth environments and procedures can then be evaluated in reference to their effects on the attachment process.

Instrumental assessments make relatively general comparisons between mothers possible. When discussions follow, they may serve to qualify and illuminate the uniqueness of individual response patterns. The findings of this study are useful in nursing practice to the extent that nurses are able to assess similarities and trends, while at the same time appreciating and supporting individual differences. Nurses have an opportunity to actively encourage the development of maternal infant attachment and to provide care and environments which reflect the importance attribut-

ed to this relationship.

Implications for Nursing Research

Methodological and theoretical issues brought to light in this study point to a number of recommendations for further research. Sample limitations suggest complementary research on other and larger groups of mothers. A study design that controlled for the possible effects that the exposure to the Maternal Fetal Attachment Scale might have on the attachment process would clarify the significance of this limitation.

Prenatal and postpartum assessments by independent researchers would further reduce the possibility of observer bias and researcher influence on maternal behavior. Further validation of the ability of the interaction assessment instruments to measure attachment is needed. Subjective as well as objective assessments of attachment during this period might provide greater understanding and depth to the study of attachment.

A longitudinal study design that focussed on the development of attachment at a number of intervals in the maternity cycle might indicate how attachment during late pregnancy/early postpartum period is related to mother infant attachment during other periods of development.

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APPENDIX A

Prenatal Risk Scoring Form

I	Reproductive History		Risk Score
	Age:	16	1
		16-34	0
		35	2
	Parity:	0	1
		1-4	0
		5+	2
	Past OB History		
	Habitual abortion/infertility		1
	PPH/manual removal		1
	Baby 9 lbs. (4082 gm.)		1
	Baby 5.5 lbs. (2500 gm.)		1
	P.E.T./hypertension		1
	Previous Caesarian		1
	Stillbirth or neonatal death		3
	Prolonger labor or difficult delivery		1
		Category Score	_____

II	Associated Conditions	
	Previous gynecological surgery	1
	Chronic renal disease	2
	Gestational diabetes	1
	Diabetes mellitus	3
	Cardiac disease	3
	Other Medical Disorders	
	(Chronic bronchitis, lupus, etc.)	
	Score according to severity	1-3
	Category score	_____

APPENDIX A - continued

III	Present Pregnancy	Risk Score
	Bleeding 20 wks	1
	Bleeding 20 2ks	3
	Anemia 10 gm %	1
	Prolonged pregnancy (42 wks)	1
	Hypertension	2
	Premature rupture of membranes	2
	Polyhydramnios	2
	Small for dates	3
	Multiple pregnancy or breech or malpresentation	3
	Rh isoimmunization	3
	Category Score	_____
	Total Risk Score	_____

Note: Low risk 0-2
High risk 3-6
Extreme risk 7

Adapted from Nova Scotia Prenatal scoring Form
Reproductive Care Program

APPENDIX B

Introduction to Mothers and Explanation of Procedure

Hello Ms. _____. My name is Judith Fuller. I am a registered nurse and a graduate student at the School of Nursing, Dalhousie University, Halifax. I understand that you expressed an interest in being part of a study on mothers and their babies during your last visit to your doctor. I would like to tell you more about the study and then you can let me know if you still wish to be in the study. The first part of the study involves answering some questions about yourself and completing a short questionnaire. This would take place in your home and take no longer than ten minutes. The questionnaire is a list of activities that mothers may or may not do in relation to their unborn babies. You are asked to make a check mark beside each one showing how much you do each activity. There are no right and wrong answers. I will show you an example of how to do the questionnaire when I give it to you.

The second part of the study will take place in the hospital after you have your baby. On the second and third day after your baby is born, I will observe you while you feed your baby. I won't talk to you at this time because I want you to feed your baby as you normally would. After the second time that I observe you, we can talk about the study. I am not working for your doctor, nor am I a staff member of

APPENDIX B - (continued)

the hospital. The study, however, has been approved by your physician, the hospital and Dalhousie University. I will be the only person to see the information that you give me. You may decide at any time that you do not want to stay in the study. Taking part or withdrawing from the study will not change the health care you receive. Do you have any questions?

APPENDIX C

Consent Form

The purpose of this study is to learn more about mothers and their unborn babies and mothers and their babies after birth. This study will be conducted by Judith Fuller, a registered nurse and graduate student at the School of Nursing, Dalhousie University in Halifax.

The study has been explained to me by the researcher.

I understand that my involvement in the study will include:

a) the researcher asking me questions about myself;

b) my completing a questionnaire about myself and my unborn baby;

c) after my baby is born, the researcher observing me and my baby during two feedings in the hospital.

Only the nurse researcher will look at the information gathered from me. All information that may identify me as part of the study will be destroyed when the study is complete. When the information has been collected, I will be free to ask questions about the study. I understand that I can withdraw from the study at any time without any effect to my present or future health care.

I understand the above and would like to take part in the study.

Date: _____ Signed: _____

Witness: _____

APPENDIX D

Demographic Data Form

1. Age: _____

2. EDC: _____

3. Marital status: _____ married _____ single

4. Parity: _____

5. Hospital: _____

6. Mother's education: highest level achieved:
   1. grade school _____
   2. some high school _____
   3. high school _____
   4. some college _____
   5. college degree _____
   6. vocational school _____

7. Husband/partner's education: highest level achieved:
   1. grade school _____
   2. some high school _____
   3. high school _____
   4. some college _____
   5. college degree _____
   6. vocational school _____

8. Experience with ultrasound during this pregnancy:
   _____ 1. yes _____ 2. no

9. Type of delivery: _____

10. Feeding Method: _____

APPENDIX E Maternal Fetal Attachment Scale

	Definitely Yes	Yes	Uncertain	No	Definitely No
1. I talk to my unborn baby.	_____	_____	_____	_____	_____
2. I feel all the trouble of being pregnant is worth it.	_____	_____	_____	_____	_____
3. I enjoy watching my tummy jiggle as the baby kicks inside.	_____	_____	_____	_____	_____
4. I picture myself feeding the baby.	_____	_____	_____	_____	_____
5. I'm really looking forward to seeing what the baby looks like.	_____	_____	_____	_____	_____
6. I wonder if the baby feels cramped in there.	_____	_____	_____	_____	_____
7. I refer to my baby by a nickname.	_____	_____	_____	_____	_____
8. I imagine myself taking care of the baby.	_____	_____	_____	_____	_____
9. I can almost guess what my baby's personality will be from the way s/he moves around.	_____	_____	_____	_____	_____
10. I have decided on a name for a girl baby.	_____	_____	_____	_____	_____
11. I do things to try to stay healthy that I would not do if I were not pregnant.	_____	_____	_____	_____	_____

APPENDIX E Maternal Fetal Attachment Scale (continued)

	Definitely Yes	Yes	Uncertain	No	Definitely No
12. I wonder if the baby can hear inside of me.	_____	_____	_____	_____	_____
13. I have decided on a name for a boy baby.	_____	_____	_____	_____	_____
14. I wonder if the baby thinks and feels things inside of me.	_____	_____	_____	_____	_____
15. I eat meat and vegetables to be sure my baby gets a good diet.	_____	_____	_____	_____	_____
16. It seems my baby kicks and moves to tell me it's eating time.	_____	_____	_____	_____	_____
17. I poke the baby to get him/her to poke back.	_____	_____	_____	_____	_____
18. I can hardly wait to hold the baby.	_____	_____	_____	_____	_____
19. I try to picture what the baby will look like.	_____	_____	_____	_____	_____
20. I stroke my tummy to quiet the baby when there is too much kicking.	_____	_____	_____	_____	_____
21. I can tell that the baby has the hiccoughs.	_____	_____	_____	_____	_____
22. I feel my body is ugly.	_____	_____	_____	_____	_____

APPENDIX E Maternal Fetal Attachment Scale (continued)

	Definitely Yes	Yes	Uncertain	No	Definitely No
23. I give up doing certain things because I want to help my baby.	_____	_____	_____	_____	_____
24. I grasp my baby's foot through my tummy to move it around.	_____	_____	_____	_____	_____

APPENDIX F

Maternal Fetal Attachment Scale by Subscale

Subscale Roletaking

4. I imagine myself feeding the baby.
8. I imagine myself taking care of the baby.
18. I can hardly wait to hold the baby.
19. I try to picture what the baby will look like.

Subscale Differentiation of Fetus From Self

3. I enjoy watching my tummy jiggle as the baby kicks inside.
5. I'm really looking forward to seeing what the baby really looks like.
10. I have decided on a name for a girl baby.
13. I have decided on a name for a boy baby.

Subscale Interaction with Fetus

1. I talk to my unborn baby.
7. I refer to my baby by a nickname.
17. I poke my baby to get him/her to poke back.
20. I stroke my tummy to quiet the baby when there is too much kicking.
24. I grasp my baby's foot through my tummy to move it around.

Subscale Attributing Characteristics to the Fetus

6. I wonder if the baby feels cramped in there.
9. I can almost guess what my baby's personality will be from the way s/he moves around.
12. I wonder if the baby can hear inside of me.
14. I wonder if the baby thinks and feels things inside of me.
16. It seems my baby kicks and moves to tell me it's eating time.
21. I can tell that my baby has the hiccoughs.

APPENDIX F - (continued)

Subscale Giving of Self

2. I feel all the trouble of being pregnant is worth it.
11. I do things to try to stay healthy that I would not do if I were not pregnant.
15. I eat meat and vegetables to be sure my baby gets a good diet.
22. I feel my body is ugly.
23. I give up doing certain things because I want to help my baby.

APPENDIX G

NURSING CHILD ASSESSMENT FEEDING SCALE

		Yes	No
I	**Sensitivity to Cues**		
	1. Parent positions child so that child is safe but can move his arms.		
	2. Parent positions child so that the child's head is higher than hips.		
	3. Parent positions child so that trunk-to-trunk contact is maintained during more than half of the breast or bottle feeding (50%).		
	4. Parent positions child so that eye contact is possible.		
	5. Parent's face is at least 7-8 inches or more from the child's face during feeding except when kissing, hugging or burping the baby.		
	6. Parent smiles, verbalizes, or makes eye contact with child when child is in open-face-gaze position.		
	7. Parent comments verbally on child's hunger cues prior to feeding.		
	8. Parent comments verbally on child's satiation cues before terminating feeding.		
	9. Parent varies the intensity of verbal stimulation during feeding.		
	10. Parent varies intensity of rocking or moving the child during the feeding.		
	11. Parent varies the intensity of touch during the feeding.		

APPENDIX G - (continued)

		Yes	No
12.	Parent allows pauses in feeding when the child indicates by cry face, halt hand, back arching, pulling away, pushing food away, tray pounding, turning head, shaking head no or saying "no" or falling asleep or when child is in pause phase of the burst-pause sequence of sucking (75% of the time).		
13.	Parent slows pace of feeding or pauses when child averts gaze, places hand-to ear, hand-to-mouth, hand-behind-head, hand-back-of-neck, hands over stomach, yawns, rubs eye, or displays feet movement (75% of the time).		
14.	Parent terminates the feeding when the child turns head, falls asleep, compresses lips, pushes food away, shakes head no or says "no", once or more or after other methods (repositioning, burping, or waiting) have proved unsuccessful.		
15.*	Parent does not interrupt child's sucking or chewing by removing the nipple, jiggling the nipple, or offering the child more or other kinds of food while child is eating.		
16.*	Parent does not offer food when the child looks down, turns away or turns around.		

* Need only occur once to score "no"

APPENDIX G - (continued)

II **Response to Distress** (indicate in box whether or not, if no distress, mark each box "yes"). If child shows distress during the feeding does the parent:

		Yes	No
17.	Stop or start feeding in response to the child's distress.		
18.	Change the child's position in response to the child's distress.		
19.	Make positive or sympathetic verbalization in response to child's distress.		
20.	Changes voice to softer or higher pitch in response to child's distress.		
21.	Makes soothing non-verbal efforts in response to child's distress.		
22.	Diverts child's attention by playing games, introducing a toy, or making faces in response to child's distress.		
23.	Parent does not make negative verbal response to child's distress.		
24.	Parent does not make negative comments to home visitor about child in response to child's distress.		
25.	Parent does not yell at child in response to his distress.		
26.	Parent does not use abrupt movements or rough handling in response to child's distress.		
27.	Parent does not slap, hit, or spank child in response to distress.		

APPENDIX G - (continued)

III **Social-Emotional Growth Fostering**

		Yes	No
28.	Parent pays more attention to child during feeding than to other people or things in environment.		
29.	Parent is in en face position for more than half of the feeding (50%).		
30.	Parent succeeds in making eye contact with child once during feeding.		
31.	Parent's facial expression changes at least twice during feeding.		
32.	Parent engages in social forms of interaction (plays games with child) at least once during the feeding.		
33.	Parent uses positive statements in talking to child during the feeding.		
34.	Parent praises child or some quality of the child's behavior during the feeding.		
35.	Parent hums, croons, sings, or changes the pitch of his/her voice during the feeding.		
36.	Parent laughs or smiles during the feeding.		
37.	Parent uses gentle forms of touch during the feeding.		
38.	Parent smiles, verbalizes or touches the child within 5 seconds of child smiling or vocalizing at parent.		
39.	Parent does not compress lips, grimace, or frown when making eye contact with child.		
40.	Parent does not slap, hit, shake or grab child or child's extremities during the feeding.		

APPENDIX G - (continued)

		Yes	No
	41. Parent does not make negative or uncomplimentary remarks to the child or home visitor about the child or child's behavior.		
IV	**Cognitive Growth Fostering**		
	42. Parent provides child with objects, finger foods, toys, and/or utensils.		
	43. Parent encourages and/or allows the child to explore the breast, bottle, food, cup, bowl or the parent during feeding.		
	44. Parent talks to the child using two words at least three times during the feeding.		
	45. Parent verbally describes some aspect of the food or feeding situation to child during feeding.		
	46. Parent talks to child about things other than food, eating, or things related to the feeding.		
	47. Parent uses statements that describe, ask questions or explains consequences of behavior more than commands in talking to the child.		
	48. Parent verbalizes to child within five seconds after child has vocalized.		
	49. Parent verbalizes to child within five seconds after child's movement of arms, legs, hands, head, trunk.		
	50. Parent does not talk baby talk.		

APPENDIX G - (continued)

		Yes	No
V	**Clarity of Cues**		
	51. Child signals readiness to eat.		
	52. Child displays a buildup of attention at the beginning of feeding.		
	53. Child demonstrates a decrease in tension within a few minutes after feeding has begun.		
	54. Child has periods of alertness during the feeding.		
	55. Child displays at least two different emotions during the feeding.		
	56. Child has periods of activity and inactivity during the feeding.		
	57. Child's movements are smooth and coordinated during the feeding.		
	58. Child's arm and leg movements are generally directed toward parent during feeding (not diffuse).		
	59. Child makes contact with parent's face or eyes at least once during the feeding.		
	60. Child vocalizes during feeding.		
	61. Child smiles or laughs during feeding.		
	62. Child averts gaze, looks down or turns away during feeding.		
	63. Child actively resists food offered.		
	64. Child demonstrates satisfaction at end of feeding through sleep, facial expressions, decreased muscle tone, arms extended along side, vocalizations or change in activity level or mood.		

APPENDIX G - (continued)

		Yes	No
	65. Child does not have more than two rapid state changes during feeding.		
VI	**Responsiveness to Parent**		
	66. Child responds to feeding attempts by parent during feeding.		
	67. Child responds to games, social play or social cues of parent during feeding.		
	68. Child looks in the direction of the parent's face after parent has attempted to alert the child verbally or non-verbally during feeding.		
	69. Child vocalizes to parent during feeding.		
	70. Child vocalizes or smiles within 5 seconds of parent's vocalization.		
	71. Child smiles at parent during feeding.		
	72. Child explores parent or reaches out to touch parent during feeding.		
	73. Child shows a change in level of motor activity within 5 seconds of being handled or repositioned by parent.		
	74. Child shows potent negative cues during last half of feeding.		
	75. Child shows potent negative cues within 5 seconds after parent moves closer than 7 to 8 inches from child's face.		
	76. Child does not turn away or avert gaze from parent during first half of feeding.		

APPENDIX H

Funke Mother Infant Interaction Assessment
(during first 4 days postpartum)

Note: Observation to take place during infant's feeding.

1. _____ 5. Mother gives baby almost constant eye-to-eye (en face) contact.

_____ 4. Mother gives both baby and observer equal amounts (50-50) of eye-to-eye contact.

_____ 3. Mother gives baby eye-to-eye (en face) contact 35% of the time.

_____ 2. Mother gives baby eye-to-eye (en face) contact 1-34%, i.e., gives 65% or more of eye contact elsewhere.

_____ 1. Eye-to-eye contact never occurs between mother and baby.

2. _____ 5. Mother expresses great pleasure and satisfaction with her child's feeding behaviors, i.e., pleased about amount being taken, baby's sucking and burping.

_____ 4. Mother generally pleased, but concerned, i.e., Is the baby taking exactly the right amount, often enough? or baby's not burping well.

_____ 3. Mother generally expressed neither satisfaction nor dissatisfaction with her child's feeding behaviors.

_____ 2. Mother expresses some, 2 or 3 disappointments and/or dissatisfactions in her baby's feeding behavior in that the baby is not meeting her expectations.

_____ 1. Mother expresses more than 3 problems and/or frustrations, and is grossly dissatisfied with her baby's feeding behavior; openly resentful or rejecting, viewing baby as an interference.

APPENDIX H - (continued)

3. _____ 5. Enfolds baby against her own body, uses entire arm to bring baby close to her.

_____ 4. Holds the baby approximately 3-5 inches from her own body.

_____ 3. Holds the baby approximately 5-8 inches from her body uses mostly forearm for supporting baby.

_____ 2. Holds the baby approximately 8-12 inches from her own body, uses mostly palms or hands for supporting baby.

_____ 1. Holds the baby approximately 12 or more inches from her own body, or does not hold baby.

4. _____ 5. Mother speaks acceptingly and affectionately and directly to her baby 5 or more times during the feeding activity.

_____ 4. Mother speaks acceptingly and affectively to her baby 2-4 times.

_____ 3. Mother speaks to her baby without intonation or inflection in her voice during the feeding activity.

_____ 2. Mother does not initiate any comments to her baby during feeding activity.

_____ 1. Mother speaks to her child in a demanding, and/or aggressive, and/or rejecting manner during the feeding activity.

Total Score = 1 + 2 + 3 + 4 + = _____

APPENDIX I

Attachment History Questionnaire

Note: If married and living with husband, questions 1 and 2 apply to husband. If married and not living with husband or if not married, questions 1 and 2 apply to significant male partner.

1. Relationship with partner/husband.

_____ 1. No partner at present.
_____ 2. Partner, but not living together.
_____ 3. Living with partner/husband.
_____ 4. Living with partner/husband for past year.

2. Would you describe your relationship with your partner/husband as:

_____ 1. very poor
_____ 2. poor
_____ 3. fair
_____ 4. good
_____ 5. very good

3. Would you describe your relationship with your mother as (having been if deceased):

_____ 1. very poor
_____ 2. poor
_____ 3. fair
_____ 4. good
_____ 5. very good

4. Would you describe your relationship with your father as (having been if deceased):

_____ 1. very poor
_____ 2. poor
_____ 3. fair
_____ 4. good
_____ 5. very good

5. Do you have any close friends or relatives in your community with whom you discuss things like pregnancy, childbearing, personal problems?

_____ 1. no
_____ 2. yes

6. How many close friends or relatives do you have where you live?

_____ 1. none _____ 2. one _____ 3. more than one

APPENDIX I - (continued)

7. Were you separated from one or both of your parents before you were 12 years old?

_____ 1. yes _____ 2. no

(If yes) Were you separated from your

_____ 1. mother _____ 2. father

How long were you separated? _____

How often ? _____

Reason for separation:

_____ 1. death of parent
_____ 2. divorce of parents
_____ 3. health of parent
_____ 4. other

APPENDIX J

Percentages of Women Marking Each Option on MFA by Subscale (n=32)

Subscale Attributing Characteristics to the Fetus (α=.65)

Item	Def. Yes Yes	Uncertain	Def. No No
Wonder if baby cramped	37.5%	18.8%	43.7%
Guess personality	25.5%	40.6%	34.4%
Wonder if baby hears	68.7%	18.8%	12.5%
Baby feels and thinks	62.5%	25%	12.5%
Baby kicks at eating time	21.9%	18.8%	59.3%
Baby has hiccoughs	21.9%	15.6%	62.5%

Subscale Giving of Self (α=.74)

Item	Def. Yes Yes	Uncertain	Def. No No
Pregnancy worth it	98.3%	3.1%	3.1%
Healthy activities	78.1%	6.3%	15.6%
Eats meat and vegetables	93.8%	-	6.3%
Gives up activities	84.4%	3.1%	12.5%
Feels body is ugly (Item reversed in scoring)	18.8%	12.5%	68.7%

Subscale Roletaking (α=.72)

Item	Def. Yes Yes	Uncertain	Def. No No
Imagine feeding baby	78.1%	12.5%	9.4%
Imagine caring for baby	100.0%	-	-
Wanting to hold baby	100.0%	-	-
Can picture what baby will look like	90.6%	-	9.6%

APPENDIX J (continued)

Subscale Differentiation of Fetus From Self (α=.72)

Item	Def. Yes Yes	Uncertain	Def. No No
Enjoy tummy jiggling	100.0%	-	-
Anxious to see baby	100.0%	-	-
Chosen a boy name	65.6%	12.5%	21.9%
Chosen a girl name	78.1%	9.4%	12.5%

Subscale Interaction with Fetus (α=.36)

Item	Def. Yes Yes	Uncertain	Def. No No
Talks to baby	78.1%	9.4%	12.5%
Strokes tummy in response to movement	62.5%	12.5%	25.1%
Pokes baby	43.7%	-	56.3%
Baby has nickname	28.0%	9.3%	62.5%
Grasps baby's foot	12.5%	3.1%	84.4%