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## Maternal-Infant Contact and Development of Attachment

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Priscilla N. White, Major Professor

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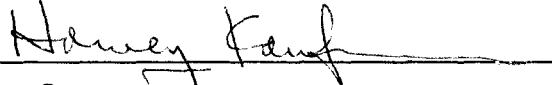
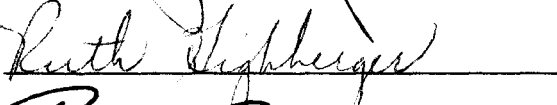

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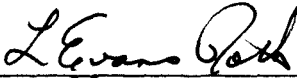
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Priscilla N. White,  
Major Professor

We have read this dissertation  
and recommend its acceptance:

  
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Vice Chancellor  
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MATERNAL-INFANT CONTACT AND DEVELOPMENT  
OF ATTACHMENT

A Dissertation  
Presented for the  
Doctor of Philosophy  
Degree  
The University of Tennessee, Knoxville

Patricia Gentry Droppleman

December 1979

**1406097**

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## ABSTRACT

The purpose of this study was to attempt to establish more precisely the sensitive period for mother-infant attachment, by comparing maternal behaviors of mothers who had immediate contact with their newborns to mothers whose contact with their infants was delayed. A secondary purpose was to determine whether maternal attachment behaviors occurred more frequently for those mothers whose infants were awake and alert.

Fourteen caucasian Americans and one oriental American primigravid women and their healthy neonates were studied. The method used to determine the effects of time of initial significant contact and infant state was observation of video-taped interaction of three differing times of contact groups by a naive observer. Group I was Immediate Contact, Group II was Early Delay (1½ hours delay) and Group III was Control (6-10 hours delay). The subjects were video-taped during initial significant interaction for one hour and again 24 to 36 hours post-delivery for one hour during a scheduled feeding. Bar graphs of the frequency of occurrence of bonding behaviors and frequency of occurrence of state 4 were used to visualize which of the three groups exhibited the most bonding behaviors, and the most state 4 of infant arousal during the second session of taping. The categories of behavior consisted of en facé holding, fondling, smiling,

proximity, prolonged gazing and talking to the neonates. Interrater reliability was 97.7%. Evidence from the data in this study supports the theory that early extended contact does facilitate bonding. In the analysis Group II exhibited the most bonding behaviors, Group I had the second largest number and Group III had a decrease in behaviors at the second taping. For Groups I and II, there is a relationship between the amount of time infants are in state 4 of infant arousal and the bonding behaviors exhibited by the mother when the data is examined for each subject in the group. Vast intrasubject variation within groups was not noted except with subject 3, Group I on two categories of behaviors, i.e., en facé and talking. The frequency of interruptions were scored across groups and within subjects. Group I, Session I had nearly three times the number of interruptions as occurred in Groups II and III. Group II had the least number of interruptions overall.

The results indicate that early extended contact is important to the development of attachment between mother and infant but that immediate extended contact may not be critical. An intervening variable in the development of bonding when extended contact occurs immediately after delivery is frequency of interruption of the mothers. Age of mother at delivery may also be a variable to be considered. Infants are in state 4, the quiet alert state for at least one hour after delivery and some infants are in state 4



for longer than one hour post-delivery. Skin-to-skin contact seems to enhance bonding. The "sensitive period" for bonding may extend beyond two hours post-delivery.

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## CHAPTER I

### INTRODUCTION

During the last forty years perinatal morbidity and mortality have been reduced significantly. As the birth experience moved from the home setting to the hospital, many routines were introduced in relation to mothers, fathers and their infants in order to prevent infection in the neonate, and to increase the overall quality of care to the infant. Concentrated effort by hospital personnel to improve the quality of physical care to mothers and infants has resulted in diverse practices that may inhibit the development of the mother-father-infant relationship.

The routine hospital practice in the United States has been, and in many institutions continues to be, to delay significant contact between mother and infant until approximately 6 to 10 hours after birth, despite publication of research that suggests that delaying maternal-child contact after birth results in a reduction of the mother's attachment to the infant (Klaus, Jerauld, Kreger, McAlpine, Steffa & Kennell, 1972; Kennell, Jerauld, Wolfe, Chesler, Kreger, McAlpine, Steffa & Klaus, 1974; Klaus & Kennell, 1976; deChateau, 1976; Hales, Trause & Kennell, 1977; O'Connor, Vietze, Hopkins & Altemeier, 1977; and Kontos, 1978); and despite the recent American Medical Association guidelines that advocate promoting "attachment and bonding of mothers and their infants."

Attachment is defined as a unique emotional relationship between two people that is specific and endures through time (Klaus & Kennell, 1976). The words bonding and attachment have been used by Klaus and Kennell synonymously but the word attachment as introduced by Bowlby (1969) refers to a conformation mirroring the quality of the affectional linking between parents and infants, particularly the mother-infant. This linking develops gradually throughout the first year of life. Conversely, bonding is a swiftly ensuing phenomena occurring in the period immediately following birth. Attachment is a bi-directional process reflecting a reciprocal interaction between mother and infant. Bonding is primarily unidirectional, proceeding from mother to infant and expressive of the mother's development of an affectional tie to her child. Indications of maternal bonding to infants include certain behaviors such as en facé position, prolonged gazing, fondling, smiling, proximity, and talking to the infant. These behaviors are thought to be facilitators and maintainers of contact; they are also facilitators of affection between one human being and another.

The maternal sensitive period is described as that period immediately after birth when the human mother forms, or begins to form, a special bond to her infant. It has been hypothesized that this optimal period for bonding lasts only a short time and events occurring during this time period may exert enduring effects on the mother-child alliance (Klaus & Kennell, 1976). Although bonding develops more effortlessly

during the sensitive period, the process can occur at a later time, but will be protracted and more difficult to achieve (Kennell, Trause & Klaus, 1975).

The maternal sensitive period requires differentiation from the sensitive period for infants, which is sometime between two and six months when the infant develops an attachment to the mother (Yarrow, 1961; Bronfenbrenner, 1968). The maternal sensitive period implies the direction of the process proceeding from mother to child (Klaus & Kennell, 1976).

In this study the term bonding and attachment was used synonymously to describe the phenomenon of mother to infant attachment in the first hours and days of life.

#### Range of Research on Attachment

Theories of bonding and attachment have evolved from ethological observations that particular species—specific manners of behaving are highly anticipatory and are predictably extracted once stimulation by the mother mammal is initiated and especially when the organism is biologically so disposed. Instinctually, nonhuman mammals perform activities from birth which promote proximity and facilitate caregiving. Experimental studies in animal research have demonstrated that there is a rapid onset of maternal behavior among mammals. In many species, there is a distinct sensitive or critical period for the mother and neonate which

has important consequences for the young. Female goats, sheep and laboratory rats are particularly vulnerable to separation from their young, and if separation occurs immediately after birth, distinctly maladaptive behaviors ensue, ranging from physical punishment of the newborn to complete and absolute rejection (Collias, 1956; Hersher, Richmond & Moore, 1963; Klopfer, 1971; Rosenblatt & Lehrman, 1963).

Theories of human bonding are evolving from a series of studies that support the existence of a sensitive period immediately after birth and that maintain the concept that interference in the development of the attachment process has long-lasting effects on future development of affectional ties (Rose, Boggs & Alderstein, 1960; Kennell & Rolnick, 1960; Klaus et al., 1972; Kennell et al., 1974; Klaus & Kennell, 1976; deChateau, 1976; Hales et al., 1977; O'Connor et al., 1978; Kontos, 1978). Cumulative results of such research on mother-infant dyads who encountered differing amounts of mutual proximity in the first hours and days of the neonates' lives indicate quantitative differences between the groups.

#### Research Imperatives

Investigation of parent-infant interaction is a relatively new phenomenon. This area of research is of interest to several scientific disciplines such as



anthropology, sociology, developmental and educational psychology, ethology, physiology, medicine and nursing. Traditionally, medicine and nursing have adopted stances of cure or amelioration of disease or illness while attempting to preserve life. The practice of obstetrics and obstetrical nursing utilized the medical model and concerned themselves almost exclusively with immediate life threatening events. Pregnancy was considered a pathological state and child bearing was viewed as hazardous at best.

With the advent of amended obstetrical intervention in high risk populations and the development of the field of perinatology, perinatal and neonatal physiological outcomes have improved. Many of the former hazards to successful child bearing have been diminished or eradicated. Now is the time to inquire whether the end justifies the means—do the means meet the criteria for optimal medical and nursing care as well as the socio-emotional health of the mother-infant dyad? Recent knowledge concerning the well-developed neural behavioral organization of the neonate demands evaluation of hospital practice, around the natal period.

Mothering disorders such as failure to thrive, child abuse, sleeping and feeding problems, frequent bouts of illness, frequent avoidable injury and other developmental disturbances have been identified and recognized in families. Further study of the natal period is warranted to assist in the development of both preventive and later intervention techniques.

### Potential Contributions of this Project

Some of the reasons for investigating the interaction between mothers and infants close to birth include:

1. Recent research suggests that there may be a critical or sensitive period when infants and mothers are biologically and optimally ready to be reciprocally interactive, and that this time period is within the first couple hours of life. This project can add to the body of accumulating knowledge on the "maternal sensitive" period.

2. There is a need to isolate some of the factors which impinge on the development of attachment between mothers and infants.

3. There is a need to sensitize medical and nursing staff toward making perceptive observations of a family's interactional behavior.

4. There is a need to alter hospital routines and neonatal routines that separate mothers and infants after vaginal and cesarean deliveries.

5. There is a need to develop ways to intervene with families who experience a poor transition to parenthood.

6. There is a need to identify early indications of maladaptive mothering behaviors in order to better assist health professionals in recognizing them and to assist caregivers in application of intervention techniques.

7. There is a need to change the attitudes of hospital personnel in relation to such issues as the

appropriateness of early extended contact, breast-feeding, rooming-in, sibling visitation, father participation in labor, delivery and the post-partal period and all other issues that appear to promote optimal parenting and family development.

8. There is a need for further investigation of the effects of early stimulation on the human infant.

### Purpose of the Study

The purpose of this study was to determine whether maternal attachment behaviors (such as en facé, gazing, fondling, smiling, proximity and talking to her first infant) were more frequent when initial contact between mother and infant occurred immediately after birth than if it was delayed for 1½ hours or for 6 to 10 hours after birth. A secondary purpose was to determine whether the same maternal attachment behaviors were more frequent for those mothers whose infants were awake and alert a greater amount of time during the initial contact period than for mothers whose infants were awake and alert a lesser amount of this time.

### Objectives

The general objectives in this study were to compare primagravid mothers and infants who had immediate contact with mother-infant dyads who experienced significant contact at 1½ hour post-delivery, and to mother-infant dyads who experienced significant contact 6 to 10 hours post-delivery.

The specific objectives of this study were as follows:

1. To examine the differences in maternal attachment behaviors between mothers at three different times of initial contact.

2. To investigate the consciousness level of the neonate and its impact on attachment behaviors exhibited by the mother.

3. To more precisely define the parameters of the critical period or the maternal sensitive period.

### Hypotheses

Maternal attachment behaviors would occur more frequently for mothers who had immediate initial contact with the infant than for those mothers whose initial contact was delayed 1½ hours after birth and those mothers whose initial contact was delayed 6 to 10 hours after birth.

Maternal attachment behaviors during maternal-child contact would be related to the amount of time infants were awake and alert during initial contact.

### Nominal Definitions of Variables

#### Attachment

A unique emotional relationship between two people which is specific and endures through time (Klaus & Kennell, 1976).

### Maternal Sensitive Period

That period of time immediately after birth when the human mother forms, or begins to form, a special bond to her infant.

### Consciousness Level of the Neonate

One of six states of infant arousal ranging from deep sleep to crying. These six states are appropriately defined in Chapter II.

### Immediate Contact

The umbilical cord is severed and the neonate is placed immediately in the arms of the mother and stays with the mother for approximately 1 hour post-delivery.

### Early Delayed Contact

One and one-half hour delay in contact. Only brief contact occurs after delivery; significant contact occurs at 1½ hours post-delivery and lasts approximately 1 hour.

### Control

Six to ten hour delay in contact. Only brief contact occurs after delivery; significant contact occurs between 6 and 10 hours post-delivery and lasts approximately 1 hour.

### Usual Hospital Practice

The delay of significant contact between mothers and infants for 6 to 10 hours post-delivery.

### Brief Contact

The mother sees her infant at delivery and may even touch her infant for a period not to exceed 4 minutes.

### Initial Significant Contact

The first time that the infant is held by the mother for a period of time that is at least of 1 hour duration post-delivery. Skin-to-skin proximity is included.

### Limitations of the Study

The possible limitations of this study included the following:

1. There was a relatively small sample size. A larger sample size might have increased the sample's representativeness and allowed for use of more powerful statistical procedures, and thus extended the generalizability of the findings. At the onset of this study, many people were naïve to the concepts of bonding and attachment but with the increasing awareness of the importance of early contact among health care providers and the dissemination of information to expectant couples the sophistication of the public increased thereby making it difficult to secure a naïve sample. The American Academy of Pediatrics and The American Medical Association's position paper on bonding and attachment which supported early extended contact between mothers and infants was another deterrent to procurement of a larger sample.

Since the subjects were randomly assigned to one of three treatment groups it became an ethical dilemma to assign the controls.

2. There was an absence of self-report data in terms of how the mothers perceived their infants, how they felt when they held their infants for the first time, how the infant fit into the mother's prior mental schema of expectation of sex and physical characteristics and so forth.

3. Videotape recording is often considered a more obtrusive way of recording behavior than direct observations. The presence of the machinery and the experimenter may have been obtrusive and may possibly have effected maternal behavior.

Research conducted in a natural setting such as the one in the present study does not lend itself to traditional methods of data collection and analysis. Graphic presentation was chosen as the best analytic tool to present the results of the study, due to the type of data collected and the size of the sample. Bar graphs were used for both intra-group as well as cross-group comparisons.

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

The literature concerning human mother to infant attachment is related to early research which focused on the process by which the human infant became attached to his or her mother (Bowlby, 1958; Spitz & Coblener, 1965). These researchers described deleterious effects on the institutionalized infant and/or on the infant who experienced long-term maternal separation. A central issue crystalized from their research; that it is essential to the nature of infants to have a warm and nurturing relationship between themselves and other human beings in order to survive and to develop normally physically, emotionally, and psychologically.

#### Capacity of Infants for Interaction

In most mammalian species, an adult is responsible for caring for the young, and indeed their very survival spins from this thread of care. Bowlby (1969) identified some capacities of the human newborn which might stimulate and initiate interaction between infants and their mothers. He suggested that smiling, crying, clinging, sucking and visual following are behaviors that elicit responses from mothers that in turn begin the attachment process. More



recent research has demonstrated the powerful neuro-behavioral organization of the full-term infant. The recognition by Wolff (1959) that there are six distinct stages of infant arousal is crucial to the present scientific appreciation of the potential of the neonate for interaction with and influence upon his or her environment. Examination of infants in different states of arousal from quiet alert to deep sleep points up the intactness of the central nervous system (Brazelton, 1974). Many studies show evidence of the reactive capacity of the neonate and several of these studies describe initiation of reciprocal interaction between mother and infant. Tactile stimulation of the infant's face results in the infant's turning its face toward the mother (Blauvelt & McKenna, 1962). Lifting of a crying neonate to a mother or caregiver's shoulder results in cessation of crying and a visually alert infant (Korner & Thoman, 1970).

A neonate can see, focus, follow and discriminately select visually (Brazelton, 1975; and Fantz, Fagen & Miranda, 1975). When newborn infants were presented with two identical pictures the infants more often chose to look at the picture on the right (Miranda, 1970). In several studies, mothers have demonstrated a preference for holding the infant to the left side of the body (deChateau, 1977; Salk, 1962, 1970, 1973). The fact that infants more often choose to look to the right could be an unconscious cueing in of mothers to hold infants to the left side in order to facilitate

interaction. Also since neonates seem calmed by hearing the human heart beat perhaps holding the infant on the left near the heart will soothe the infant. Other research in the area of visual perception suggests that the neonate prefers the human form to nonhuman forms; when presented with a face-like configuration and other configurations of equal brightness, complexity and symmetry, neonates will choose face-like patterns (Goren, 1975). Not only does the neonate prefer the human face, but also he or she can imitate behaviors exhibited on human faces. Two-week old neonates who were watching an experimenter open his mouth, stick out his tongue, protrude his lip, etc., were video-taped and shown to match the experimenter's movements correctly (Meltzoff & Moore, 1977).

The auditory system is well-organized in the neonate and he or she will turn their heads in the direction of a human voice and will choose to attend to a female vocal pitch over any other (Eisenburg, 1976). Condon and Sander (1974) noted that neonates 1 to 2 days old moved rhythmically and synchronously with an adult speaking, but not with mechanical tapping noises or with adults making disconnected vowel sounds. Further indication of the neonate's development has been shown in studies of their abilities to respond to their environment through a variety of sensory channels. Neonates can smell their own mother's breast pad at 6 to 10 days of life (MacFarlane, 1975) and appear disturbed by unusual maternal appearance (Cassel & Sander, 1978).

The neonate is inherently capable of shaping his or her environment. Korner (1974) suggested "that appropriateness of a mother's response to her infant is largely determined by the infant's level of neurophysiological development" (p. 117) and since the human neonate is a dependent person, the quality of his or her life seems to be directly related to the quality of the affectional bond between the neonate and the neonate's parents, particularly the mother. The advanced neuro-behavioral organization of the full-term neonate thus enables the neonate to elicit responses in the caretaker that are a part of the chain of mother-infant reciprocity which facilitates attachment (Lozoff, 1977).

#### Maternal Capacity for Interaction

Kennell et al. (1970) in a study that examined responses of mothers to the demise of their newly-born infants found that the affectional bond between mothers and their infants had begun to develop during the gestational period. However, there is some evidence to support the existence of a sensitive period immediately after birth and to support the idea that interruption in the development of the attachment process has long-lasting effects on future development of human affectional ties. Rose, Boggs and Alderstein (1960) and Kennell and Rolnick (1960) advanced the theory that early events post-delivery may effect

attachment and alter mother-child relationships, especially regarding the quality of maternal caregiving. Anxious feelings that mothers experienced in the first few days postpartally about their offspring may affect their relationships long afterward, even when the problem or supposed problem is minor and is easily resolved. A striking example of this is the report that any anomaly of their newborn infant is unacceptable to the parents. Initially, the absence of an infant's finger, or an infant's arm was equally as disturbing, as anxiety producing and as totally unwelcome to the parents (Mercer, 1977).

The sensitivity of the mother, has also been hypothesized as being an important variable in initiation of the maternal-infant relationship (Ainsworth & Bell, 1969; Bell & Ainsworth, 1972; Blake, Stewart & Turkin, 1975). Hopkins (1976) suggested that . . . " the sensitive mother may be the mother who most efficiently and appropriately regulates her own behavior specifically so that it remains generally within her infant's assimilative-accomodative developmental limits" (p. 11).

#### Importance of Early Contact

Another critical factor in maternal-infant attachment may be whether or not the infant is awake, alert and responsive to the mother when their initial contact takes place, and whether the mother is alert, awake and responsive

to the infant at this time. Wolff (1959) first described six separate states of consciousness in the infant. Desmond, Rudolph and Phitaksphraiwan (1966) further demonstrated that the infant is in state 4 of the six states (alert, awake and responsive) for 45 to 60 minutes during the first hour after birth. After the first hour of life, the infant falls into a deep sleep for the next 3 to 4 hours. Mothers often speak to their infants in high-pitched voices (Lang, 1972) and the infant seems to attend to the female voice more often than the male voice (Brazelton, 1974). Brazelton (1966) reported that immediately after birth infants of unmedicated mothers can easily follow a moving hand with their eyes at a 12 to 15 inch distance, indicating that visual acuity is present at birth. All of these studies point to the first 30 minutes of the infant's life as being the ideal time for the initial meeting between infant and parents (Klaus & Kennell, 1976).

Leifer, Leiderman, Barnett and Williams (1972) and Leiderman and Seashore (1975) researched the influence of early separation on the mother-infant dyad and they concluded that attitudes and behaviors of mothers of premature infants who were given early contact in comparison with delayed-contact were different but that these differences could not be attributed to early contact alone. Rather, they found that the sex of the infant, parity, socio-economic status of the family and the behavior of the infant also exerted influence on maternal behavior.

In the past twelve years, twelve separate studies have had as their primary focus the effects of close contact between mother and infant in the first minutes, hours and days of life and the subsequent development of attachment between mothers and infants.

Winters (1973) observed that the six women in his study who put their infants to their breasts immediately after delivery were still breast feeding two months later, whereas of the six women in his study who had delayed breast feeding contact (approximately 16 hours after birth), only one was still breast feeding at two months. None of the mothers stopped breast feeding because of physical problems; all had originally planned to breast feed.

The assertion that the period immediately after delivery is a crucial time for mothers and infants was further confirmed in a study conducted in Sweden (Greenburg, Rosenberg & Lind, 1973). A random assignment of rooming-in versus nonrooming-in for new mothers post-partally revealed that the rooming-in mothers displayed more competence in care giving, vocalized greater self-confidence in mothering tasks and appeared more sensitive to their infants than did the control group of nonrooming-in mothers.

A longitudinal study (Klaus et al., 1972; Kennell et al., 1974; Ringler, Trause & Klaus, 1976) supported the notion of a "sensitive period" close to delivery and the positive impact of early contact. This study suggested that 16 extra

contact hours between mothers and infants postnatally positively affected maternal behavior for at least two years following birth.

In a related study focusing on variables of physiological well-being, Klaus and Kennell (1976) observed that 35 days after delivery more mothers who had extended early contact with their infants were breast feeding and had a lower incidence of infection; and at six months, the early contact infants weighed nearly  $1\frac{1}{2}$  pounds more than the control group.

In another study which had an experimental design almost identical to the one above, Klaus and Kennell (1976) found that at 35 days post-partum and at 12 months post-partum, there were no significant differences in early contact versus delayed contact groups in terms of weight gain or breast feeding; however, there was a higher incidence of infection in the delayed contact group. Recently, Sosa, Kennell, Klaus and Urrutia (1976) observed 100 mothers in a breast-feeding study in Brazil. Two months later, 77% of the early-contact mothers were successfully breast feeding in contrast to 27% of delayed-contact mothers. These results were confounded by the presence of a nurse who supported the mothers during the experimental period and encouraged them to breast feed, thereby making these findings somewhat questionable.

Klaus and Kennell (1976) reported a further study where nine early-contact mothers exhibited significantly more

attachment behaviors than the ten mothers who were separated from their infants according to normal hospital regimen. At 12 hours post-delivery, both groups of infants were placed in the newborn nursery for the next 12 hours. After this 12-hour time period, both groups went back to their mothers for the initial breast feeding. The routine for both groups did not vary after the initial difference of brief early contact.

Research conducted from different theoretical perspectives supported the idea of the beneficial aspects of early extended contact. An investigation of the contact phenomena (Hopkins, 1976) utilizing a transactional model found that early contact infants exhibited positive gains on the Brazelton Neonatal Assessment Scale and that early-contact mothers perceived their infants more positively.

DeChateau (1976) observed the effects of early skin-to-skin contact in the first 35 minutes of life for one group of mothers and infants and compared maternal behaviors at three months and at 1 year with a control group for which the only difference was the absence of contact in the first 35 minutes after birth. The experimental manipulation lasted for 15-20 minutes beginning 20 minutes after delivery. Early-contact mothers held their infants more at 36 hours, kissed their infants more and held their infants more in the en face position at 3 months, and were more affectionate with their children at 1 year of age. Hales et al. (1977),



in a similar study, compared three groups which differed in terms of time of initial contact; 20 mothers who had skin-to-skin contact for 45 minutes after they left delivery, another 20 mothers were separated after birth but brought together at 12 hours post-delivery skin-to-skin. The third group received their infants at 12 hours post-delivery and did not experience skin-to-skin contact. Significantly more attachment behaviors occurred with the first, immediate contact group.

O'Connor et al. (1978) are presently conducting a study on 301 low-income primigravid mothers who are being randomly assigned to routine hospital care or rooming-in. After one year, the routine hospital care group's offspring exhibited more maladaptions such as failure to thrive, abuse, neglect and abandonment than did the extra-contact group. Data from this study are still being analyzed and further results will be forthcoming.

Kontos (1978) conducted a study in which four groups of twelve mothers experienced differing amounts of separation from their infants. Data from two observation periods at one month and at three months post-partum revealed that mothers who received extra contact displayed more attachment behaviors in interaction with their infants than mothers who were separated from their infants. Further, mothers who experienced rooming-in displayed more attachment behaviors than mothers who did not experience rooming-in.

In the most recent study of early contact, Campbell and Taylor (1979) have analyzed data on 50 dyads with an eventual sample of 100. They are also testing the hypothesized relationship between early-contact and maternal-infant attachment. A preliminary analysis of their data indicated that there were no differences thereby failing to support findings from previous research. A more complete report of their results may provide interesting and somewhat contradictory conclusions.

### Conclusion

In summary, this review has included an overview of the pertinent research relevant to the mother-neonate dyad, the neural behavioral organization of the infant, the concepts of attachment and maternal sensitivity, and the possible impact of early or immediate contact for the mother-infant dyad in terms of a number of variables indicative of physiological and emotional development. It does appear that there is evidence which suggests that early extended maternal-neonatal contact post-partially positively influences the quality of maternal-infant attachment.

Much of the accumulated research has been focused on short-term observations of small numbers of dyads with insufficient comparisons of multiple variables that impinge on attachment development. To date, research has not focused to any great extent on the contributions of the infant in the formulation of the maternal-infant bond.

Data from a fair number of studies seem to suggest that social, affective and cognitive development of the neonate may be affected by the quality of maternal-infant attachment. However, the unique individuality of the mother and the infant cannot be overlooked. There probably are dyads who do not benefit significantly from an early contact experience as a result of variables which have not yet been clearly delineated.

Early extended contact in the period immediately after birth apart from anything else cannot entirely explain later differences in maternal-infant behavior. Many variables probably interact in the process of the development of attachment. Parity of the mother, socio-economic status, family development and perspective, past experience, age of parents, and health of the parents are some of the socio-demographic variables that may effect the mother-infant synchrony. Social-psychological variables such as the relationships the mother has developed with her own parents and her partner and the course and her experience of pregnancy would logically seem to be of import. However, relatively little attention has been given to these variables in the research to date.

Peter deChateau, in expressing the notion of the maternal critical or sensitive period, states "it is reasonable to assume that during the early post-delivery sensitive phase of development, the infant is also best served by a pattern

of maternal behavior that for the most part is genetically determined and that qualitatively and quantitatively differs markedly from the input he receives from others at this time" (1979, p. 56). The uniqueness of the maternal-infant relationship has been recognized but needs to be examined more closely in terms of a multivariate perspective.

Cumulatively these ideas lead to the assumption that early extended maternal-infant contact enhances the development of a strong and affectionate relationship between parent and child. The logical conclusion then is that there may be a sensitive period optimal for the development of attachment, and that this sensitive period is probably within the first several hours after birth.

## CHAPTER III

### METHODS

#### Subjects

The subjects for this study consisted of 15 married primigravid women who delivered healthy full-term infants of birth weights greater than six pounds. The mothers had no complications during pregnancy, or at delivery and were awake at the moment of birth.

The researcher visited preparation for parenting classes at a local private hospital and Lamaze childbirth preparation classes and solicited subjects at these times. The hospital facility where the subjects delivered, served a mixed urban, rural and mixed socio-economic clientele. The investigator explained the procedures to be followed in the study including the three experimental time-of-contact procedures. Informed consent was obtained (see Appendix A) and information was obtained on the demographic data sheet (see Appendix B). Sixteen subjects were obtained through Lamaze classes; nineteen subjects were obtained through the classes at the private hospital.

After the initial stages of data collection, the investigator began to procure the sample at another local hospital facility which served a mixed urban-rural, mixed socio-economic population. Permission from these women to

participate in the study was sought from them shortly after delivery. Six subjects were obtained in this manner. A third method of obtaining subjects was through a printed explanation of the study placed in two private physicians' offices. If interested, the volunteers would call the investigator; two participants were obtained in this manner. Six women were dropped from the sample owing to birth complications, or failure of video equipment to function appropriately. Four subjects independently decided not to participate in the study either prior to labor or during labor. Eighteen subjects were not in the study due to a variety of communication failures. A total of 43 subjects signed consent forms to participate in the study. The final sample however consisted of 15 mothers and their normal full-term infants (10 males and 5 females). Eight of the subjects breast fed their infants, seven chose to bottle feed their infants.

The subjects were randomly assigned to groups but the composition of the groups were fairly equal (see Table 1). Groups II and III were nearly identical; Group I was slightly different in that it consisted of 2 extra fathers present at delivery, 2 more mothers who chose to breast feed rather than bottle feed and the educational preparation of mothers in Group I was slightly more advanced. There did not appear to be any trends that could account for differences in the number of attachment behaviors exhibited except that in Group

Table 1. Variables Considered in Attachment by Subject.

Subjects	Age of Mother	Parenting Preparation	Father Present at Delivery	Breast	Bottle	Education of Mother	Sex of Infant
<u>Group I</u>							
S <sub>1</sub>	26	Lamaze	Yes	Yes		Some Coll.	Male
2	29	Lamaze	Yes	Yes		Coll. Grad.	Female
3	18	None	No		Yes	H. S. Grad.	Male
4	26	Lamaze	Yes	Yes		Some Coll.	Male
5	24	Hospital	Yes	Yes		H. S. Grad.	Male
<u>Group II</u>							
S <sub>1</sub>	29	Lamaze	Yes	Yes		M. S. Degree	Male
2	28	Lamaze	Yes	Yes		H. S. Grad.	Female
3	22	None	No		Yes	H. S. Grad.	Male
4	18	None	No		Yes	Did not finish H.S.	Female
5	23	None	No		Yes	H.S. Grad.	Male
<u>Group III</u>							
S <sub>1</sub>	23	Lamaze	Yes	Yes		Coll. Grad.	Male
2	19	Hospital	Yes	Yes		H. S. Grad.	Male
3	18	None	No		Yes	H. S. Grad.	Female
4	17	None	No		Yes	Did not finish H.S.	Male
5	15	None	No		Yes	Did not finish H.S.	Female

III the subjects were younger than the other two groups. Group I had a mean age of 24.3 and Group II of 24 while Group III had a mean of 18.2. Age of the mother at delivery may have been an intervening variable along with delayed significant contact and absence of skin-to-skin contact, which cumulatively accounted for the decrease in attachment behaviors observed in Group II mothers at the second session.

### Procedures

As stated previously, the mothers were randomly assigned to one of three groups based on differing times of initial contact with infants. A table of random numbers was used to assign subjects to groups. Mothers in Group I had contact with their infants video-taped throughout the first hour after delivery. Mothers in Group II had the usual hospital regimen of brief contact with the baby (less than 3-4 minutes) and later, at 1½ hours after delivery, contact between infant and mother was video-taped for one hour. Mothers in Group III had the usual hospital practice of brief contact with the infant at birth and contact at 6 to 10 hours post-delivery videotaped.

The three groups in this study were defined as follows:

1. Group I - Immediate contact - Mother - neonatal contact occurred as soon as the umbilical cord was severed. Infant had skin-to-skin contact with the mother from birth and for at least one hour post-delivery (n = 5; females = 1; males = 4).



2. Group II - Delayed Contact - Mother-neonatal skin-to-skin contact occurred from approximately 1½ hours post-delivery to 2½ hours post-delivery (n = 5; females = 2; males = 3).

3. Group III - Control (C) - Usual hospital practice which consisted of a brief glimpse of the infant at birth with significant contact between mother and infant occurring approximately 6 to 10 hours post-delivery without skin-to-skin proximity, usually at a scheduled feeding (n = 5; females = 2; males = 3).

In Group I and II, the infants were nude and infant and mother were resting under a heated panel. In Group III, infants were clothed in a shirt and diaper. The mother sometimes undressed the infant to explore the infant's body.

All mother-infant dyads in Groups I, II and III were videotaped at 36 to 48 hours post-delivery during a scheduled feeding. Mothers were attired in sleeveless or short-sleeved gowns, infants were attired in diaper and short-sleeved shirt, sometimes wrapped in a blanket. Constraints of data collection included problems such as equipment failure, interference of staff in time of contact protocol (even though staff knew of procedural aspects), failure of the volunteer or hospital staff to call investigator when subject's labor ensued, reluctance of nursery staff to accept immediate extended contact (even though infants and mothers

were being warmed by a thermally controlled heat panel). Initial significant contact was filmed in delivery rooms with certain attendant distractors. Noise, rushing movement, limitations of space in an atmosphere of urgency and hushed expectation prevailed. Post-delivery medical and nursing procedures necessarily interfered with mother-infant interaction at times as well as physician, husband and staff talking to the mother. The delivery tables were small and it was uncomfortable for mothers to be holding their infants in a cramped position during episiotomy repair. Understandably this repair procedure interrupted the attention of the mother. Although the researcher tried to be unobtrusive, the presence of the camera and the researcher are elements that must be considered when describing the environmental context.

### Measures

The tapes were analyzed for two major classes of behaviors: attachment behaviors exhibited by mothers and state of arousal of the infant. The behavior categories of attachment were drawn from the work of Klaus et al. (1972) and included the following: en facé looking, fondling, smiling, proximity, prolonged gazing and talking to the infant. Interruptions in interaction were also analyzed.

### Operational Definitions of Behavior

En face Position: A position in which the mother's face is rotated so that her eyes and those of the infant meet fully in the same vertical plane of rotation (Robson, 1967).

Fondling: Touching, kissing, caressing, stroking, patting gently, cuddling, bouncing or rapidly moving the infant or any part of the infant (not associated with feeding).

Smiling: A change of facial expression involving an upward curving of the mouth expressive of affection or pleasure.

Proximity: Touching of the infant's trunk by the mother's body.

Prolonged Gazing: Protracted looking at the infant by the mother for a period of at least 5 seconds.

Talking to the Infant: Mother speaks to or makes sounds suggesting speech that are directed to the infant.

Interruption: The occurrence of any event that would preclude the mother from attending to the baby was scored as an interruption. Examples of interruptions are nursing and medical care which may have caused the mother's attention to be diverted from the neonate, telephone calls that may interfere with mother-infant interaction, or any other activity or event that intrudes in the maternal-neonatal relationship. State of arousal of the infant was drawn from

Wolff (1959) and included the following six states: regular sleep, irregular sleep, drowsiness, quiet alert, alert activity and crying.

Operational Definitions of State  
of Consciousness

1. Regular sleep. The state during which the infant's "breathing rhythm is smooth and even; the infant moves relatively little although he or she shows frequent spontaneous startles of both the extension (Moro) and the flexor (startle) kind, but otherwise they moved relatively little" (Desmond, Rudolph and Phitaksphraiwan, 1966, p. 111).
2. Irregular sleep. State during which infants experience "few spontaneous startles but many other movements take place ranging from simple limb displacement to voluptuous writhing of the whole body. Spontaneous smiling can occur during this state."
3. Drowsiness. State during which the "infant lies quietly intermittently opening and closing his or her eyes. Spontaneous smiling can occur during this period."
4. Alert inactivity or quiet alert. State during which the infant lies quietly with eyes wide open; "eyeballs are bright and appear to focus. In this state, the infant attends to both visual and auditory stimuli. Spontaneous smiling can occur in this state."

5. Alert activity. State during which the infants are kicking and mouthing; hand-mouth contact, sucking, and rooting may be observed. A "pre-cry grimace, defined as a stretch and downward pull of the mouth, dimpling of the chin and contraction of the orbicular muscles of the eyes," can be observed in this state. Spontaneous smiling can occur during this state.

6. Crying. "Before meals infants experience a rhythmical cry with a braying quality accompanied by tandem kicking. After meals crying is shrill, arrhythmic and not synchronized with kicking. The legs are stiffly extended or sharply flexed at the hips."

Other variables which were recorded for descriptive purposes included: sex of infant; education of the infant's mother; and presence of spouse or other family member or friend during labor and delivery and during the initial contact period; the initial method of feeding and any change in method of feeding.

The investigator requested that the staff delay instillation of silver nitrate drops in the infant's eyes and in procuring infant footprints. Physicians immediately sucked out the nares, mouth and throat of neonates to free the airway of mucous and amniotic fluid and then they cut the umbilical cord. The one minute Apgar was determined simultaneously and if transition to extra-uterine existence was progressing satisfactorily, the neonate was bonded to the

mother. Identification bracelets were attached to the wrist of the mother and to the wrist and ankle of the neonate. Several of the mothers in the study introduced their infant to the breast at this time.

When significant contact was delayed taping was sometimes done in private rooms with little extraneous distractions but at other times recording was done in a four-bed ward with the subjects' naturally inquisitive roommates as onlookers. When viewing the tapes, one is struck in many cases by the often intense interest of the mother in her infant; in other cases, one is drawn to a conclusion of general disinterest and easy distractibility on the part of the mother. The researcher usually set up the video-equipment, focused the camera and left the room to further avert obtruding. From time to time it was necessary to re-focus the camera but the researcher studiously avoided conversation as much as possible having informed the subject earlier that following the second taping the researcher would demonstrate child care techniques to the mother as well as answer any questions she might have concerning the infant.

The camera was equipped with sound and the investigator noted that the mother would often talk to the infant if left alone. Perhaps videotaping may be less obtrusive and more conducive to a natural interaction in the first days of their inchoate relationship than was previously anticipated.

The videotaped interactions of mother and infant were scored by an observer unfamiliar with the hypotheses of the

study. The rater scored occurrences of each of the previously-cited attachment behaviors and interrater reliabilities were computed for each variable. Three female observers were trained to use a time sampling technique with the categories of behavior under study and were trained to assess reliability. Interactional data were viewed by three observers during several of the same sessions and the researcher determined the degree of agreement between observers. The frequency of occurrence was obtained for each attachment behavior. Fifteen seconds out of every three minutes was sampled. Reliability checks were conducted on the observer at every third viewing of the tapes in order to maintain a high degree of reliability. The average percent of agreement was 97.7%, with a range of 95 to 99.

The following formula was used to determine interrater reliability:

$$\frac{\text{Number of Agreements}}{\text{Number of agreements} + \text{Number of disagreements}}$$

An observer recording sheet (see Appendix C) was used to simplify data collection. The sheet was divided into rows, one for each behavior and a column for each 15 second interval. State of infant consciousness was also noted; raters recorded the occurrence of each of the six separate states of infant arousal (see Table 2). Frequency of interruption was also recorded. All three observers were

Table 2. Comparison of Maternal Attachment Behavior for Women Given Immediate Contact with their Infants and Women who have 1½ and 6 to 10 Hour Delay.

Independent Variables	Group I Immediate Contact		Group II 1½ Hour Delay		Group III 6 to 10 Hour Delay	
	A.B. <sup>a</sup>	C.L.N. <sup>b</sup>	A.B.	C.L.N.	A.B.	C.L.N.
Dependent Variables	<u>en facé</u>	State 1	<u>en facé</u>	State 1	<u>en facé</u>	State 1
	fondling	State 2	fondling	State 2	fondling	State 2
	smiling	State 3	smiling	State 3	smiling	State 3
	proximity	State 4	proximity	State 4	proximity	State 4
	prolonged gazing	State 5	prolonged gazing	State 5	prolonged gazing	State 5
	talking	State 6	talking	State 6	talking	State 6

<sup>a</sup>Attachment behaviors.

<sup>b</sup>Consciousness level of the neonate.



registered nurses who were currently enrolled in graduate school.

## CHAPTER IV

### RESULTS

#### Introduction

A graphic presentation of the data was used to present the results. Observational techniques which were utilized consisted of a time sampling method. A record of the occurrence of an attachment behavior was determined at 15-second intervals out of every 2 minutes. Comparisons between subjects within groups and comparisons of groups were graphed in a bar design, as was the state of arousal of the infant and the occurrence of interruptions. Reliability between observers was reported for all behaviors combined and for state of arousal combined, and reliability checks were conducted at every other viewing of the tapes to determine consistency of agreement between observers.

#### Sample Characteristics

As was previously mentioned, the dyads consisted of 15 married primiparous women and their infants. Six of the subjects were Lamaze prepared. Two subjects had been prepared at classes held at the hospital and 7 had no formal delivery preparation. Five of the subjects had participated formally in education beyond high school; 7 of the subjects were high school graduates; and 3 subjects had not finished

their high school education. The age of subjects ranged from 15 to 29, with a mean of 22. Out of the 15 subjects, 8 fathers were present throughout labor and delivery. In Group I, 4 fathers were present, Group II had 2 fathers present, and Group III had 2 fathers present.

### Group Comparisons

The first hypothesis predicted that the early extended contact group would exhibit more maternal attachment behaviors 24 to 36 hours post-delivery than those groups for whom significant contact was delayed  $1\frac{1}{2}$  hours or 6 to 10 hours post-delivery. The data did not support this hypothesis (Figure 1).

Group II, which had a delay of  $1\frac{1}{2}$  hours, exhibited the most maternal attachment behaviors at the second session and also had the largest total number of attachment behaviors overall. Group I, Session I had the least number of attachment behaviors and Groups I and II combined had the least total number of behaviors overall. Group III had the largest number of behaviors in Session I and the smallest number in Session II. The greatest increase in the number of attachment behaviors between Session I and Session II occurred in Group II. This data outcome was unanticipated as the researcher predicted a greater difference occurring between Sessions I and II for Group I so that this group would exhibit the greatest increase in attachment behaviors. This is particularly interesting in

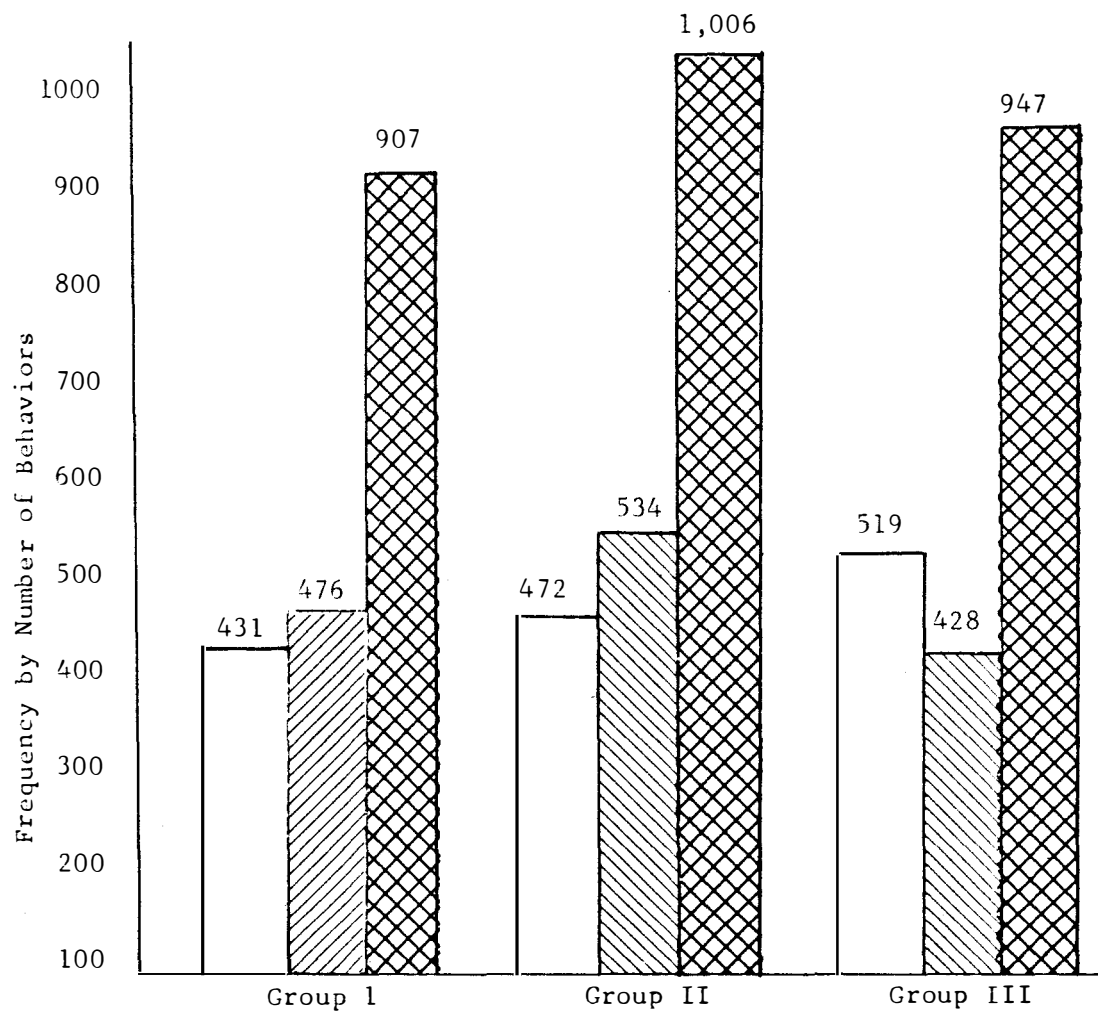


Figure 1. Attachment behaviors exhibited by mothers.

Key:  Session I  Session II  Total Session

light of the finding that the infants in Group I, Session I were in state 4 of infant arousal the greatest amount of time.

There was a decrease in attachment behaviors noted between Session I and Session II in Group III and an increase in attachment behaviors for Group I and II at the second session which may imply that early initial contact is important for facilitating the attachment process.

The hypothesis that maternal attachment behaviors during maternal-child contact are related to the amount of time infants are in state 4, i.e., quiet, alert state of consciousness during initial contact was substantiated, within groups for two of the groups, but not across groups (Figure 2). During the first hour of life, infants in Group I, Session I were in state 4 for a much greater time period than were infants who had contact from 1½ to 2½ hours post-delivery (Group II) as previously reported by Wolff (1959) and others, and for a slightly longer period of time than infants in Group III. It was anticipated that mothers in Group I, Session I would therefore exhibit more attachment behaviors than the mothers in the other two groups which was not the case. However, further evaluation of the data support the conclusion that there may have been intervening variables which interfered with this expected outcome.

The second hypothesis was substantiated within Groups I and II (Figure 3). For Groups I and II, there is a

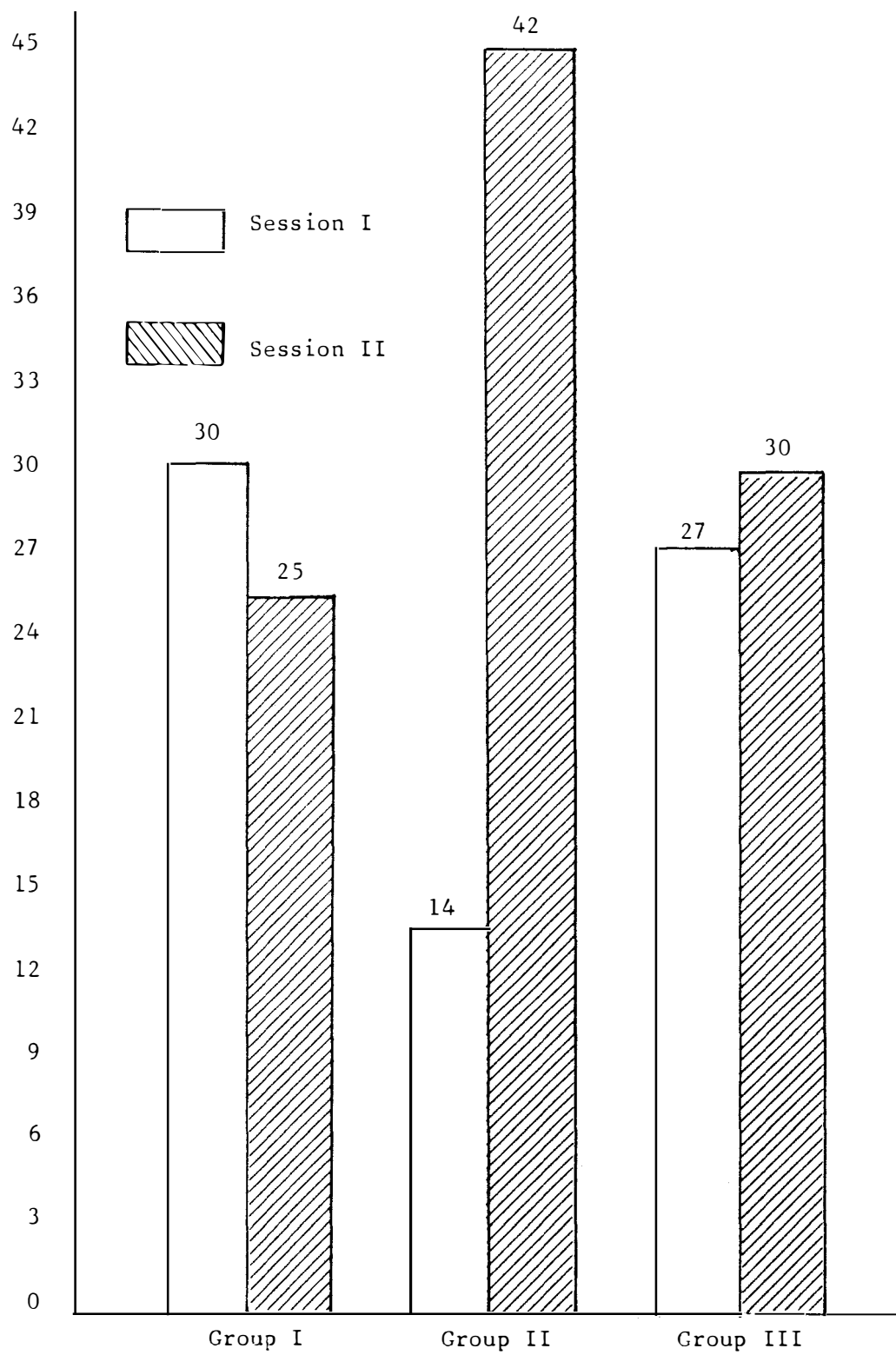


Figure 2. State of consciousness for infants.

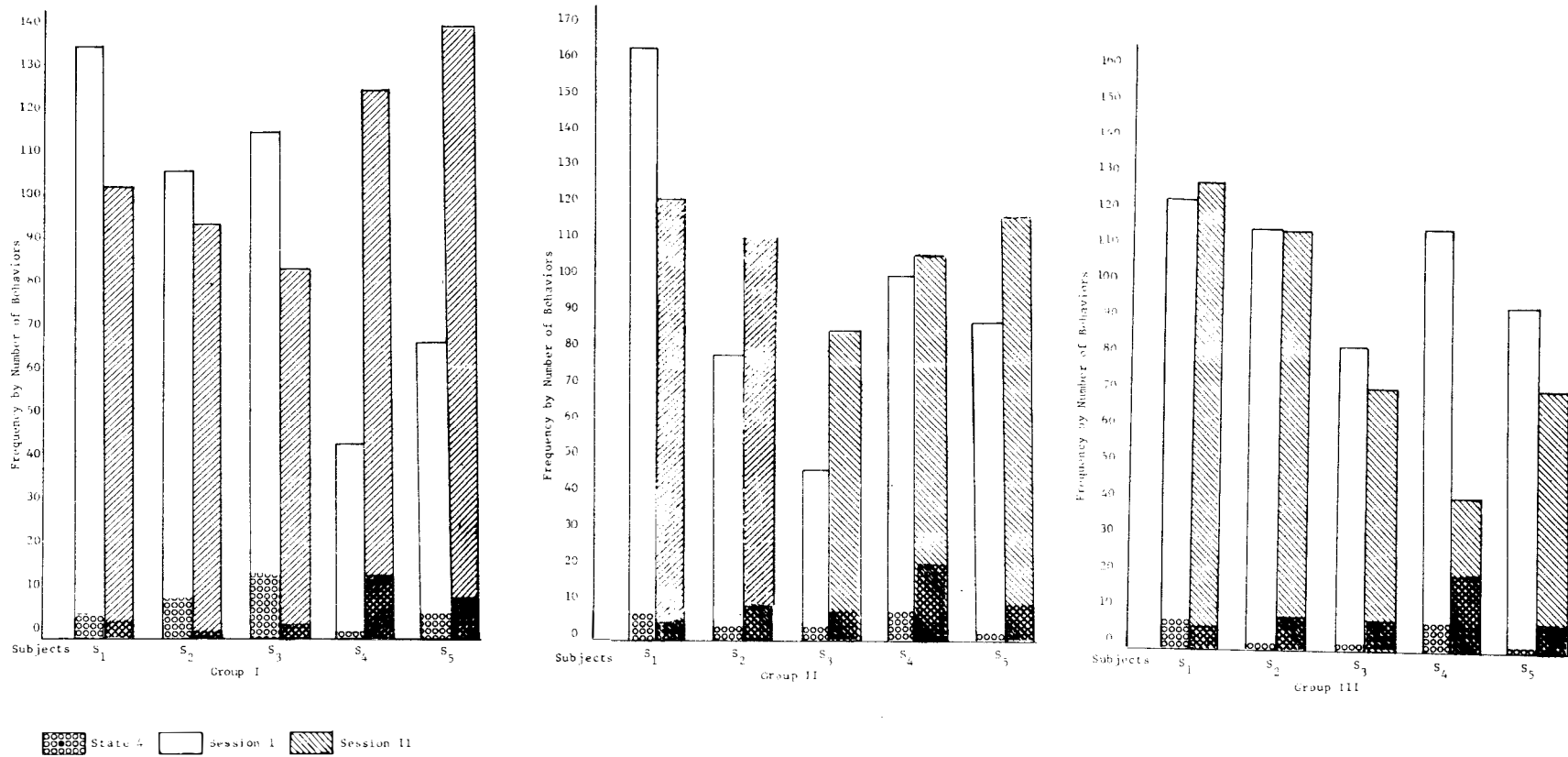


Figure 3. Frequency of infant state and attachment behaviors by subjects in groups I, II, and III.

relationship between the amount of time the infant is in state 4 and the attachment behaviors exhibited by the mother when the data are examined for each subject in the group.

As state 4 increases, attachment behaviors increase; as state 4 decreases per subject, attachment behaviors decrease. However, these results did not hold true for Group III; there did not appear to be a relationship between infant state and attachment behaviors (Figure 3).

Vast intra-subject variation within groups was not noted except with subject 3 on two categories of behaviors, i.e., en facé and talking (Figure 4).

Within Group I, subject 3 mother had a much higher frequency of en facé looking and talking behaviors. Of the 5 infant subjects, baby 3 was in state 4 the largest amount of time. This is the subject 1 in Group I who did not have her husband present throughout labor and delivery.

An evaluation of states is documented in Table 3. Except for Group I, Session I, where state 4 was the most frequently occurring state, state 1, the regular sleep, occurred most frequently for infants within groups and across groups.

### Interruptions

Routine hospital practice at time of delivery and after delivery is a complex compilation of necessary administration of care to mother and infant. In this study,



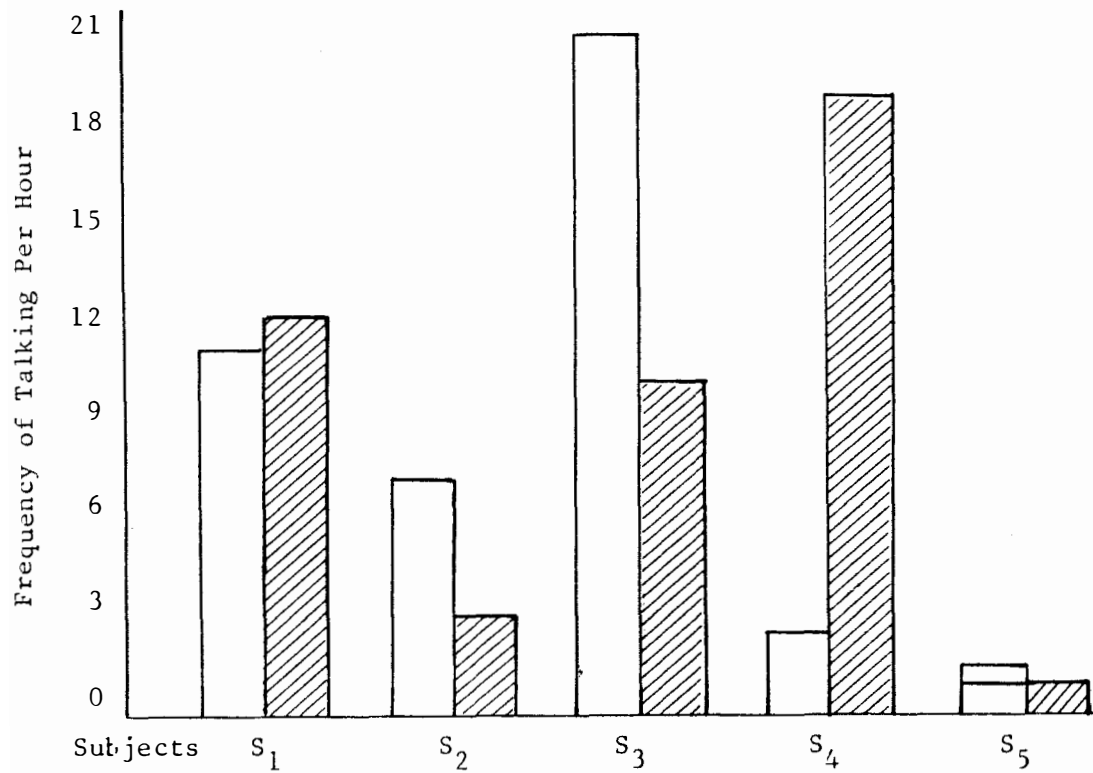
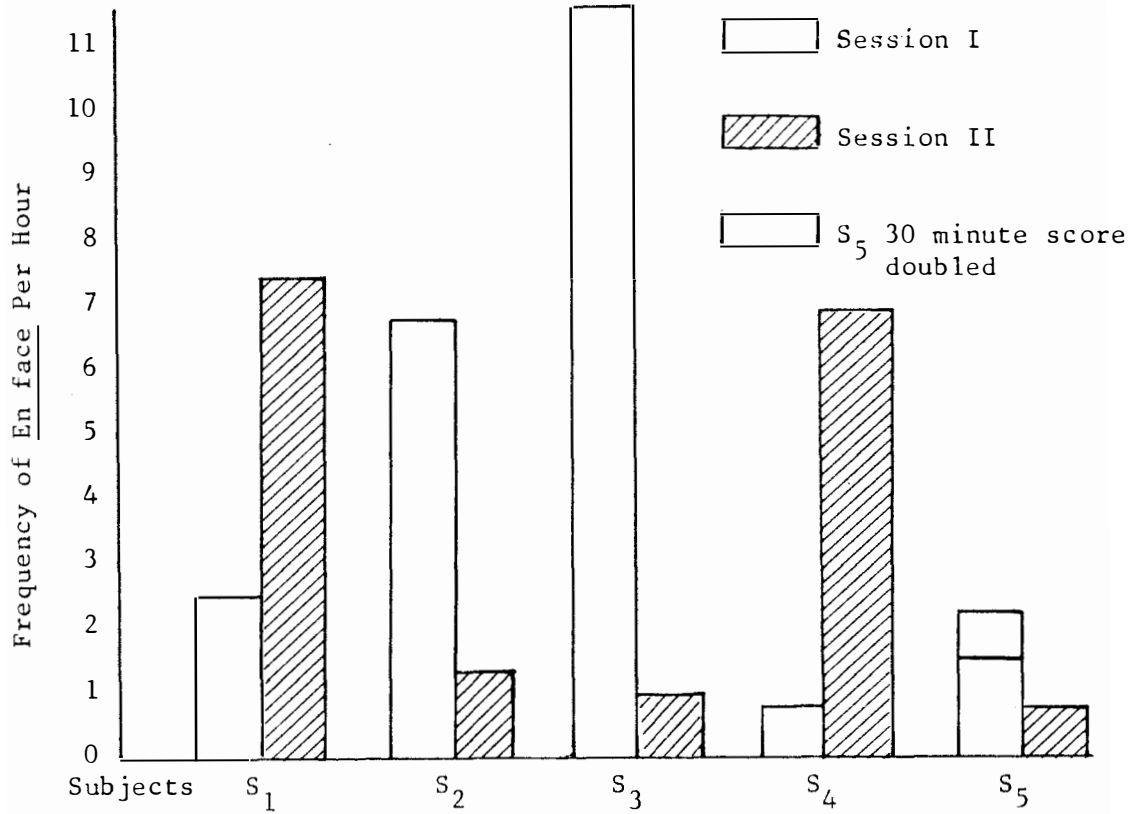


Figure 4. Two categories of behaviors for subject III in group I.

Table 3. Frequency of States of Consciousness of the Neonate Across Groups

Group	Session	Highest Frequency of Occurrence
I	I	State 4
I	II	State 1
II	I	State 1
II	II	State 1
III	I	State 1
III	II	State 1

as previously stated, immediate care of the full-term, healthy neonate consisted of sucking out the infant's mouth and nares, thereby aiding the infant in transition to extra-uterine existence, severing of the umbilical cord from the placenta, and drying the infant to prevent heat loss. The infant was handed to the mother on the narrow delivery table. Routine hospital protocol called for intravenous infusion during labor and delivery, making it difficult to hold the baby comfortably. Although some controls were built into the study in terms of delaying administration of silver nitrate to the infant's eyes and footprinting, in order to hasten contact between mother and infant, the immediate care of the mother naturally precluded any further control. The 5 primiparous mothers in Group I spent the first 30-45 minutes of their inchoate relationship with their infants expelling their placentas, having their vaginal episiotomies repaired, having their uterine fundi massaged,

having intravenous and sometimes intra-muscular injections administered, besieged by questions from staff and their husbands who were present at delivery. In several instances breast feeding was initiated on the narrow delivery table, but several mothers requested delaying attempts to feed the infant until the dyads were removed to the recovery room. The investigator on several occasions turned off the tape when treatment of the mother involved issues of privacy and began taping again 5-10 minutes later. On the theory that these routine interruptions may not optimize reciprocal responding between mother and infant, the investigator felt that it might be important to score the frequency of interruptions across groups (Figure 5) and within subjects in Groups I, II, and III (Figure 6), as well as the frequency of attachment behaviors.

Group I, Session I had nearly three times the number of interruptions as occurred in any other session for any of the three groups; 114 interruptions occurred in the first hour of delivery, as compared with the next largest number, which was 45. Combined with Session II, Group I had the overall largest number of interruptions, 167, as compared with 84 in Group II and 88 in Group III. Group II had the least number of interruptions overall and exhibited the largest number of attachment behaviors.

Looking at interruptions within Group I for individual subjects, subject 4 experienced the largest number of

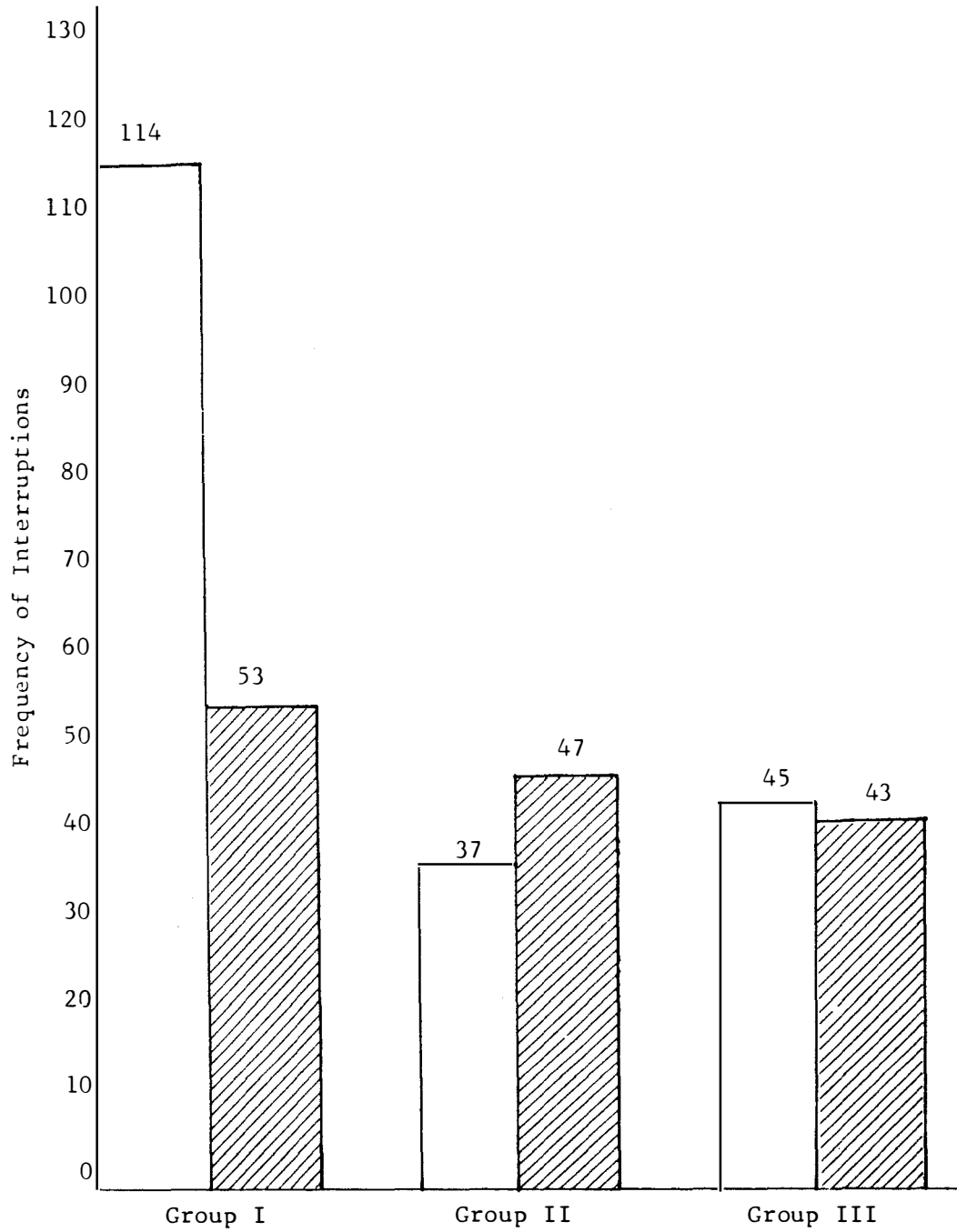
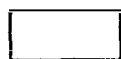


Figure 5. Comparison of interruptions across groups.

Key:



Session I



Session II

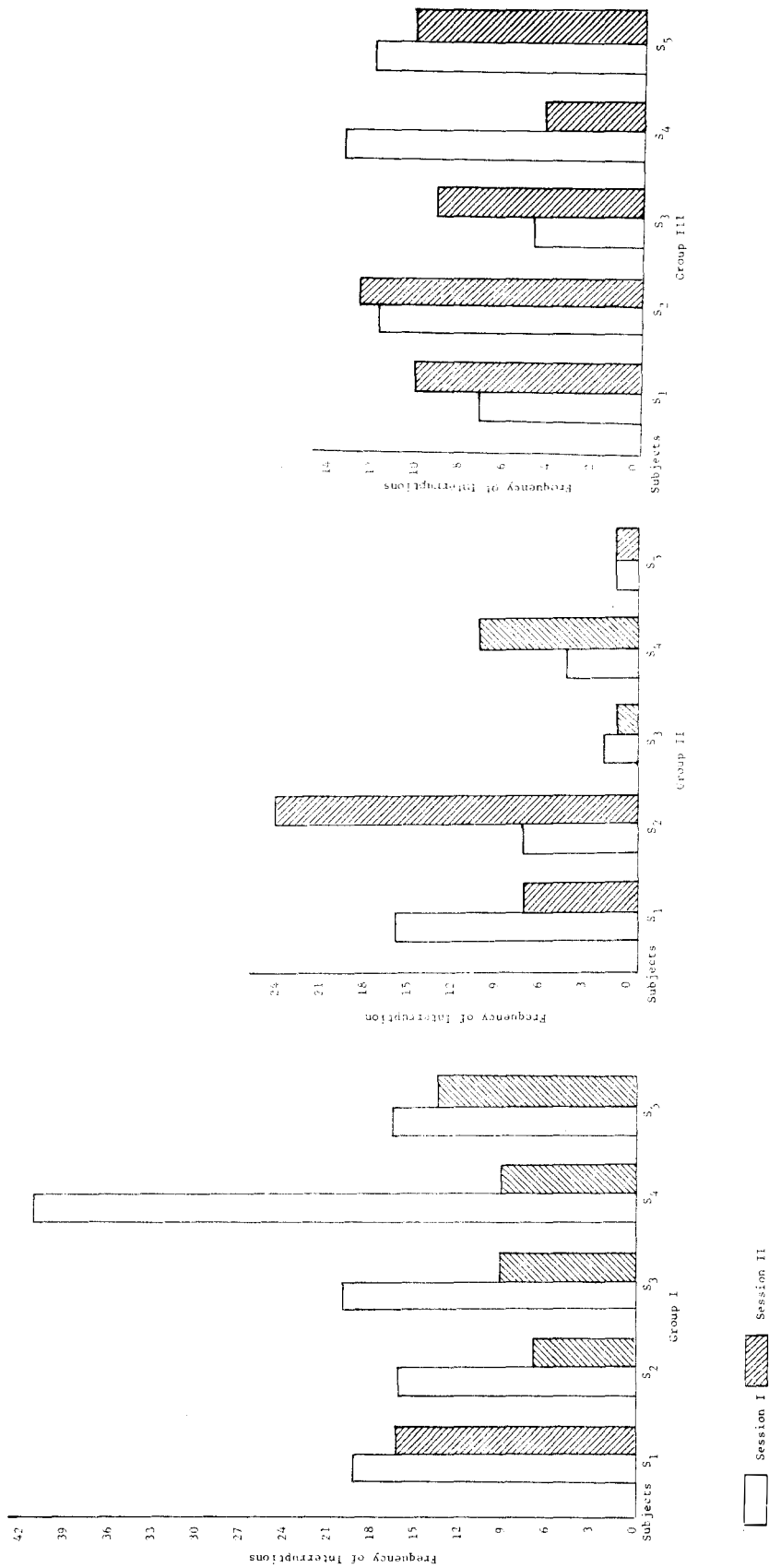


Figure 6. Interruptions within subjects in Groups I, II, and III.

interruptions in Session I, and subject 4 exhibited the fewest number of attachment behaviors. There does seem to be some evidence of a relationship between frequency of interruptions and the frequency of attachment behaviors exhibited by the mother.

### Summary

The major purpose of this study was to examine the effect of extended initial contact in the early post-partum hours on maternal attachment behaviors to more clearly delineate the "sensitive" period for attachment and its relationship to the state of infant arousal.

Fourteen women who were white Americans, and one woman who was Chinese-American, and their healthy newborn infants formed the dyads to be studied. The method used to determine these effects was observation of the videotaped interaction of the three differing times of contact groups by a naïve observer. Two hypotheses were tested. The hypotheses are stated below with the interpretation of the graphed data as the supporting criteria.

### Hypothesis I

Maternal attachment behaviors during maternal-child contact will be increased when the initial contact occurs immediately after birth than if contact is delayed 1½ hours or 6-10 hours post-partally. The data did not support this hypothesis. Group II, which had a delay of 1½ hours,

exhibited the most maternal attachment behaviors at the second session and also had the largest total number of attachment behaviors overall.

### Hypothesis II

Maternal attachment behaviors during maternal-child contact are related to the amount of time infants are in state 4 of infant arousal states during initial contact.

The data did not support this hypothesis within Groups I and II. For these groups, there was a relationship between the amount of time the infant was in state 4 and the attachment behaviors exhibited by the mother when the data are examined for each subject in the group. However, comparison of the data across groups did not support the assumptions that as the absolute level of state 4 increased, the absolute level of attachment behaviors exhibited by mothers would increase.

## CHAPTER V

### CONCLUSIONS, INTERPRETATION, AND IMPLICATIONS

#### Conclusions

Studies utilizing a behavioral methodology typically involve a relatively small sample size because of the complexity of data analysis, but the size of the sample may limit the generalizability of the results.

The subjects consisted of a cross-section socio-economically and educationally, in terms of age range and in relation to child-birth preparation. Applied behavioral observation in a naturalistic setting is fraught with difficulty and a large sample size is hard to obtain. Data collection and analysis are extremely time consuming and practically, large samples require a tremendous time investment. Insofar as the characteristics of this sample approximate other groups and the findings partially agree with those of other studies of mother-infant contact, there may be greater generality.

In the analysis of mother-infant contact and the development of attachment, Group II or the 1½-hour delay group exhibited the most attachment behaviors at the second taping. Group I had an increase of 45 behaviors at Session II. Group II had an increase of 62 behaviors at Session II.



Group III had a decided decrease; at Session II, attachment behaviors declined 91 behaviors over Session I. As predicted Group I, Session I were in state 4 for a much greater amount of time than the other group. On the basis of this data, the following conclusions were drawn:

1. Early extended contact facilitates the development of attachment between mother and infant as indicated by the frequency of attachment behaviors exhibited by the mother.

2. Immediate extended contact may not be critical to mother and infant bonding.

3. An intervening variable in the development of bonding when extended contact occurs immediately after delivery is frequency of interruption of the mother.

4. Peter Wolff's (1959) findings were reconfirmed. Infants are in state 4, the quiet, alert state, for at least 1 hour after delivery.

5. Some infants may be in state 4 for nearly 2 hours post-delivery.

6. Peter deChateau's (1976) findings were reconfirmed. Early skin-to-skin contact may enhance development of bonding.

7. The limits of the "sensitive period" for the development of attachment appears to be at least 2½ hours post-delivery or beyond.

8. Age of mother at delivery may be a variable which may effect exhibiting attachment behaviors.

### Interpretation

Evidence from the data collected in this study supported the theory that early extended contact does facilitate bonding. Group II was an early contact group. Mothers and infants were united for approximately 1½ hours after the birth of the child. These mothers scored highest on the number of bonding behaviors they exhibited at the second session and had the largest total number of bonding behaviors overall. There was a decrease in bonding behaviors noted between Session I and Session II in Group III and an increase in bonding behaviors for Group I and II at the second session which implies that early extended contact is important for facilitating the bonding process.

### Relevant Variables in Bonding

As stated by Marshall Klaus, John Kennell (1976) and others, human maternal behavior is influenced by a myriad of fixed variables, including the genetic endowment of the perspective mother, cultural influences, relationships with her husband and other family members, the planning and course of pregnancy, the nurturing the mother received from her own mother and the temperament of the neonate. Some alterable variables include hospital practices that separate mother and infant, hospital protocol in general, and attitudes and behaviors of hospital staff toward developing families. Campbell and Taylor (1979) point out that there

are a number of confounding variables that have not been considered in relation to bonding. These include poor or nil prenatal care, poverty, family disorganization and parental psychopathology. Another variable that bears consideration is the extent of influence of extra attention that results from videotaping interaction and having been asked to participate in a research study.

Different infants will elicit differing patterns of mothering. Brazelton (1969) describes in detail striking differences in the development of mother-child relationships in 3 mother-infant dyads. These differences, all within a normal range, were related to the ways the infants' behavior and temperament effected the mother's reaction to the infant. The impact of the physiological changes that occur within the mother immediately after delivery should also be considered.

### Maternal Adaptations

The period from the termination of pregnancy via labor and delivery until the normal state of the reproductive system is returned is called the puerperium. Involution is the term used to describe the return of the pelvic organs to the nonpregnant state after the termination of pregnancy. Immediately after giving birth, the uterus begins to involute by means of diminution of the myometrial cells by the process of autolysis which breaks down uterine muscle protein into simple compounds that are absorbed and

eliminated in the urine. Following delivery of the infant and expulsion of the placenta, the uterus weighs about 1,000 gm. (2.2 lb.), one week after delivery the uterus weighs 500 gm. (1.1 lb.), and two weeks post-delivery, the uterus weighs 350 gm. (11 oz.). The body produces oxytocin, a hormone which acts on smooth muscles and aids in contracting the uterus. An injectable synthetic oxytocin is usually given at delivery to further aid contractability. The cervix, which is the head of the uterus, is bruised, succulent and soft, and it sometimes has small lacerations in it following delivery. The vaginal floor is greatly distended through delivery and the mucosa is thin due to estrogen deprivation. The perineum is edematous and if an episiotomy (a surgical incision in the perinium), or a repaired laceration is present the perineum will be tender and will cause discomfort in the first hours and days post-delivery. Bradycardia (lowered pulse rate) is common immediately following delivery. Within several hours, the cardiac load will be substantially increased due to changes in uterine blood vessels and a return of the uterine blood to the general circulation. The leukocyte count (white count) is increased for the first 4-5 days as are the hemoglobin, hematocrit and erythrocyte count due to a reduction of the blood volume. A new mother experiences diuresis (increased secretion of urine) for 2-5 days post-partum due to increased output by the kidneys. Sugar in

the urine is common due to lactose forming in the mammary glands. Many women develop hemorrhoids during pregnancy and these often increase in size during the expulsion phase of delivery. Hemorrhoids may cause the new mother considerable pain and discomfort (Pritchard and MacDonald, 1976). Labor and delivery has been compared to running a marathon race; the stress of labor leaves body cells depleted and a period of decreased activity is essential to reduce muscle fatigue and restore the cells.

With the expulsion of the placenta, there is a profound decrease in hormonal levels of estrogen and progesterone. Prolactin is the hormone secreted by the anterior pituitary gland and it is responsible for the initiation of lactation (secretion of milk from the breasts) (Pritchard and MacDonald, 1976). All of these physiological changes occur or begin to occur in the mother's body within minutes of birth and are offered here in a simplified manner in order to further investigate factors that may impinge on the developing maternal-infant relationship.

### Ethological Climate

An examination of the ethological climate and setting at the differing times of taping initial maternal-infant contact is also helpful in assessing development of maternal-infant bonding. An intervening variable in the development of bonding when extended contact begins in delivery is the high frequency of interruption of the mother. As stated

previously, Group I, Session I had the fewest number of bonding behaviors at initial contact and this may be attributable to the high frequency of necessary interruptions that occur immediately after delivery. Another variable that may have been responsible for the fewer number of attachment behaviors exhibited by immediate contact mothers than by 1½ hour delay mothers, might have been the presence of the father at delivery. Father's presence may enhance father-to-infant bonding, and may be very important in facilitating familial adjustment but whether or not father's presence enhances mother-to-infant bonding is questionable. In this study, 4 fathers out of 5 were present in delivery for Group I, Immediate Contact Group, and as stated, this group had the lowest frequency of bonding behaviors. All 4 fathers had attended preparation-for-childbirth classes. Father's presence may have caused both interruption and inhibition of mother's response. This investigator does not advocate abolition of fathers in labor and delivery, quite the contrary; however, this factor needs to be considered when looking at the total picture. Another variable that deserves consideration may be the ability of parents and mothers in particular, to feel that they have some control in relation to events surrounding birth, being able to choose whether or not the husband is present throughout labor and for delivery may aid in transition to parenthood even though this is not obvious in the quantitative type of measurement reported in this study. Another obstacle to bonding that immediate

contact mothers experienced that the other groups avoided may have been the presence of the physician, staff and the investigator at delivery. There were usually four to five additional people present in delivery. These included the physician, one or two nurses, an obstetrical technician, occasionally an anesthesiologist, sometimes a resident or intern and the investigator, who were all present at least during the first 30 minutes post-delivery.

Idealistically, it would seem optimal to begin family interaction in a quiet setting immediately after birth. The mother could suckle her nude infant and the parents could explore the miracle of their progeny together. A "birthing room" may be an alternative to mediating the frequency of interruption experienced immediately after delivery. "A birthing room is a setting within the hospital which allows a woman to labor, deliver, and recover—with her infant—in the same room and the same bed, without ever having to be moved, transferred, shifted or lifted and with minimal aggressive obstetrical intervention" (Grad, 1979, p. 245). In the majority of hospital settings in this country, birthing rooms will not be a viable alternative for many years to come. Since this is an option of limited availability, consideration should be given to the implications of this data for typical hospital routine.

In view of the high frequency of interruption that occurred with Group I, Session I subjects, and in view of

the diminished frequency of bonding behaviors exhibited for this group as compared to Group II, one might consider the option of introducing parents to their infant at delivery and encouraging contact at this time, the amount and extent to be determined through cues produced by the parents.

Significant extended interaction might be initiated after mother or parents leave delivery, allowing for a small restorative period in which the mother begins her readjustment to the nonpregnant state. This option seems reasonable in light of the data from this study; early contact is important to facilitate bonding but immediate extended contact may not be critical to mother-infant bonding. Further documentation for this position involves the data concerning state of infant arousal. The results from this study reconfirm Wolff's (1959) data in terms of neonates being awake and alert during the first hour of life. However, it appears that several infants in this study were in state 4 for as long as 1-3/4 hours post-delivery. Other variables that may be considered enhancers of bonding carry over into the second hour. For example, in studies of home births, several investigators (Lang, 1974; Klaus and Kennell, 1976) have reported a heightened state of excitement, almost of ecstasy on the part of the mother post-delivery. Ainsworth and Bell (1969) hypothesize that the sensitivity of the mother is an important variable in the initiation of maternal-infant relations. In observing several hundred hospital deliveries over a period of years, this elevation in mood was generally



noted in most mothers post-delivery. Klaus and Kennell (1976) call this mood elevation "ekstasis." The phenomena may very well be a contributing variable that makes the period around the time of delivery important to attachment development but it is the impression of this investigator that this mood phenomena is carried over into the second hour post-delivery for many mothers. Looking at the data in this study, even though the infants were awake and alert, in Group I, Session I, and even though the mothers appeared receptive and excited, they did not appear able to capitalize on these opportunities because their attention was being diverted in the innumerable ways previously described. If these variables extend into the second hour, this may be the optimal time for the development of mother-to-infant attachment. In fact, the critical or "sensitive period" for bonding may be in at least the first 2-2½ hours or beyond since the mothers in Group II (the 1½ hour delay group) demonstrated the highest frequency of attachment behaviors overall and had the greatest increase of attachment behaviors from Session I to Session II indicating an ability to maintain and increase attachment. The data indicated that infants in Group II, Session I had the lowest frequency of state 4 but perhaps mothers were able to tune into their babies because the environment was more conducive to bonding development and interaction. Group I, Session I had neonates who were in state 4 longer than any other group and mothers had an increase in attachment behaviors between Sessions I and II, but frequency of

occurrence of behaviors was less in both sessions than for Group II. Three out of five infants in Group II were in state 4 beginning at 1½ hour post-delivery until 1 hour 45 minutes post-delivery.

Cross cultural studies indicate that in many countries the first 30 minutes after birth is devoted to the mother herself (Brazelton, 1974). Perhaps the mother needs a period of recovery and recuperation before she can optimally focus on her infant, and if "ekstasis" extends into hour two after birth, the phenomena can be mobilized as an aid in facilitating bonding.

One study which compared the effects of immediate and delayed skin-to-skin contact and routine hospital care, Hales et al. (1977) found in an analysis of behaviors within subjects that eye-to-eye contact or holding the infant in the en facé position accounted for the aggregate differences and was the only variable significantly higher in the early contact group. Groups of mothers did not differ significantly in the frequency of kissing, gazing, talking to, smiling at, or fondling their infants, or in the amount of holding during nonfeeding times. The design of the present study was similar to Hales et al. and vast intra-subject variation was not documented except for one subject in Group I (Immediate Contact) on two categories of behaviors. Subject 3 had a much higher frequency of en facé looking and talking behaviors. Of the 5 infant subjects in Group I, baby 3 was in state 4 the highest percentage of time. This mother-

infant dyad was the only one of the five whose husband-father was not present during their initial contact period. En facé and talking may be more frequent when infants are in state 4. It seems reasonable to assume that if an infant is in state 4, this may more often facilitate en facé and talking behaviors from the mother. Thus, state 4 may be important for these two behaviors but not as critical in facilitating the occurrence of the other bonding behaviors. En facé and talking behaviors may also be more frequent when fathers are not present to interfere with the occurrence of these two behaviors.

It is significant to note that skin-to-skin contact was a condition for Group I and Group II but not for Group III. In these two groups, nude infants were placed with their mothers under a heat panel. Group III had initial contact with infants dressed and wrapped in a blanket. Groups I and II both had a greater frequency of bonding behaviors at Session II than did Group III. Early skin-to-skin contact may enhance the development of bonding.

Campbell and Taylor (1979) in a review of early-extended contact studies have posited that in the absence of longitudinal data on infant characteristics, it is difficult to conclude that extra contact alone is responsible for differences in mothers' responses to infants. They further state that in the small samples studied that a preponderance of infants in state 4 could account for much of the effect

attributed to early contact. In this study, the preponderance of infants in state 4 were in Group I. Only 2 infants were in state 4 in Group II and then for only 15 minutes out of the one hour period and the greatest differences in frequency of occurrence of attachment behaviors were present with this group.

### Implications

Labor and birth should be experiences that enhance self concept, and should be viewed by couples as a meaningful event. Parents' expectations and goals regarding childbirth should be attainable. Personal goals of couples are usually realistic and should not be viewed as being in conflict with the events occurring at delivery or the goals of the physician and hospital staff. Couples are often uncertain of what behaviors are prohibited or permitted in the labor and delivery environment, and this can be a source of anxiety for expectant parents. Research in attachment has tended to focus on behavior rather than feelings and perceptions of parents. It has often been unidimensional when in reality bonding and attachment involve multidimensional variables. Internal states as well as external expressions of behavior are important. Sensory overload is a physiologic phenomena that often occurs during labor and delivery. The atmosphere of the delivery room is intense and the manipulations of the body increase as delivery approaches. Parents are frequently

bombarded by unanticipated events which interfere with the infant claiming process. The mother needs to call on all her energy reserves for delivery and rapidly occurring stimuli, loss of personal identity and the appearance of strange equipment and procedures may deplete her strength and increase her anxiety. A sense of loss can occur for families when their expectations regarding the birth experience are unfulfilled. Ideally couples should emerge from the birth experience with feelings of strengthened familial ties (Clark & Affonso, 1979).

Hospital staff, including physicians, can aid couples in transition to parenthood and can facilitate adjustment in families by creating a setting which communicates trust. This can be accomplished by providing information to couples in order to help them fulfill their expectations. Knowledge of anticipatory events will decrease their fears. Staff needs to be supportive physically and psychologically; they should promote physical comfort and physical-psychological relaxation. In light of the findings in this study, although immediate extended contact may not be critical to bonding, parents should be offered this option and staff should be accepting and supportive of parental decisions. In order to incorporate the reality of extra-uterine existence of the infant into the present, parents and particularly mothers need to see, touch, listen to, and explore their infant. This ideally should begin in delivery, but perhaps extended

significant interaction can occur after the mother leaves delivery. Routine care can be given to the infant while routine medical care is being given to the mother. However, instillation of silver nitrate drops can be delayed for several hours as they interfere with infant's vision and may impede parent-to-infant bonding. It is important for staff to pick up on cues the parents are presenting, and proceed at the pace of the parents which can be gauged by their degree of interest in the infant. They should not be forced to interact with the child but allowed the opportunity. The new parents' feelings and perceptions as well as interactions with their infant is important. In terms of father's presence in labor and delivery, this too should be the choice of clients. Recent research (Lynn, 1974) points to the important contributions of the father to the infants psychosocial development. The father's presence is probably just as important to his mate in helping her to integrate the labor experience into a meaningful whole post-delivery, as was his position as loving supportive, nonjudgemental, caring assistant in coping with the task of labor. Father's presence at delivery may be and probably is invaluable to overall family adjustment. However, one should be aware of its impact on immediate mother-infant interaction. Parke (1974) in studying the triadic interaction 2 to 4 days after birth of the neonate noted that the father assumes the dominant role in parent-infant interaction. This may be attributed

to early socialization of women in our culture and perhaps helps to explain the decreased external showing of attachment behavior in the 4 women in Group I whose husbands were present at delivery. In some families, the father will be the primary attachment figure and/or primary caregiver. Father-infant interaction should not be overlooked as a valuable contributor to the social-emotional and even the cognitive functioning and development of the infant.

Hospital staff needs to be aware of the impact of interruptions on the family. Inservice in maternal-child settings should include discussion, role-play and other simulations of patient-staff interaction and should include appropriate actions to communicate respect and caring to clients, as well as ways of being unobtrusive in this setting.

#### Future Methodological Approaches

Behavioral studies in a natural setting such as a hospital require weeks of preparation to thoroughly familiarize staff on every shift to procedure and method as well as background of the problem. Forty-three subjects agreed to participate in this study; eighteen subjects were lost primarily due to communication problems with staff and/or study participants. Subjects sometimes failed to tell staff they were in the study until it was too late to call the researcher. At other times, staff felt it was too early to call the researcher and then forgot to call or

events precipitated toward delivery and there was not enough time. At other times, the researcher was called but too late in terms of the random group assignment. At other times, staff inadvertently gave immediate extended contact and in effect assigned subjects to a group. At other times, due to a heavy census, staff did not have an opportunity to call the researcher.

A nurse investigator was a novel phenomena in one setting, and although the majority of personnel were supportive and cooperative, some were obviously disturbed by the researcher's presence. The needs of a nurturing labor room staff are met through helping clients toward a successful pregnancy outcome. The researcher must develop rapport with the staff and proceed with the investigative task in a way that does not interfere with nursing care and the self-fulfillment of the personnel.

In another instance, the researcher had a hand in altering routine hospital protocol that was disturbing to the regimen of several nursery personnel. Many of these problems could have been overcome if fully anticipated but realistically there will always be some problems inherent in research conducted in naturalistic settings.

Hypothetically, the following changes would be beneficial in replicating this study.

1. Briefing of each nursing staff member on every shift regarding purpose of the study and research protocol.



2. Discussion session regarding ongoing research with nursing staff at least once a month in order to maintain a high level of interest in the research project.

3. Distribute cards to study volunteers that contain information relating to their participation in the study that they can bring to the hospital and give to the nursing personnel. These cards can be taped to the outside of their charts to remind personnel that they are participants in a research project.

4. The role of the nurse-researcher must be clear from the outset. He or she is in the setting as investigators only, not as additional nursing personnel.

5. The nurse-researcher must keep in focus the investigating task and not interfere with the staff-client relationship.

### Research and Theory Development

In the areas of future research and theory construction, the results of this study point to the following implications.

1. Additional controlled longitudinal studies with larger sample sizes involving primigravid mothers and the effects of early contact is warranted to further determine whether there is a sensitive period in the human.

2. Exploration of the father's role in interaction with the neonate, would enable researchers to understand

differences in bonding development between mothers and fathers.

3. Studies of triadic interaction in the early post-partal period seem to be relevant. Parke (1974) points out that in the triadic situation the father plays the dominant role in interacting with the infant 2 to 4 days post-partally.

4. The results of this study have indicated that development of maternal-infant bonding or parent-infant bonding cannot be viewed as a result of time of contact alone, but that many variables impinge on attachment not the least of these being interruptions when significant initial contact occurs immediately after delivery. A detailed study of the ethological setting at delivery and post-delivery might be useful.

5. A systematic evaluation of altered hospital practice and its effects on parent-infant relations is in order to determine priorities for medical practitioners and medical protocol.

6. An investigation of infant temperament and the role of the neonate in structuring parent-infant interaction is called for.

7. A study of the neonate's potential for interaction and consideration of ways to enhance reciprocal interchanges would be helpful.

8. The perceptions and feelings of mothers regarding the events surrounding birth are important variables that

warrant further investigation, in an effort to aid practitioners to a greater sensitivity perinatally.

### Summary

This study explored the relationships between time of initial contact post-partally and the external observation of developing attachment behaviors in the mother. It also explored the relationship between consciousness level of the neonate and its influence on attachment. Early extended contact does appear to influence maternal bonding but immediate extended contact may not be critical to the development of attachment since there are so many interruptions in the immediate post-partal period that interfere with the mother's focusing on her newborn. Even though the infant is in state 4 for at least the first hour, and logically this would seem to be the optimal time for acquaintance between mother and infant to occur, it appears that some infants are in state 4 for 1-3/4 hours or longer. In this study, attachment behaviors were greater for those mothers who experienced initial significant contact in the second hour of life rather than immediately post-partally.

## BIBLIOGRAPHY

## BIBLIOGRAPHY

- Ainsworth, M. D. S., & Bell, S. M. Some contemporary patterns of mother-infant interaction in the feeding situation. In J. A. Ambrose (Ed.), Stimulation in early infancy. London: Academic, 1969.
- Bell, S. M., & Ainsworth, M. D. S. Infant crying and maternal responsiveness. Child Development, 1972, 43, 1171-1190.
- Blake, A., Stewart, A., & Turcan, D. (Eds.) Parent-infant interaction (Ciba Foundation Symposium 33). Amsterdam: Elsevier, 1975.
- Blauvelt, H., & McKenna J. Mother-neonate interaction: Capacity of the human newborn for orientation. In B. R. Foss (Ed.), Determinants of infant behavior. New York: Wiley, 1962, 3-25.
- Bowlby, J. Attachment and loss (Vol. 1). New York: Basic Books, 1969.
- Bowlby, J. Nature of a child's tie to his mother. International Journal of Psychoanalysis, 1958, 39, 350-373.
- Brazelton, T. Neonatal behavioral assessment scale. London: William Heinemann Medical Books, Ltd.
- Brazelton, T. B. Infants and mothers. New York: Dell, 1969.
- Brazelton, T. B. The early mother-infant adjustment. Pediatrics, 1963, 32, 931-938.
- Brazelton, T. B., Koslowski, B., & Main, M. In M. Lewis & L. A. Rosenblum (Eds.), The effect of the infant on its caregiver. New York: Wiley, 1974.
- Brazelton, T. B., School, M. L., & Robey, J. S. Visual responses in the newborn. Pediatrics, 1966, 37, 284-290.
- Brazelton, T. B., Tronick, E., Adamson, L., Als, H., & Wise, S. Discussion 149, Parent-infant interaction, (Ciba Foundation Symposium 33), Amsterdam: Elsevier, 1975, 137-149.

- Bronfenbrenner, U. Early deprivation in mammals: A cross-species analysis. In G. Newton & S. Levine (Eds.), Early experience and behavior. Springfield: Thomas, 1968.
- Campbell, S. G., & Taylor, P. Bonding and attachment: Theoretical issues. Seminars in Perinatology, Vol. 3, No. 1, January 1979, 3-12.
- Cassel, Z., & Sander, L. Neonatal recognition process and attachment: The masking experiment. Presented at the Society for Research in Child Development, Denver, 1975.
- Clark, A. & Affonso, D. Child bearing: A nursing perceptive, Edition 2. Philadelphia, F. A. Davis Co., 1979.
- Collias, N. E. The analysis of socialization in sheep and goats. Ecology, 1956, 37, 228-239.
- Condon, W. S., & Sander, L. W. Neonate movement is synchronized with adult speech: Interactional participation and language acquisition. Science, 1974, 183, 99-101.
- deChateau, P. Effects of hospital practices on synchrony in the development of the infant-parent relationship. Seminars in Perinatology, Vol. 3, No. 1, January 1979, p. 56.
- deChateau, P. Neonatal care routines: Influences on maternal and infant behavior and on breast feeding. Unpublished thesis, Umea University medical dissertations, Umea, Sweden, N.S., No. 20, 1976.
- deChateau, P. The influence of early contact on maternal and infant behavior in primiparal. Birth and the Family Journal, 1976, 3, 149-155.
- deChateau, P. Left-side preference in holding and carrying newborn infants. J. Maternal-Child Health, 1977, 2, 418-421.
- Desmond, M. M., Rudolph, A. J., & Phitaksphraiwan, P. The transitional care nursery: A mechanism of preventive medicine. Pediatric Clinic of North America, 1966, 13, 651-668.
- Eisenburg, R. B. Auditory competence in early life: The roots of communicative behavior. Baltimore: University Park Press, 1976.
- Fantz, R., Fagan, J., & Miranda, S. Early visual selectivity as a function of pattern variables, previous exposure, age from birth and conception and expected cognitive deficit. In L. B. Cohen & P. Salapatek (Eds.), Infant perception from sensation to cognition. New York, Academic Press, 1975.

- Fantz, R., & Miranda, S. Newborn infant attention to form and contour. Child Development, 1975, 46, 224-228.
- Goren, C., Sarty, M., & Wu, P. Visual following and pattern discriminations of face-like stimuli by newborn infants. Pediatrics, 1975, 56, 544-549.
- Grad, R. K. Breaking ground for a birthing room. American Journal of Maternal-Child Nursing, 1979, 4, 245-249.
- Greenburg, M., Rosenberg, I, & Lind, J. First mothers rooming in with their newborns: Its impact on the mother. American Journal Orthopsychiatry, 1973, 43, 783-788.
- Hales, D., Trause, M. A., & Kennell, J. H. How early is early contact? Defining the limits of the sensitive period. Pediatric Research, 1977, 10, 448.
- Hersher, L., Richmond, J., & Moore, A. In H. R. Rheingold (Ed.), Maternal behavior in mammals. New York: Wiley, 1963.
- Hopkins, John B. The effect of early and extended neonatal contact on mother-infant interaction. Doctoral dissertation, George Peabody College for Teachers, 1976.
- Kennell, J. H., & Rolnick, A. Discussing problems in newborn babies with their parents. Pediatrics, 1960, 26, 832-838.
- Kennell, J. H., Jerauld, R., Wolfe, H., Chesler, D., Kreger, N. C., McAlpine, W., Steffa, M., & Klaus, M. H. Maternal behavior one year after early and extended post-partum contact. Developmental Medicine and Child Neurology, 1974, 16, 172-179.
- Kennell, J. H., Slyter, H., & Klaus, M. H. The mourning response of parents to the death of a newborn infant. New England Journal of Medicine, 1970, 283, 344-349.
- Kennell, J. H., Trause, M. A., & Klaus, M. H. In Parent-infant interaction, (Ciba Foundation Symposium 33), Amsterdam: Elsevier, 1975.
- Klaus, M. H., & Kennell, J. H. Mothers separated from their newborn infants. Pediatric Clinic of North America, 1970, 17, 1015-1037.
- Klaus, M. H., Jerauld, R., Kreger, N., McAlpine, W., Steffa, M., & Kennell, J. H. Maternal attachment: Importance of the first post-partum days. New England Journal of Medicine, 1972, 286, 460-463.

- Klaus, M. H., Kennell, J. H., Plumb, N., & Zuehlke, S.  
Human maternal behavior at first contact with her young.  
Pediatrics, 1970, 46, 187-192.
- Klaus, M. H., Trause, M. A., & Kennell, J. H. In Parent-infant interaction, (Ciba Symposium 33). Amsterdam: Elsevier, 1975.
- Klaus, M. H., & Kennell, J. Maternal-infant bonding. St. Louis, Mosby, 1976.
- Klopfer, P. Mother love: What turns it on? American Science, 1971, 49, 404-407.
- Kontos, D. A study of the effects of extended mother-infant contact on maternal behavior at one and three months.  
Birth and the Family Journal, 1978, 5, 3.
- Korner, A. F., & Thoman, E. B. Visual alertness in neonates as evoked by maternal care. J. Exp. Child Psych., 1970, 10, 67.
- Lang, R. Birth book. Ben Lomono, California: Genesis Press, 1972.
- Leiderman, P., & Seashore, M. In Parent-infant interaction, (Ciba Foundation Symposium 33). Amsterdam: Elsevier, 1975.
- Leifer, A., Leiderman, P., Barnett, C., & Williams, J.  
Effects of mother-infant separation on maternal attachment behavior. Child Development, 1972, 43, 1203-1218.
- Lozoff, B., Brittenham, G., Trause, M., Kennell, J., & Klaus, M. The mother-newborn relationship: Limits of adaptability. The Journal of Pediatrics, 1977, 91, 1.
- Lynn, D. The father: His role in child development. Monterey: Brooks/Cole, 1974.
- MacFarlane, A. Olfaction in the development of social preferences in the human neonate. In Parent-infant interaction, (Ciba Foundation Symposium 33, new series). Amsterdam: Elsevier, 1975, 103-117.
- Meltzoff, A., & Moore, K. Imitation of facial and manual gestures by human neonates. Science, 1977, 198, 75-78.
- Mercer, R. T. Nursing care for parents at risk. New Jersey: Charles B. Slack, 1977.



- Miranda, S. B. Visual abilities and pattern preferences of premature infants and full-term neonates. J. Exp. Child Psychol., 1970, 10, 189.
- O'Connor, S., Sherrod, K., Sandler, H., & Vietze, P. The effect of extended post-partum contact on problems with parenting—A controlled study of 301 families. Birth and the Family Journal, 1978, 5, 231-234.
- O'Connor, S. M., Vietze, P., Hopkins, J., Altemeier, Post-partum extended maternal-infant contact: Subsequent mothering and child health. Pediatric Research, 1977, 11, 380.
- Parke, R. Father-infant interaction. In M. Klaus, T. Leger, & M. Trause (Eds.), Maternal-attachment and mothering disorders: A round table. Sausalito, California: Johnson & Johnson Co., 1974.
- Pritchard, J., & MacDonald, P. Williams obstetrics (Fifteenth edition). New York: Appleton, Century, Crofts, 1976.
- Ringler, N., Trause, M., & Klaus, M. Mother's speech to her two-year-old: Its effects on speech and language comprehensive at five years. Pediatric Research, 1976, 10, 307.
- Rose, J., Boggs, T., Jr., & Alderstein, A. The evidence for a syndrome of "mothering disability" consequent to threats to the survival of neonates: A design for hypothesis testing including prevention in a prospective study. Am. Journal Dis. Child, 1960, 100, 776-777.
- Rosenblatt, J., & Lehrman, D. In H. R. Rheingold (Ed.), Maternal behavior in mammals. New York: John Wiley and Sons, Inc., 1963.
- Salk, L. Mother's heartbeat as an imprinting stimulus. Trans. N. Y. Acao, Science, 1962, 7, 753.
- Salk, L. The critical nature of the post-partum period in the human for the establishment of the mother-infant bond: A controlled study. Dis. Nerv. Syst. Supp., 1970, 11, 110.
- Salk, L. The role of the heartbeat in the relations between mother and infant. Scientific American, 1973, 228, 24-29.
- Seashore, M., Leifer, A., Barnett, C., & Leiderman, P. The effects of denial of early mother-infant interaction on maternal self-confidence. Journal of Personality & Social Psychology, 1973, 26, 369-378.

- Sosa, R., Kennell, J., Klaus, M., & Urrutia, J. In Breast-feeding and the mother, (Ciba Foundation Symposium 45). Amsterdam: Elsevier, 1976.
- Spitz, R., & Coblner, W. The first year of life. New York: International Universities Press, Inc., 1965.
- Winters, N. The relationship of time of initial feeding to success of breast-feeding. Unpublished Master's thesis, University of Washington, 1973.
- Wolff, P. H. Observations on newborn infants. Psychosomatic Medicine, 1959, 21, 110-118.
- Yarrow, L. Maternal deprivation: Toward an empirical and conceptual reevaluation. Psychological Bulletin, 1961. 58, 459-490.

## APPENDICES

APPENDIX A

INFORMED CONSENT SHEET

I am interested in maternal-infant contact between mothers and infants in the hospital. I am a registered nurse and I have a Master's degree in Child Development. I would like to observe your interactions with your infants on two occasions—during initial contact and during contact with your child 36 hours after birth. During the contact periods, you and your infant will be warmed by an overhead heat panel. Your infant will be nude, but the heat panel will keep the infant warm and cozy. You will be attired in the gown provided by the hospital. I will be videotaping you and your infant during both contacts. The procedures for observing you and your infant will in no way interfere with the medical care you both will receive. Your obstetrician's approval will be obtained prior to the observations. I will train female raters who are nursing students to view the tapes; these tapes will not be viewed by anyone not connected with the project. The tapes will be assigned identification numbers so that the viewers will not know your name; the tapes will be destroyed as soon as the project is completed. In reporting the results of the study all participants will remain anonymous. On completion of the study, I will send you a general summary of the results of the study.

I want to emphasize that your well-being and the well-being of your infant is of the utmost importance. You are free to withdraw from participating in the project at any time, or during any stage of the project.

\_\_\_\_\_  
Witness

\_\_\_\_\_  
Signature (Mother)

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature (Father)

\_\_\_\_\_  
Signature (Researcher)

APPENDIX B

MATERNAL-INFANT CONTACT PROJECT DATA SHEET

1. Name of Mother \_\_\_\_\_
  2. Name of Father \_\_\_\_\_
  3. Age of Mother \_\_\_\_\_
  4. Address \_\_\_\_\_
  5. Phone \_\_\_\_\_
- 
- 

1. Is this your first pregnancy? \_\_\_\_\_
2. How do you plan to feed baby  
Breast? \_\_\_\_\_  
Bottle? \_\_\_\_\_
3. If breast feeding, how long do you plan to feed by this  
method? \_\_\_\_\_
4. Do you plan to be awake at delivery? \_\_\_\_\_
5. Are you married? \_\_\_\_\_
6. If you are married, are you living with your husband? \_\_\_\_\_
7. Do you plan to keep your baby? \_\_\_\_\_

ANSWER ONLY IF YOU ANSWERED YES TO NUMBER 5

1. Does your husband plan to be with you during labor? \_\_\_\_\_
2. Does your husband plan to be with you at delivery? \_\_\_\_\_
3. Does (a) another family member \_\_\_\_\_  
(b) a friend \_\_\_\_\_  
plan to be with you during labor? at time of  
delivery?

Do not write below this line

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1. Sex of infant \_\_\_\_\_
2. Has mother changed her mind about method of feeding? \_\_\_\_\_

APPENDIX C

RATING SHEET FOR MATERNAL-INFANT CONTACT PROJECT

Rating Intervals		Maternal Attachment Behaviors									State of Infant Consciousness							
Minute	Seconds	En face F	Gazing F	Fondling F	Smiling F	Proximity F	Talking F	Feeding Breast F	Bottle F	Interruptions F	Time Non-Cod	1	2	3	4	5	6	Non- Codable
0-2	0-15																	
4	0-15																	
6	0-15																	
8	0-15																	
10	0-15																	
12	0-15																	
14	0-15																	
16	0-15																	
18	0-15																	
20	0-15																	
22	0-15																	
24	0-15																	
26	0-15																	
28	0-15																	
30	0-15																	
32	0-15																	
34	0-15																	
36	0-15																	
38	0-15																	
40	0-15																	
42	0-15																	
44	0-15																	
46	0-15																	
48	0-15																	
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52	0-15																	
54	0-15																	
56	0-15																	
58	0-15																	
60	0-15																	

## VITA

Patricia Gentry Droppleman was born in Richmond, Virginia on June 12, 1935. She attended parochial schools in Williamsport, Pennsylvania and was graduated from St. Joseph's High School in 1953. She was awarded a diploma in nursing from the Williamsport Hospital School of Nursing in 1956. She earned the Bachelor of Science degree from Catholic University of America at Washington, D. C. in 1962 with a major in Nursing, and the Master of Science degree in Child Development from The University of Tennessee at Knoxville in 1974.

From 1956-1957, she was employed in office nursing with a medical internist and from 1957-1958, she was employed as a staff nurse in Labor and Delivery in Williamsport, Pennsylvania. From 1958-1962, she was employed as a staff nurse and as a head nurse in E.E.N.T. and Medical-Surgical nursing at the Washington Hospital Center at Washington, D. C. The summer of 1960, she was employed in medical nursing at the Veterans Administration Hospital in Elsmere, Delaware. From 1968 to 1970, she was employed as a staff nurse in geriatric nursing in Wellsley, Massachusetts.

She entered the Graduate School at The University of Tennessee in September 1972, and while pursuing the master's degree in Child Development, worked as a graduate teaching assistant for one year. She also taught Child Development

at Fort Sanders Presbyterian Hospital School of Nursing in the summers of 1973 and 1974, and in the fall of 1974, she joined the same faculty as an instructor of Obstetrical and Gynecological nursing. From the fall of 1975 to the present, she has been employed as a full-time instructor in the College of Nursing at The University of Tennessee at Knoxville. Areas of teaching experience include Family Health Nursing I and II, Advanced Family Health Nursing, Independent Study, Professional Seminar, Management, Long-Term Nursing, Children and Health, and Psychosocial and Developmental Theories I and II.

She is married to Dr. Leo F. Droppleman, a practicing clinical psychologist from Parkersburg, West Virginia and is the mother of three daughters, Susan, Beth, and Jacqueline.