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EVALUATING CHANGES IN INFANT BEHAVIOR
DURING EXAMINATION IN THE PARENT’S
LAP VERSUS THE EXAMINATION TABLE

by

KELLI MAY DAVIDSON

A Thesis
Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Nursing
in the Division of Nursing
Mississippi University for Women

COLUMBUS, MISSISSIPPI
August 2000
Evaluating Changes in Infant Behavior During Examination in the Parent’s Lap Versus the Examination Table

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Abstract

A predictor of an attachment between an infant and its parents is through evaluation of infant behavior in relation to the parent. The purpose of this quasi-experimental two-group study was to determine if any changes in infant behavior occurred during examination in the parent’s lap or on an examination table. Two null hypotheses guided this study: There will be no difference in behavioral changes in the infant when examined in the parent’s lap and in the infant examined on the examination table; and there will be no difference in parental satisfaction of an infant examination done in the parent’s lap and an infant examination done on an examination table. Barnard’s Parent-Child Interaction Model provided the theoretical framework for the study. Participants were selected by a non-randomized convenience sampling technique at a private pediatrician’s office in an urban community of a southern state. Data were collected by the use of several instruments. Informed consent and a demographic questionnaire were completed to participate in
Abstract

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this study. A researcher-devised recording device was used to assess infant behavior changes. Participants completed a needs fulfillment survey. Means, percentages, t tests, and Mann-Whitney U analysis were used to evaluate data. Analysis of data revealed there was a significant outcome between infant behavior during examination in the parent's lap and on an examination table. However, there was no significant difference in the parent's level of satisfaction of an examination of infants examined in the parent's lap or on an examination table. Results indicated that infants displayed fewer distress behaviors when examined on the parent's lap. Recommendations were to conduct a study with a larger, more diverse sample, evaluate changes in parents' behavior during examination of their infants, compare behavior of well infants versus ill infants, and survey clinician's on infant examination techniques.
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I am deeply appreciative to those who were an active part in the completion of my thesis. I am especially grateful to my advisor, Patsy Smyth, whose insight and valuable judgments led me through this research endeavor and this part of my life that I will never forget. Thank you very much for all that you have done. I would also like to thank my research committee members, Sandra Faulkner and Carrie McCarter, for their advisement and enthusiasm of this research project. I would also like to thank Gail Gunter, the reference librarian at Mississippi University for Women. Without her help, none of the research in this thesis would have been possible. Thank you all very much.

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Chapter I
The Research Problem

Physical contact and touch are the core essence through which infants and parents begin a long and complicated relationship. At the basis of most relationships is some form of attachment. The most reliable predictor of an attachment between an infant and its parents is the evaluation of infant behavior in relation to the parent-infant interaction. Thus, the amount and quality of physical contact between parent and infant are directly related to the security of the infant, exemplified through the infant’s behavior.

Wahlberg (1990) postulated that parent-child interaction is continuously interwoven. Wahlberg indicated that feelings of comfort, security, and satisfaction, as well as feelings of insecurity and disappointment, are absorbed from each member of the interaction. Behavioral indicators, such as an infant’s cognitive, language, and social development, are all strongly related to parental stimulation, responsiveness, and method of emotions (Casey
& Whitt, 1980). The focus of the current research was to determine how parental attachment might affect the way in which an infant behaves during an examination procedure.

Establishment of the Problem

The concept of parental-infant bonding and attachment is a topic that researchers have been exploring to aid in the understanding of human growth and development. Bonding has been defined as "a positive relationship between parent and child that is specific to a particular child that endures over time" (Symanski, 1992, p. 675) and the parents' own perceived emotions and feelings as portrayed to that child. The concepts of attachment are associated with the development of a strong link between two people that enable and or foster unique special relationships which persist through time (Goulet, Bell, St-Cyr Tribble, Paul, & Lang, 1998).

Understanding the process of bond and attachment formation and why these bonds and attachments are important is of primary concern when dealing with the relationship between parents and infants. The ramifications of positive or negative attachment and bond formation between parent and child greatly impact not only the infant's emotional and physical development, but also
the parent’s attainment of role identity and emotional well-being. The importance of understanding the process of attachment formation in parents and infants is highly sensitive.

Attachment is often linked with terms such as love, respect, instinct, and connection. Symanski (1992) indicated that attachment is the bond formed by the infant to the parent, while some researchers refer to the attachment process interchangeably between parent to infant or infant to parent. Attachment is further defined as the creation of a strong bond characterized by the seeking and keeping of closeness that develops gradually between parents and their infants (Goulet et al., 1998). Attachment and bonding may be further defined as a relationship that is mutual in which both the parent and child contribute equally, beginning in infancy and advancing as the relationship changes and grows over time (Lobar & Phillips, 1992).

Crouch and Manderson (1995) attempted to more clearly define parental-infant bonds and the process of attachment formation. Crouch and Manderson questioned whether bonds and attachments are programmed instinctual responses of the parent that tie the parent to the child for life or is
the development of the bond and attachment only formed during the early periods of life and used for the development of the person’s own personal behaviors and feelings that will be used to form bonds with other people later in life? Thus, the essence of bonding and attachment may not only be the timing of attachment formation between parent and infant, but also in the ability of the formed attachment to weld together infants to their parents and parents to their infants.

The attachment and bonding process allows for the development of an increased sense of worth in the infant and the parent. This achievement facilitates the development of an effective tie between the parent and infant. Parents who are able to develop a sensitivity and recognition of their infant’s needs may be more likely to develop a more permanent relationship to that infant in both a physical and emotional sense. In instances where secure attachments are not formed between the parent and the infant, a large void of emotional attachment may develop. In order for infants and parents to weld together in a successful bonding venture, there must be a mutual acceptance of one another, trust, and a need for emotional attachment (Goulet et al., 1998).
Bonding and attachment are abstract concepts, which denote a process in which relationships are formed. These attachments and bonds aid in determining and evaluating the ways in which emotions and actions influence others. This process enables the interactive experiences between a parent and infant which result in a satisfactory commitment to one another. Successful attachment between parent and infant may foster the growth of future relationships and commitments (Goulet et al., 1998). As cited by Elsie (1991), each person, whether it is the infant or the parent, will bring into the relationship his or her own rhythm of engagement, activity levels, characteristic affective and behavioral displays, responsiveness, attention spans, anxieties, and levels of interests. Measuring the degree to which bonding and attachment between parent and infant occur is usually done through observational methods of verbal and nonverbal behaviors of the parent-infant relationship. The observed cues enable researchers to better understand ways in which parents and infants can develop and maintain healthy attachments (Tomlinson, 1990).

Components of the attachment and bonding process include the comfort level of a person in his or her role
as a parent and the ability to acquire and care for the infant. Not only do these parents express this security and sense of confidence, this attainment of comfort helps to develop pleasure and gratification in knowing that they, as parents, have some emotional security in their relationship with their baby. Such gratification occurs when the baby responds to the parent in a positive manner. The enduring nature of the parent-infant relationship attributes a successful central core to the relationship between parent and infant (Goulet et al., 1998).

The relationship that develops between a parent and child incorporates security, emotions, and integrity, all of which aid in developing a person’s well-being. The importance placed on how bonding occurs and why bonding is important greatly impacts the growth and development of a person’s beliefs and personality. The feelings and experiences of attachment, which a person encounters at an early phase of life, are exemplified throughout the life continuum. A successful accomplishment of establishing attachments and bonds within relationships aids in the development of core concepts of security and stability in a person’s life. The ability of an individual to foster emotional and physical attachments helps to incorporate
the person into a holistic being. The key issue with attachment formation is to determine the strength, security, and stability of the formed attachment between parent and infant.

Anticipating the emotional, physical, and cognitive needs of the parents and their infant aids the practitioner in promoting the attachment process. Nurse practitioners have unique opportunities to impact the parental-infant attachment process by educating, examining, guiding, and supporting parents in their decisions regarding the parental-infant relationship. Understanding the interaction among parent, infant, and nurse practitioner may strengthen the caregiver's relationship for evaluation of an infant's behavior during examination. The communication and relationship demonstrated between the parent and nurse practitioner are important because the infant depends on interactions with these people for physical care, learning, support, and love (Villarreal, 1997).

Frequently, physical examinations can cause changes in an infant's behavior. Even a brief separation of parent and infant may cause behavioral changes in the infant (Anisfeld, Casper, Nozyce, & Cunningham, 1990). The
attachment system a child maintains is in constant balance between exploration of his or her environment and proximity seeking to the attachment figure. In instances of distress, the infant or child may become insecure and the balance may shift from environmental exploration to the seeking out of the child’s attachment figure (Calkins & Fox, 1992). If an infant experiences a stress response from parental separation during an examination, this can lead to mistrust of the environment and the nurse practitioner. It is essential to remember that infants vary in their temperament, developmental skills, and prior experiences in relation to the physical examination (Vessey, 1995).

Negative responses of an infant to physical examination may also impair the parent’s satisfaction in relation to future examinations and subsequent childcare. Oehler, Hannan, and Catlett (1992) discovered that a forced physical separation of parent and infant may highlight how a parent may respond to their infant, thus affecting the ability of the parent to attach particular needs and cues to his or her infant in a health care setting.
Changes in infant behaviors, such as changes in pulse rate and facial expressions, are indicators an infant experiences during a physical examination by a nurse practitioner. The demonstration of such behaviors allows for future relationships to be enhanced; for example, a lack of security may enhance mistrust in the nurse practitioner by the infant or parent (Goulet et al., 1998). Involving the parents in the physical examination of their infant can potentiate the ongoing bonding process. Symanski (1992) indicated that some health care provider's examination methods allow the parent to become more aware of the baby's unique characteristics. A more dyad-centered exam should be conducted on the premise that the quality of the parent-infant relationship is enhanced when the parent knows how to respond to the infant's behavioral cues. By incorporating the parent actively in the examination process, the nurse practitioner reinforces the relationship of the dyad, which encourages the parents to feel as though they are integral to the process, leading to parental satisfaction and infant trust (Symanski, 1992).
Significance to Nursing

The parental-infant bond and attachment are aspects of health care that must be addressed by the nurse practitioner. The practitioner’s ability to identify strengths and weaknesses in roles of the parents and infants that he or she encounters may greatly influence the attachment and bonding process. The nurse practitioner must be able to educate, guide, and foster the interest of parents and the nursing profession in the bonding and attachment process.

Nurse practitioners, as primary caregivers, assume a critical role in the effort of promoting bonding and attachment between parent and infant. The ability to relate the importance of parental-infant attachment to the day-to-day activities and involvement of nurse practitioners is significant. Nurse practitioners need to be aware of the interactions between parent and child in order to encourage the development of a partnership (Oehler et al., 1992). Nurse practitioners should develop a more active role in facilitating the parent-child relationship (Casey & Whitt, 1980). The development of strong attachment behaviors occurs over time and is characterized by information being gathered amongst
individuals, thus allowing the generation of opinions and feelings to develop. This "knowing" of information, opinions, and feelings helps to develop a bond between individuals (Goulet et al., 1998).

There is a paucity of research conducted on the impact of physical examination of infants utilizing differing examination procedures, such as in the parent's lap or on the examination table. Minimal research was identified on how the physical separation of the parent and infant in an examination setting can affect the infant's behavior. Most literature reports regarding infant behavior are in correlation with infants and painful situations and not in a normal aspect of childcare. This study is significant to nursing research by exemplifying the need for evaluation of normal infant behavior changes in everyday situations.

Parents and infants gain a sense of security from their surrounding environment as well as in the attainment of emotional and physical bonds of attachments from their parental influences (Lobar & Phillips, 1992). When parents respond to their infants needs through touch and or spoken words, an increased sense of security is developed (Oehler et al., 1992). The exchange of mutually satisfying
behaviors assists the self-efficacy and confidence of parents, infants, and nurse practitioners, thus exerting a positive influence on their environment. The significance of this study to nursing theory and education exists because of the social, emotional, and behavioral components which develop within supportive family relationships. The qualities of the interactions among infants, parents, and caregivers provide the basis of trust necessary to develop healthy relationships. Thus, the patterns of attachment between this team may be used as guides in distinguishing observations and interventions that practitioners use to provide safe, supportive, and nurturing environments for patients.

Data gathered from the current study will serve to direct nurse practitioners to develop new strategies for assessing infants physically as well as assessing the parental-infant attachment bond. Once a relationship is established among the parent, infant, and practitioner, a more stable, positive outcome, oriented session that better serves the needs of the parent, child, and practitioner is developed. Thus, the foundation for education and knowledge will be formed.
This study is significant to the field of nursing by providing an evaluation of infant behavior by reviewing nursing practice, research, and theories. This study could provide the foundation for further intervention and research by evaluating how practitioners practice and correlate themselves into the roles of bonding and attachment.

Theoretical Framework

The nursing theory used to guide this research study was the Parent-Child Interaction Model by Barnard (1966). Barnard’s model was used to evaluate child health, growth, and development while viewing the parent and child as an interactive design (Tomey & Alligood, 1998). The interaction that occurs among parent (caregiver), child, and the environment is in constant motion with all parts being interchangeable and in constant interaction. The nursing paradigm of nursing, person, health and environment is applicable in this nursing theory.

Nursing is defined by Barnard (1966) as “a process by which the patient is assisted in maintenance and promotion of his or her independence. This process may be educational, therapeutic, or restorative: it involves facilitation of change, most probably a change in the
environment" (p. 629). Barnard later added to her definition of nursing by incorporating the phrase that nursing is the "diagnosis and treatment of human responses to health problems" (Barnard, 1982, p. 2). The major focus of this model in relation to nursing is the clinician's support given to the child's caregiver during the infant's first year of life. Nurse practitioners should provide support for parents by enabling them to recognize and respond to the cues their infant signals (Tomey & Alligood, 1998).

According to Barnard, person in the nursing paradigm is described as the ability of infants, children, and adults "to take in auditory, visual, and tactile stimuli from the environment, but also to make meaningful associations from what he or she takes in" (Tomey & Alligood, 1998, p. 427). Mutual congruence and modeling between the parent and child occur on a personal level. Both the parent's and child's behaviors are influenced; therefore, both functioning parties are affected. Thus, during examination, infants and parents may be affected by behavioral changes that the infant undergoes. The ability of one person in the relationship to respond and react to the other person's behavior signals a growth fostering
activity of both the parent and the child (Tomey & Alligood, 1998).

Health is not clearly defined by Barnard (1982) but involves the goals of proper child-health assessment. Barnard states that the primary goals of health care are prevention. Emphasis is placed on the need to identify problems with health before they develop and what interventions are most readily accessible for treatment and prevention (Barnard, 1982).

Barnard’s theory includes a tangible role for the environment, stating that, “in essence, the environment includes all experiences encountered by the child: people, objects, places, sounds, visual, and tactile sensations” (Tomey & Alligood, 1998, p. 428). Animate and inanimate factors are distinguished within the environmental setting. Siblings, animals, parents, and other humans are included in the animate environment, while the inanimate environment includes the physical characteristics of the surroundings, most importantly focusing on objects available for the infant to explore and manipulate. The most important aspect of the animate environment is the activities in which the caretaker and others present arouse and direct the infant to involve and interact with
the external world. The environment provided by the nurse practitioner influences ways in which the parent and child might respond with these stimuli. The physical and social aspects of the surroundings become an important aspect of stimulation for the infant. The ability of the nurse practitioner to correlate these factors into a functioning state is contingent on the developmental processes of the child. The assertions of this theory encompass the beliefs that the environment assumes a critical role for the child by using the child’s own physical and social skills allowing a correlation to develop within their environment (Tomey & Alligood, 1998).

The ability of a parent to respond to the infant’s needs during stressful times, such as an examination, allows the nurse practitioner to become more aware of the interactions between the parent and infant. Communication between the parent and the nurse practitioner enhances the relationship of the dyad. Thus, goals of attachment and interactions between parents, infants, and practitioners are further strengthened. Person, health, nursing, and environment are all aspects of the nursing realm. The ability of nurse practitioners to guide and foster attachments between parents and children will achieve an
overall satisfaction with health care as perceived by parents.

The Parent-Child Interaction Model supported the framework for this research study by incorporating how changes in one's environment may influence experiences of a person. By changing the examination technique, the nurse practitioner was able to manipulate the environment of the persons involved. Thus, a better understanding of the interaction among parent, child, and nurse practitioner was utilized. Being able to use the health exam to learn about parent-child interactions was a way in which the practitioner was able to identify particular infant behavior and responses to the parent and indicate their interest in the child's behavior (Barnard, Morisset, & Spieker, 1993). The promotion of the caregiver's ability to provide and promote change and interaction within the environment of the infant better enables the infant to develop an increased responsiveness to his or her environment.

Assumptions

For the purposes of the study, the following assumptions were made:
1. All infants between the ages of 2 and 12 months have formed an attachment to their parent figure.

2. Changes in infant behaviors are observable.

3. The parent and child are an interactive system that is influenced by the environment and by individual characteristics of each member of the relationship, allowing a mutually rewarding relationship to develop (Tomey & Alligood, 1998).

Purpose of the Study

The purpose of the study was to evaluate changes in infant behavior during an examination conducted in the parent’s lap or on an examination table.

Statement of the Problem

The competence of the parent in protecting the infant from undue stress, as well as the infant’s capacity to respond to that parent, may strongly affect the quality of the emerging relationship (Birns, Blank, & Bridger, 1966). Numerous research exists regarding the parent-infant attachment process. However, there is little research regarding how the attachment bond between parent and infant may be influenced by examination procedures. Little was known on how changes in an exam setting would impact
an infant’s behavior during examination in the parent’s lap versus performing the exam on an examination table.

Hypotheses

For the purposes of this study, the null hypotheses were as follows:

$H_{01}$: There would be no difference in behavior for the infant examined in the parent’s lap and for the infant examined on the examination table.

$H_{02}$: There would be no difference in the level of satisfaction for a parent who held an infant during an examination and a parent whose infant examination was conducted on an examination table.

Definition of Terms

For the purposes of the study, terms were defined as follows:

Infant: Theoretical: a baby or very young child; the youngest or smallest person in a group; a person who is a minor (Mish & Morse, 1994). Operational: a child, male or female, who was no less than 2 months old and no older than 12 months. The child was a full-term infant at birth and had no developmental delays or physical handicaps as evaluated by reviewing the infant’s medical record.
Behavior changes: Theoretical: any alteration in a person’s action in a physical nature. Operational: physiological changes in the infants of this study as measured by differences in pulse rate and physical expressions, such as a cry response and or change in facial expression. The behaviors were measured prior to examination of the infant and again during examination proceedings.

Examination: Theoretical: the process of inspection (Mish & Morse, 1994). Operational: the formal inspection of an infant from head to toe performed by a pediatrician, with one group evaluated on a table and the other group evaluated in the lap of a parent.

Parent: Theoretical: a person who cares for an infant, child, and or a teenager; a person who cares for and raises another person (Mish & Morse, 1994). Operational: the caregiver of the infant who was present during the examination.

Lap: Theoretical: the front part of the lower trunk and thighs of a seated person (Mish & Morse, 1994). Operational: being held in the parent’s arms and placed on the front part of the lower trunk and thighs of the caregiver while seated in a chair.
Examination table: Theoretical: a piece of furniture with a broad horizontal surface used for the inspection of patients. Operational: a flat surface on which the pediatrician placed the infant for examination.

Parental satisfaction: Theoretical: the caregiver's feelings of fulfillment of their needs. Operational: the caregiver's perception of need fulfillment following the examination of his or her infant as measured by completion of a satisfaction survey.

Summary

In this chapter, the research problem was identified. An establishment that a problem existed was supported by thorough research and evaluating theories of bonding and attachment significant to the nursing arena. A theoretical framework by Barnard (1966) was also addressed to support the need for understanding the important aspects of interaction among parent, infants, and health care providers. Finally, the purpose of the study, assumptions, hypotheses, and definition of terms were addressed. These attributes were significant in the establishment of a basis for this research.
Chapter II

Review of the Literature

An extensive literature review was conducted pertaining to parental-infant attachment and the infant examination process. Little research was identified which related to the correlation of parental-infant attachment and infant examinations. Several studies provided background information about the importance of touch and parental contact in relation to infant behavior. The following review of literature represents a summary of relevant documented studies relating to infant behavior during examination: proximity of the parent and the infant, the development of infant emotion regulation, a pediatrician's influence of the parent-infant relationship, how cry responses of infants may be determined by maternal touch, the use of social referencing in research, evaluation of pain and its effects on infant behavior, and certain age-related facial changes of infants in pain.
Parent-Infant Proximity

Anisfeld, Casper, Nozyce, and Cunningham (1990) conducted a baseline study to determine whether carrying an infant promoted attachment. The study focused on how infants were carried and how that procedure would affect maternal-infant attachment over a period of time. The researchers proposed three hypotheses. First, at 3½ months the infants carried in close physical contact with the mother would entice the mother to be more responsive and sensitive to that infant's needs during the infant's first few months of life. Second, Anisfeld et al. (1990) proposed that at 13 months the infants carried in close physical contact with the mother would be more securely attached than infants carried in an infant seat carrier. Third, Anisfeld et al. (1990) hypothesized that the responsiveness of the mother at 13 months would correlate to the responsiveness she exhibited at 3½ months. Bowlby's attachment theory was used to give direction for relating the importance of the proximity of the mother and infant in attachment and how certain infant behaviors, such as crying and vocalizing, reflect the responsiveness in which the maternal role addresses the infant.
The researchers used a timed series experimental design. The sample population was two groups of mothers and their infants in a low-income, inner-city area. The sample was randomly divided into a control group and an experimental group. The control group consisted of 26 mothers who used infant seats for carrying their babies, thus having less physical contact between the mother and the infant. The experimental group consisted of 23 mothers who used a soft infant carrier, or baby sling, to carry their babies allowing physical contact between the mother and the infant. Prior to any research, consents were obtained from participants in the study.

Data were gathered using several different types of instrumentation. The intervention or experimental aspect of the study was randomly administered by the researchers prior to the discharge of the mother and infant from the hospital setting. Each member of the prospective group was given either an infant seat carrier or a soft baby sling carrier. The experiment took place over a 13-month study period with frequent assessment periods. Introductory information was gathered using the Maternal Attitude Scale and the Brazelton Neonatal Assessment Scale to determine baseline information regarding each mother’s biases.
Follow-up data collection occurred at three points in time: 2 months, 3½ months, and 13 months.

At 2 months the researchers gathered data using the Lifestyle Questionnaire I, which allowed for documenting certain familial and environmental influences that could affect the study. Another tool used at this time was the Product Use Questionnaire so the mother could respond to questions relating to use of the device, such as how often, under what circumstances, and who used the device. At the 3½-month collection point, data were retrieved using the following tools: the Bayley Scales of Infant Development, videotaped sessions of mother-infant play sessions, the Carey Infant Temperament Scale, and the Product Use Questionnaire (Anisfeld et al., 1990). Finally, at 13 months, using the Ainsworth Strange Situation Scale, the Lifestyle Questionnaire II, and the Product Use Questionnaire, data were collected for analysis.

Two teams of researchers were employed to gather data for analysis in this study. One team of researchers knew the mothers' group assignment, and the second team was a blind study group that analyzed data through the videotaped play sessions (Anisfeld et al., 1990).
Descriptive conventional statistics were used to analyze the data. Anisfeld et al. (1990) conducted an analysis of associations between the dependent and independent variable by measuring the following: sex, parity, ethnicity, household composition, mother's education, perceived social support, method of feeding, Maternal Attitude Scale, infant irritability (NBAS), and infant temperament. Chi-square analysis was used for comparing the security of attachment between the mother and the infant. t tests were used for measuring the maternal responsivity and sensitivity to her infant.

Anisfeld et al. (1990) discovered that through the use of prolonged physical contact with the mother by using a soft baby carrier, mothers and infants become more responsive to one another, thereby forming more secure attachments. Findings of the study were classified into three groups of attachment between mother and infant: secure, insecure-avoidant, and insecure-resistant. In the experimental group 83% of the mother-infant dyad formed secure attachments, 13% formed insecure-avoidant attachments, and 4% formed insecure resistant attachments (p = .019). In the control group setting, 38.5% of the mother-infant dyad formed secure attachments, 38.5%
developed insecure-avoidant attachments, and 23% formed an insecure-resistant attachment. The maternal responsivity was measured by the mother's reaction to her infant's cries and vocalizations. The experimental group's mean was 61%, and the control group's mean was 44%, thus exemplifying that the experimental mothers were more responsive to their infants' behaviors (p < .02). Lastly, Anisfeld et al. (1990) indicated that the maternal sensitivity of the experimental group mothers was not significantly higher than the control group mothers (p = .09). The researchers stated that, "the experimental mothers were more contingently responsive and their infants were more likely to be securely attached" (Anisfeld et al., 1990, p. 1623). The significant differences in maternal behavior which emerged were that the mothers who carried their infants via the body carrier responded more contingently to their infants' vocalizations than the mothers of the babies carried in the seat carrier (p < .05).

Anisfeld et al. (1990) concluded that the causal relationship between how infants are carried, either through direct physical contact or by a non-physical contact route, greatly influences the attachment of an
infant to their mother. The different types of interventions in this study affected not only the attachment of the infant to his or her mother, but the way in which the mother responded to her infant’s needs. "The process of being carried close to the mother seems to have had an effect on the infant’s security of attachment above and beyond that attributable to increased maternal responsivity as measured in this study" (p. 1625).

The findings of their research are germane to the current study endeavor because of the importance found by Anisfeld et al. (1990) on the causal relationship of physical touch between the mother and the infant. Anisfeld et al. (1990) suggested that further study should involve the correlation of the influence of direct physical touch with the attachment process.

Development of Emotion Regulation

Field (1994) combined a data review to develop an essay on the effects of mothers’ physical and emotional unavailability in relation to infants’ ability to regulate emotional states. The author evaluated the impact of maternal absence and maternal unavailability in the emotional deregulation of the infant or child.
Field (1994) conducted a retrospective, observational study of infants, children, and their mothers. The sample population consisted of 40 infants and their mothers for the first and third aspects of the study and 20 infants and their mothers for the second aspect of the study. The first aspect of study included observations on how changes in children's behaviors, such as changes in activity and play levels, indicated the amount of stress they experienced during the mother's absence. The second aspect of the study evaluated the differences in sleep patterns and behavioral problems encountered by the children and how they correlated with what type of maternal separation was involved; either maternal separation after the birth of another child or a maternal business trip. The third aspect of the study evaluated how maternal emotional unavailability differed from maternal absence.

Field (1994) indicated that children adapt to separation from their mothers when not confronted with a change in the relationship (p < .05). Field exemplified that behavioral changes, such as activity levels and play levels of the children, are indicative of the ability of the infant to adapt to the situation. The hospitalization of the mother was significantly more stressful for
children than the maternal business trips (p < .05), as measured by changes in sleep and behavioral problems of the children. Lastly, emotional unavailability, whether it is physical maternal separation or a maternal lack of emotion (as demonstrated by a still face by the mother in the study), indicated that infants became more negative and agitated (p < .05) when the mother did not respond to them. These infant behaviors were measured by changes in smiling, vocalizing, gaze, crying, and behavioral gesturing (Field, 1994).

In conclusion, Field (1994) suggested that emotional dysregulation of children and infants may develop from either a brief or a prolonged separation from the mother. The author stated that the "harmonious interaction with the mother or primary caregiver is critical for the development of emotion regulation" (Field, 1994, p. 226). The long-term effects of early maternal emotional dysregulation are imperative regarding the development of an infant or child's emotional well-being. These aspects that need to be further evaluated. The outcomes of this study were important for the current research application by demonstrating how separation from parents and or
caregivers might affect measurable behaviors, such as facial responses and cry responses.

Influence of the Pediatrician

In 1980 Casey and Whitt conducted a study to determine how a pediatrician's guidance would affect mothers and infants. The goals of their study were to evaluate how guidance from a pediatrician might affect the mother-infant relationship and how an infant's development might be improved from the guidance. First, the researchers asked, "Can pediatricians promote interaction between the mother and infant in the first six months of the infant's life?" (Casey & Whitt, 1980, p. 816). Secondly, the researchers proposed the effectiveness of medical guidance and how the guidance might effect an infant's development by 6 months of age.

Casey and Whitt (1980) conducted a randomized, experimental design. The sample population consisted of three groups of mothers and their infants. The three groups of mothers and infants were as follows: experimental, control, and no contact. The members of the study came from a five-county, low-income area. Inclusion criteria for the mothers were primaparous, > 16 years of age, and planned to be the primary care provider to their
infants. The infant’s inclusion criteria were birth weight of > 2500 grams, > 36 weeks gestational age, and 5-minute Apgar score > 6.

The dyad statistics were as follows: experimental (n = 15), control (n = 17), and no contact (n = 12) (Casey & Whitt, 1980). The experimental and control mother-infant dyads were followed clinically by a single pediatrician at 2, 4, 8, 15, 21, and 27 weeks of age. Infants in the experimental and control groups received care that was consistent with guidelines set forth by the medical community. The infants in these groups received examinations, while the mothers received education and discussions of routine preventive care and nutrition for their infants. However, the experimental maternal-infant dyad received additional educational discussion of ways in which the mother might promote and stimulate her infant’s cognitive development. The no-contact group was used in order to control the potential effects of frequent visits of mothers and infants with the same pediatrician. These study participants did not receive the experimental education intervention. They did not have the same pediatrician at each of their checkups as well. Consents were obtained from all participants in the study, and
there was no financial charge to the participants for any of the examinations performed.

Data were collected to evaluate both the maternal-infant relationship and the infant's development at 27 weeks after the interventions at the scheduled visits. Introductory data were collected concerning demographics and attitudes prior to the first clinic visit. Casey and Whitt (1980) used eight different individual scales developed by Ainsworth to analyze the mother-infant relationship. These scales addressed the following dimensions of the mother-infant relationship: Sensitivity-Insensitivity, Cooperation-Inference, Accessibility-Ignoring, Interaction Offered, Interaction Appropriateness, Visual Contact, Vocal Contact, and Appropriateness of Play. Infant development was evaluated using the Bayley Mental Scales of Infant Development (MDI) and the Object Permanence and Vocal Imitation Scales of the Ordinal Scales of Psychological Development (Casey & Whitt, 1980). An assistant, who was blind to the study and the group assignments, collected data. The assistant observed the mother and infant in a room with a two-way mirror after the mother was instructed to play, as she wanted with her infant.
Chi-square analysis and t tests were used to measure the statistical data in this research study. Chi-square data analysis was conducted to assess categorical variables of demographics and maternal attitudes of the three groups (p < .05). t tests were used to analyze the data collected regarding the maternal-infant relationship and the infant’s cognitive development.

Casey and Whitt (1980) established that the mother-infant dyad which received the intervention rated significantly higher than the control group dyads in relation to the relationship between mother and infant as demonstrated by the t-test results for the continuous variables indicated on the eight scales of the Ainsworth scales. The results were "Interaction Appropriateness (p < .01), Cooperation-Interference (p < .01), Sensitivity-Insensitivity (p < .05), and Appropriateness of Play (p < .05)" (Casey & Whitt, 1980, p. 818). Measures on Accessibility-Ignoring, Interaction Offered, Vocal Contact, and Visual Contact were directed to the experimental group (p < .10). No significant differences emerged for infant developmental aspects on the MDI or on the Object Permanence Scale. With the Vocal Imitation Scale (p = .08), the experimental group performed higher
than the other two groups. The significant differences which emerged from this study were the effective ways in which counseling was provided by clinicians and how the counseling sessions improved the early mother-infant relationship and its effects on the child's long-term well-being (Casey & Whitt, 1980).

Casey and Whitt (1980) concluded "a brief pediatric intervention during child health supervision was effective in changing the relationship of these mothers and their infants in the first six weeks of life, as well as one aspect of infant development" (pp. 819-820). The researchers implied that a more active role for the clinician is imperative in facilitating the mother-child relationship. Lastly, the researchers stated that the role portrayed by the clinician in the maternal-infant relationship might have an effect on a child's intellectual performance and social development later in life.

The findings in this study are germane to the current research by correlating the importance of the practitioner role to the parental-infant relationship and changes in examination techniques. Evaluating changes in exam technique, such as having the infant in the parent's lap
as compared to examining the infant on the exam table, allows a better understanding to evolve on how changes within the environment might influence an infant’s behavior pattern. Because so many parents rely on their practitioner for guidance, a strong relationship among parent, child, and practitioner must be developed.

Infant Cry Response

Christensson, Cabrera, Christensson, Uvnas-Moberg, and Winberg (1995) completed a research study that helped to identify whether a separation distress call existed in the human neonate in the absence of maternal body contact. The researchers questioned whether immediate postnatal crying in the newborn might be an indicator of distress as seen in other mammalian species when separated from the mother. The research question used to guide this study was as follow: How would the infant recognize physical separation of mother and newborn? There was no cited applicable theory to guide this study (Christensson et al., 1995).

The researchers used a randomized, clinical, experimental design. The sample population consisted of three groups of newborns and their mothers. The groups were as follows: cot group (n = 14), skin-to-skin group
(n = 15), and cot/skin-to-skin group (n = 15). The cot group would be kept in an incubator type setup beneath the bed of the mother for 90 minutes following birth with no maternal contact. The skin-to-skin group would be placed on the mother’s chest for the 90-minute time period. Lastly, the cot/skin-to-skin group would be kept on a cot beneath the mother’s bed for 45 minutes following birth and then placed on the mother’s chest for the remaining 45 minutes. Inclusion criteria for the mothers and newborns were uncomplicated pregnancy, vaginal and uncomplicated delivery of a full-term healthy infant with no visible deformities, and only the use of a local anesthetic prior to episiotomy (Christensson et al., 1995). All infants were cared for in the normal hospital routine of delivery and preparation by being cleaned, assessed, and wrapped in a cotton cloth. This aspect of the study took approximately 4 to 12 minutes. The mothers were blind to group placement, and approval of the study was granted by local and institutional ethics committees.

Data were gathered by assessment of axillary temperatures, evaluation of the newborn’s cry responses, and by monitoring blood levels of cholecystokinin (CCK) and oxytocin in the newborn. Axillary temperatures were
taken at 5 to 14 minutes after birth and again at 90 minutes. A "tie microphone" that allowed for taped recordings of the newborn's crying was attached to each of the infant's towels in close proximity to the newborn's mouth. An in-vitro measurement was used to assess blood levels of cholecystokinin from the umbilical cord immediately after birth and again by a venous stick at 90 minutes. Mothers were asked to soothe their infants as normal but to not move the baby as the recorder might become loosened. No formal statistical tool was used to measure and report data (Christensson et al., 1995). A medical student who was experienced in newborn care, but blind to group assignments, was employed for data analysis. The audiotapes were listened to in 5-minute intervals with episodes of crying being recorded by the use of a stopwatch. Crying was defined as the total time from the onset of crying until crying had stopped (Christensson et al., 1995).

Christensson et al. (1995) applied descriptive statistics to analyze the data. The Mann-Whitney U test, t tests, and Spearman’s coefficient of correlation were used to assess data. The mean axillary temperature did not differ between groups at the beginning of the study (36.4
to 36.9°C). However, at the end of the study, both the skin-to-skin group and the cot/skin-to-skin groups had significantly higher ratings (p = < .001 and p < .03, respectively). Crying responses differed greatly. The median amounts of crying were 0 at 5 minutes for the skin-to-skin group, while crying was 7 to 42 seconds at 5 minutes for the cot group. The cot/skin-to-skin group followed the same pattern with more crying while away from the mother in the first 45 minutes and less crying while close to the mother. At 90 minutes, crying was as follows: cot group (p < .05), skin-to-skin group (p < .001), and cot/skin-to-skin group (p < .01). Lastly, Christensson et al. (1995) analyzed the blood samples. The researchers found a correlation between cholecystokinin levels in cord blood and venous blood collected at the 90-minute time frame after birth (r_s 0.62, p = < .001).

Christensson et al. (1995) concluded that the human infant recognizes a physical separation from the mother, thus beginning a distress call response. The researchers found that the cry was not dependent on an earlier social experience, thus indicating some form of genetic coding involvement. The researchers also assumed that the crying recorded in this study was a specific signal which
indicated the newborn's ability to communicate their preference for maternal body contact. Lastly, the researchers addressed that the neonatal cry elicited a maternal response to search and or retrieve their newborn for a survival value (Christensson et al., 1995).

The findings of this study are of interest to this researcher because of the clear points that are made in relation to physical contact between the parent and infant. Studying how clinicians might evaluate cry responses of the newborn and infant may aid in determining the importance of including the parent in the physical examination of an infant. The researchers suggested further study should involve a person other than the mother. Such a study would be of interest to evaluate the impact of other stimuli on the neonate, such as odor, auditory, and tactile stimulation.

Social Referencing

Mumme, Fernald, and Herrara (1996) conducted a study to evaluate infant responses to facial and vocal emotion signals in a social referencing paradigm. One goal of the study was to investigate whether facial or vocal expressions were sufficient to influence infant behavior in an ambiguous situation. The second goal was to test
whether positive and negative emotional signals of a caregiver were equally effective in influencing infant behavior. The third goal was to evaluate the usefulness of novel toy studies in providing data that would be comparable to other findings in the social referencing literature. The research question used to guide the study was: “To which particular feature of emotional signals are infants responsive?” (Mumme et al., 1996, p. 3219).

Mumme et al. (1996) used a randomized, clinical, experimental design. The sample population consisted of two groups of infants and their mothers. Inclusion criteria for the infants were 90 full-term healthy infants and their mothers from a middle-class population. The infants were between the ages of 12 and 13 months. The two groups of infants were separated into a facial signal group and a vocal signal group. Each infant was included in three experimental trials:

1. Neutral or baseline trial (control group): The mother expressed neutral affect toward a toy with regard to vocal or facial expression.

2. Expression trial: The mother expressed neutral, happy, or fearful affect toward a toy with regard to vocal or facial expression.
3. Happy trial: The mother expressed happy affect toward the toy so that all infants would end the experimental session positively.

The mothers within the facial signal group and vocal signal group were given a brief training and instruction session to insure understanding of vocal and facial expression they were to use in response to the toys. The study included the three between subject expressions that were found in the expression trial. These groups were then evaluated within the two mother-infant dyads (Mumme et al., 1996). There were five dependent measures in which coding of infant behavior responses were measured: looks to mother, infant proximity to toy, infant proximity to mother, positive affect of infant, and negative affect of infant (Mumme et al., 1996).

Mumme et al. (1996) performed statistical analysis using Pearson’s product-moment correlation and analyses of covariance. The results of the infant coding responses were not highly correlated. The highest correlation was in the face-only group of positive and negative affect, \( r = -0.40 \). In the voice-only group the highest correlation was between infant proximity to toy and infant proximity to mother, \( r = 0.37 \), and between durations of looks to
mother and negative affect of infant, $r = .37$. An ANCOVA analysis was used to examine covariance of the three expression groups. The findings were as follows: the neutral-voice group differed significantly from the fear-voice group on the measure of looks to mother, infant proximity to toy, and negative affect ($p < .05$), and the neutral-face group differed from the fear-face group on the measure of looks to mother ($p < .05$). The analysis of the infant’s expression in the face-only group with regard to positive and negative affect revealed only a minimal effect on sex ($p < .05$). Neither the happy-face group nor the fear-face group conditions differed significantly from the neutral-face group ($p > .10$). In the emotional response to vocal stimulation, the happy-voice group did not differ significantly from the neutral-voice group ($p > .10$). However, the multivariate effect for the neutral group, as opposed to the fear group, was marginally significant ($p = .07$) (Mumme et al., 1996).

The researchers found that the vocal responses influenced infant behaviors, while the infant’s proximity to its mother and the positive affect of the infant were not greatly influenced by either negative or positive vocalizations of the mother. Mumme et al. (1996)
established that there were few significant differences in infant responses to neutral, happy, and fearful facial expressions, but the infants were more prone to react to fearful vocalizations. The researchers stated, "social referencing research represents one of the most promising approaches to date for investigating early understanding of emotional communication" (Mumme et al., 1996, p. 3236).

Findings of this study important to the current research included the importance of the socialization of infants within their environment and with their caregiver. Analyzing infant vocalizations and facial responses to elements within their environment indicates the importance of studying behavioral changes of infants. The use of behavioral indicators is important in evaluating changes in infant behavior.

Pain and Infant Behavior

In 1995, Fuller and Conner conducted a study to determine if behavioral responses were reliable indicators of infant pain. The purpose of the study was to determine which behavioral or physiological measures were good clinical indicators of pain in 0- to 12-month-old infants. Two specific aims of the study were to determine which measures differed across four levels of long-lasting non-
procedural pain and the influence that age had upon changes in the levels of pain.

The researchers organized a nonrandomized, clinical, experimental design. The sample population consisted of 88 infants divided into a 16-cell matrix with five to six infants in each cell. There were four age groups and four levels of pain (LOP) groups. Inclusion criteria and matrix placement were dependent on the independent assessments of five expert, masters prepared, pediatric nurses. Age groups were divided as follows: 0 to 3 months, 4 to 6 months, 7 to 9 months, and 10 to 12 months. LOP groups were divided as follows: no pain, mild pain, moderate pain, and severe pain. The pain was due to a previous medical or surgical condition. In the no-pain category, pain resulted from hunger, frustration, or anxiety. Fifty of the infants were surgical patients, 33 of the infants were in various hospital settings, and five of the infants were videotaped at home. After identifying the subjects, parental informed consent forms were obtained, and the infants were then videotaped for 10 to 20 minutes in the hospital or home setting (Fuller & Conner, 1995).
Data were collected regarding infant health history, medical history, and general infant behavior. Variables addressed within this study were as follows:

1. Independent variables: age of infant and level of pain.

2. Dependent variables: physiological, behavioral, and cry measures. Physiological measures included apical heart rate prior to videotaping and the use of electrodes to monitor skin conductance during the videotaping sessions. Behavioral measures included positions and movements of the extremities, head, and trunk, any actions by the infant to console themselves, nurse caretaker actions, and any response to comfort measures applied to the infant. Cry measures were audiotaped from the videotapes and then digitized in a lab. The cry measures were based on the following: cry duration, mean pitch, jitter of pitch waves, shimmer of amplitude of cry cycles, measures of tenseness, formant frequencies, and mean cry energy (Fuller & Conner, 1995).

Data were analyzed with 2-level (LOP, age) MANOVA and ANOVA statistics. Alpha was set at < .05. Fuller and Conner (1995) reported that the physiological measure of heart rate of the infants was analyzed as $F(3, 72) = 6.01$,.
p = .017. This measure was broken down by showing that as the pain increased, the heart rate also increased as follows: no pain (LOP = 0) with a mean heart rate of 134, mild pain (LOP = 1) with a mean heart rate of 144, and moderate pain (LOP = 2) with a mean heart rate of 148, but decreased for severe pain (LOP = 3) with a mean heart rate of 144. Skin conductance of the infants was analyzed as $F(3, 72) = 5.14, p = .026,$ and was broken down by showing that as pain increased, the skin conductance decreased. The results were as follows: LOP = 0, 2.4 mhos (electrical current conductance measurement), LOP = 1, 2.1 mhos, LOP = 2, 1.3 mhos, and LOP = 3, 1.3 mhos. A 2-level (age, LOP) was conducted on the skin conductance variable and showed that age and LOP interaction were not significant and that these did not differ from the previous data with $F(3, 53) = 3.69, p = .017.$

The major differences in variables noted were in relation to the cry response. Fuller and Conner (1995) noted that infants’ cry responses were as follows for LOP responses: broadcast crying, oriented crying, and consolability. Broadcast crying results were as follows: LOP = 0 (M = 18.1 seconds), LOP = 1 (M = 18.7 seconds), LOP = 2 (M = 40.1 seconds), and LOP = 3 (M = 38.9 seconds).
with $p = .053$. Oriented crying results were as follows: LOP = 0 (M = 41.8), LOP = 1 (M = 41.4), LOP = 2 (M = 20.0), and LOP = 3 (M = 20.8) with $p = .054$. Consolability time in seconds results were as follows: LOP = 0 (M = 0.0), LOP = 1 (M = 20.2), LOP = 2 (M = 11.0), and LOP = 3 (M = 15.0) with $p = .011$ (Fuller & Conner, 1995).

LOP correlated with age indicated that cry response bout durations were longer with the 0- to 6-month-olds and shorter with the 7- to 12-month-old infants. There were no significant differences with LOP or age for the duration of the cry or any subcries.

In the 0- to 3-month-old infants, pitch ($p = .025$), jitter ($p = .04$), mean cry energy ($p = .02$), and second formants ($p = .04$) all increased. Pain plus anger, cheeks raising, eye closing, brow knitting and lowering, wrinkled nose with a lifted upper lip, stretch mouth, crying with squinting eyes, crying around pacifiers and concave funneled tongue all were other behaviors that increased with LOP in this age group. Head rolling, neutral brow, eyes and cheek neutrality, and consolability all decreased with increasing LOP in this age group.

In the 4- to 6-month-old infant group, behaviors that increased with increasing LOP were cry tenseness, mean cry
energy, generally broadcast cries, and static flexed elbow. Cry shimmer, holding head and trunk still, alert and quiet states, all rhythmic leg movements, and arm waving and skin conduction were all behaviors of this group that decreased as the LOP increased.

In the 7- to 9-month old infant groups behaviors that increased with increasing LOP were closing eyes, crying during sleep, and broadcast crying. Skin conductance, cry tenseness, cry pitch, second formant frequencies, and crying with squinted eyes all decreased with increasing LOP.

Finally, in the 10- to 12-month-old infant groups the static flexed leg was the only measurement that increased with increasing LOP. Consolability, rhythmic leg movements, brow knitting and lowering, and closing of eyes all decreased with increasing LOP (Fuller & Conner, 1995).

The significant differences that emerged from this study were that “heart rate data support the stress-arousal response to pain theory only for the no to moderate pain groups while changes in skin conduction did not support this theory” (Fuller & Conner, 1995, p. 266).

Fuller and Conner (1995) concluded that the behaviors of infants in regard to age combined differing results in
relation to developmental differences. "Infant development seems to affect measures of three types of behaviors: facial expressions, cry acoustic measures, and cry orientation" (p. 267). The researchers determined that the findings of this study provide objective validity for specific behaviors, such as facial expression, cry response, and consolability that are currently used by nurses and research suggestive of infant pain. The researchers also implied the importance of the correlation of age and developmental level of the infants when considering the use of certain behaviors (Fuller & Conner, 1995).

The findings in this study are of great importance to the current research due to the implications and justification of the use of specific infant behaviors. Fuller and Conner (1995) applied facial expression and cry responses, as well as measuring the physiological aspect of heart rate, which are both aspects of behavioral measure that are applicable to this current research study. The above research study validated the use of specific infant behaviors to assess changes in infant behavior.
Age-Related Facial Changes of Pain

Lilley, Craig, and Grunau conducted a study in 1997 which studied age-related changes in the facial expression of pain in the first 18 months of life regarding assessing and understanding pain. The goal of the study was to determine if the changes in facial expression that occurred during a painful procedure were dictated by the developmental age of the child. The researchers' stated purpose was to better understand the transformation in the pain experience and provide the incorporation of age into data for measuring pain in young children.

A cross-sectional research design was implemented for this study. The setting was in four child health clinics in Vancouver Health Department. The geographic area consisted of people from various ethnic and socioeconomic backgrounds. The sample population consisted of five groups of infants who were brought to the clinics for immunizations. The five groups of infants were 2-month old, 4-month old, 6-month old, 12-month old, and 18-month old. The total number of participants was 75, thus each age dyad had 15 participants. Children were excluded from the study for the following reasons: non-English speaking or reading parent and infants greater than 31 days older.
than the above mentioned age group ranges (Lilley et al., 1997). A parental informed consent was required for participation in the study.

Data were collected by tape recording interaction during the immunization process. The nurse administering the vaccine stated “now” as she gave the injection. Following administration of the vaccine(s), the participants were instructed to wait for 15 minutes to complete a questionnaire package and to ensure that their child did not experience any vaccine reaction. The questionnaire package contained demographic and descriptive information, as well as the Bate’s Infant Characteristics Questionnaire, which is a measure of temperament. The Infant Characteristics Questionnaire is broken down into two forms. The 6-month form is for infants 2 to 6 months of age and the 13-month form, is for infants 12 to 18 months of age. The Neonatal Facial Coding System and the Baby FACS were the tools used to measure facial responsivity of the infants. Both of these tools rate a set of precisely defined facial actions, such as an open mouth or a lowered brow (Lilley et al., 1997).

Measurements of the Neonatal Facial Coding System and the Baby FACS were taken at three intervals: baseline (prior
to injection), at the time of injection, and in the recovery phase.

Extraneous variables were identified as continuous or categorical. Continuous variables included time since fed and time since waking. Categorical variables included clinic site, immunization nurse, gender of child, birth order of child, prematurity, gender of parent holding the child, and parental administration of acetaminophen prior to vaccine administration (Lilley et al., 1997).

Data were statistically calculated using means and percentages to delineate background characteristics of the infants. Chi-square analysis was used to evaluate the relationship associated with age, and ANOVAs were used to evaluate the temperament relationship of the child. First, the relationship between age and temperament was examined with a one-way ANOVA and yielded no significant relationship (p > 0.5) (Lilley et al., 1997).

Second, facial actions used to calculate pain summary were derived from the NFCS and Baby FACS and were highly significant at the injection and recovery phase, $r = 0.79$, $p < .001$. Results from the 6-month and 13-month form explained the relationship between pain and temperament. The mean scores of the 6- and 13-month forms were 17.29
with a standard deviation (SD) = 4.54 and a range of 9 to 29 and 29.12 with an SD = 5.71 and a range of 16 to 41, respectively (Lilley et al., 1997). Pearson’s r correlations between pain summary scores and temperament resulted in the following for the NFCS: baseline (n = 71, r = -0.08, p = > .50), injection (n = 75, r = 0.14, p = > .20), and recovery (n = 55, r = 0.00, p = > .90). Pearson’s r correlation between pain summary score and temperament resulted in the following for the Baby FACS: baseline (n = 71, r = -0.01, p = > .90), injection (n = 75, r = -.09, p = > .40), and recovery (n = 55, r = -0.13, p = > .30) (Lilley et al., 1997).

Third, developmental changes in the amount of pain expressed revealed a pain score higher during the injection event than during the baseline event for both the NFCS data and the Baby FACS as shown by F = 157.64, p < .001, and F = 117.63, p < .001, respectively. Thus, the interaction between age and event was nonsignificant. However, the 2-month-old infants showed significantly higher findings than the 4-, 6-, and 12-month-old infants (p < .01).

Fourth, developmental changes in the nature of the pain expression were analyzed with MANOVAs and followed
with univariate ANOVAs and Tukey tests. Eighteen- and 6-month-old infants scored higher than the 4-month-old infants on furrowing of the nasolabial folds (p < .005). Eighteen-month-olds scored higher than the 4-month-old infants on the brow bulge (p < .005).

Finally, soothing interventions by the parents were examined with chi-square analysis. The study demonstrated that infants who were cradled (p < .0001) were more likely to be comforted than infants who were held upright by the parent (p < .01) (Lilley et al., 1997).

The researchers concluded that a configuration of facial expressions and behaviors occurred in response to a painful event. A second conclusion was the ability of the infants to lower and draw together their brow, tighten the muscles around their eyes, close their eyes, deepen their nasolabial furrows, and open their mouths displaying a tense, cupped tongue. These expressions are all indicative behaviors of a pain reaction. A final conclusion, the researchers state, was that while the statistical power of the research was not sufficiently evident, the relative absence of large developmental differences in individual action does support the factor that age, facial
expression, and pain are all entwined with one another (Lilley et al., 1997).

The findings in this study show that facial expression should be an integral aspect when assessing infant behavior changes. In the present study, evaluation of infant facial expression is essential.

Summary

The studies included in this literature review have addressed factors that are presumed to have an effect on the parental-infant attachment process. The linkage of the literature reviews to how infant behaviors might be influenced during examination is impressive. The changes during separation from the parent may greatly affect the actions of the infant during examination. In reviewing the research studies presented previously, the findings are correlated to exemplify how changes in infant behaviors may be used to identify and evaluate attachment among infant, parent, and caregiver. By illustrating the importance of touch and physical contact, the attachment process among infants, parents, and their health care provider will be exemplified through the exam process.
Chapter III
The Method

The purpose of the study was to evaluate changes in infant behavior during examination in the parent’s lap or on an examination table. In this chapter, methods used to study the variables of interest are identified. The research design, setting, population, and sample are described. The instrument used for measurement is discussed as well as the procedure for data collection. Finally, the methods of data analysis were identified.

Design of the Study

A quasi-experimental, two-group design was used to conduct the study. The research design involved the manipulation of an independent variable but lacked at least one of the other two properties that characterize true experiments: randomization or a control group (Polit & Hungler, 1999). The study qualified as a quasi-experimental design because there was no randomization of the two groups of infants.
Variables

The dependent variables for the study were the changes in infant behaviors as measured by pulse rate, facial expression, and cry responses. The independent variable was the manipulation of the examination technique by performing the exam in the parent’s lap or performing the examination on an exam table. For the purpose of this study, it was assumed that the parent and the infant had formed an attachment to one another.

Extraneous variables are those variables which confound the relationship between the independent and dependent variables and which need to be controlled by either the research design or the statistical analysis procedures (Polit & Hungler, 1999). Attempts were made to identify and control extraneous variables. For example, the research design eliminated an extraneous variable by limiting the study to infants between the ages of 2 months and 12 months. A child younger than 2 months may not have completed a bonding process with the caregiver and children older than 12 months have been too involved with the progression of developmental staging and exhibit greater separation anxiety when removed from the parent. Children who were premature and had documented
developmental delays or had physical handicaps were not included in the study because of the impact of growth and development with the bonding process. Also, no acutely ill children were used in the study because of the possibility of exaggerated behavior responses caused by illness. For example, a child with fever might have an increased pulse rate and be more apt to cry. By controlling variables, no extraneous variables were identified in the study.

Limitations

The following limitations were identified for the study:

1. The researcher-designed assessment record has no established reliability or validity.

2. The generalizations of the results are limited to the specific population of the study: a child, male or female, who was no less than 2 months old and no older than 12 months old, a full-term infant at birth, and had no developmental delays or physical handicaps.

3. The nonrandomized convenience sampling technique generated a sample of the population mainly consisting of Caucasian infants and their mothers.

4. The small sample size was a limitation to the interpretation of statistical analyses.
Setting, Population, and Sample

The setting for the study was an urban community of a southern state. The study was conducted in a private pediatrician's office during well-child clinic hours. The well-child exams were conducted 4 days each week for one hour each day. Approximately 5 to 6 well-child exams were scheduled during this time with ages ranging from newborn to 16 years.

The population of the community area was approximately 175,000. The community has varying socioeconomic classes and ethnic groups. The dominant groups were Caucasian and African American. The target population for the study was infants, 2 months to 12 months of age, full-term, without any documented developmental delays, or any physical handicaps. The caregivers were present. The study sample consisted of 24 infants and their parent(s) who attended a well-child examination at a private pediatrician's office. One group of infants was examined in the parent's lap, and one group of infants was examined on the examination table. The lap group consisted of 13 infants and their parents, and the table group consisted of 11 infants and their parent(s).
Methods of Data Collection

Instrumentation. A researcher-developed assessment tool to delineate demographics of the study was utilized to gather key identifying characteristics of the participants (see Appendix A). The instrument used to measure the variables of the study was the Davidson Physiologic Assessment Record (see Appendix B). The latter record was a researcher-developed recording aid that allowed the researcher to record the changes in pulse rate, facial expressions, and cry responses of the infant participants of the study. Upon completion of the examination, the parents completed a questionnaire regarding their satisfaction with the examination and the research procedures (see Appendix C). To establish face validity of the researcher-designed tool, review of the tool was made by faculty committee member evaluation and literature review.

Procedure. Permission to conduct the study was first obtained from the Committee on the Use of Human Subjects in Experimentation of Mississippi University for Women (see Appendix D). Then permission was obtained from a pediatrician in private practice in a southern state to conduct a research study with patients who attended that
medical practice (see Appendix E). After approval was granted from the pediatrician, the researcher attended clinic at the physician’s office daily during well-child exam times. Subjects were chosen on a non-randomized convenience sample approach. Participants were screened for inclusion in this study by the researcher reviewing daily clinic logs and by reviewing the medical records of the infants scheduled for appointments. After determining if the infants were the appropriate age, the consent agreement from the parent was obtained to participate in the study. A brief explanation of the study and its purpose was given to the participants. The subjects who agreed to take part in this study were required to sign a letter of consent prior to participation in the study (see Appendix F). The participants were also informed that they could withdraw from the study at any time. Confidentiality was assured by using only birth dates and assigning a number to the participants. All data were shredded after analysis was performed.

The pediatrician performed examination of 24 infants at the clinic site in an exam room one at a time. The gathering of data took 4 weeks to complete due to clinic scheduling. Infants number one to five, 11 to 15, and 22
to 24 were examined in the parent’s lap, while infants numbered 6 to 10 and 16 to 21 were examined on the examination table.

The pulse rate, facial expression, and any cry responses were recorded at the beginning of the exam in the parent’s lap, after the consent was signed prior to the start of the physical examination and again after the completion of the examination on either the parent’s lap or the examination table according to group assignment. The pulse rate was recorded by taking an apical pulse with a stethoscope and counting for 60 seconds. The initial facial expression, any subsequent changes of facial expressions, and any cry responses of the infant were assessed using the Davidson Physiologic Assessment Record. Both the table group and the lap group of infants were monitored, assessed, and recorded in the same manner. After completion of the examination, the researcher asked the parents to fill out the Post-Examination Survey to rate needs fulfillment.

Methods of Data Analysis

Descriptive statistics were used to delineate the findings of the research study. The researcher performed statistical analysis of the study by employing the
services of a statistician. The researcher compiled and formulated the data received in the course of the research study. The pulse rate, facial changes, and cry responses of the infant were analyzed using t tests and the Mann-Whitney U test. Demographics were analyzed with percentages and means. The t test was used to determine the differences in the levels of parental satisfaction.

Summary

In this chapter, the design of the current study was discussed. The variables, limitations, and the setting, population, sample, and instrumentation were presented as well as the methods of data collection. Finally, the methods of data analysis were identified. These discussions were a necessity to establish the rationale for the current study. The discussions were also an introduction to Chapter IV, which includes a presentation of the research findings.
Chapter IV

The Findings

The purpose of this two-group, quasi-experimental study was to evaluate changes in infant behavior during examinations conducted in the parent's lap or on an examination table. Barnard's Parent-Child Interaction Model provided the theoretical framework for the study. Data were collected using three instruments: a researcher-developed tool to record pulse rate, facial changes, and cry response of the infants, a demographic survey to record identifying data, and a needs fulfillment survey to rate parental satisfaction. In this chapter, the sample is described and the results of the data analysis are presented.

Description of the Sample

The sample of this study consisted of primarily Caucasian mothers with infants between the ages of 2 months and 12 months. The subjects (N = 24) were infants
who ranged in age from 2 months to 12 months with a mean age of 6 months. Age distribution is depicted in Table 1.

Table 1

Age Distribution of Sample by Frequency and Percentage

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>f&lt;sup&gt;a&lt;/sup&gt;</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>8.1</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td>41.7</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>4.2</td>
</tr>
</tbody>
</table>

<sup>a</sup>N = 24.

There were 11 males (45.8%) and 13 females (54.2%). Eighteen of the infants were Caucasian (75%), and 6 were African American (25%). Demographics related to relationship to the infant, primary caregiver, and other caregiver are presented in Table 2.
Table 2

Demographics of Relationship to the Infant, Primary Caregiver, and Other Caregiver by Frequency and Percentage

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>f^a</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Relationship to infant</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>19</td>
<td>79.1</td>
</tr>
<tr>
<td>Father</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>Grandparent</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Primary caregiver</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>22</td>
<td>91.6</td>
</tr>
<tr>
<td>Father</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Grandparent</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Other caregiver</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Daycare center</td>
<td>4</td>
<td>16.7</td>
</tr>
<tr>
<td>Friends or relatives</td>
<td>16</td>
<td>66.6</td>
</tr>
<tr>
<td>Babysitter at home</td>
<td>3</td>
<td>12.5</td>
</tr>
</tbody>
</table>

^aN = 24.

The group assignment of examination in the parent's lap or on an examination table is described in Table 3.
Table 3

Place of Examination by Frequency and Percentage

<table>
<thead>
<tr>
<th>Variable</th>
<th>$f^a$</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent's lap</td>
<td>13</td>
<td>54.2</td>
</tr>
<tr>
<td>Examination table</td>
<td>11</td>
<td>45.8</td>
</tr>
</tbody>
</table>

*N = 24.

Results of Data Analysis

The null hypotheses that were used for the study were the following:

$H_0_1$: There would be no difference in behavior for the infant examined in the parent's lap and for the infant examined on the examination table.

$H_0_2$: There would be no difference in the level of satisfaction for a parent who held an infant during an examination and a parent whose infant examination was conducted on an examination table.

Infant behaviors were measured and recorded by using a researcher-developed tool with face validity. The level of parental satisfaction was measured by a needs fulfillment survey. Infant behaviors included pulse rate, facial changes, and cry responses. Each infant's behavior
was recorded pre-examination in the parent's lap and post-examination in either the parent's lap or on the examination table in accordance with their group assignment.

The pulse rates of all the infants ranged from 90 to 120 beats per minute pre-examination, with a mean pulse rate of 105.17. Pulse rates for the lap group post-examination ranged from 90 to 130 beats per minute, with a mean of 110.62, while pulse rates for the examination table group post-examination ranged from 110 to 160 beats per minute and demonstrated a mean of 128.55. The infants examined in the parent’s lap had a lower post-assessment pulse rate than the infants examined on the examination table. t tests were used to compare infants examined in the parent’s lap and infants examined on the examination table for the behavioral indices of pre-assessment pulse and post-assessment pulse. Assumptions of the t tests include the following:

1. The independent variable is categorical; there are two mutually exclusive groups.

2. Distribution of the dependent variable is normal.
3. Variances of the dependent variable for the two groups are similar, thus implying that the two groups are from a single population.

Table 4 illustrates the comparison using t tests.

Table 4
Comparison of Pulse Rates of Infants During Examination Using t-Tests

<table>
<thead>
<tr>
<th></th>
<th>Parent's lap(a)</th>
<th>Exam table(b)</th>
<th>(t)</th>
<th>(df)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse</td>
<td>(M)</td>
<td>(SD)</td>
<td>(M)</td>
<td>(SD)</td>
<td></td>
</tr>
<tr>
<td>Pre-assessment</td>
<td>104.5</td>
<td>11.1</td>
<td>106.0</td>
<td>12.5</td>
<td>-0.320</td>
</tr>
<tr>
<td>Post-assessment</td>
<td>110.6</td>
<td>12.3</td>
<td>128.6</td>
<td>15.8</td>
<td>-3.125</td>
</tr>
</tbody>
</table>

Note. \(N = 24\).  
\(a\)\(n = 13\).  \(b\)\(n = 11\).  
*\(p < .05\).

Mann-Whitney U tests were used to compare infants examined in the parent's lap and infants examined on the examination table for the infant behaviors of facial rating and crying time responses. There was no statistical difference in the pre-assessment facial rating of the two
infant groups (p = .311). The post-assessment facial rating was significantly higher for the infants examined in the parent’s lap than for the infants examined on the examination table (p = .001). There was no statistically significant difference in the pre-assessment crying time of the two infant groups (p = .116). The post-assessment crying time was significantly lower for the infants examined in the parent’s lap as compared to the infants examined on the examination table (p = .001). Facial expressions were ranked and rated according to the degree of change expressed on the infant’s face. A rating of 1 indicated a sleeping face, 2 indicated a small smile, 3 indicated a smile with a giggle, 4 indicated a small frown, and 5 indicated an open mouth cry and furrowed brow. Crying time was ranked from 1 to 5 in 10-second intervals. Table 5 illustrates the comparison of the two infant groups.
Table 5

Mann-Whitney U Comparison of Facial Responses and Cry Responses of Infants During Examination

<table>
<thead>
<tr>
<th>Infant behavior</th>
<th>M</th>
<th>SD</th>
<th>U</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Facial rating</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent's lap</td>
<td>3.77</td>
<td>0.73</td>
<td>55.5</td>
<td>.311</td>
</tr>
<tr>
<td>Exam table</td>
<td>3.27</td>
<td>1.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-assessment</td>
<td>3.46</td>
<td>1.27</td>
<td>18.5</td>
<td>.001*</td>
</tr>
<tr>
<td>Parent's lap</td>
<td>1.55</td>
<td>0.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exam table</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Crying time</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parent's lap</td>
<td>1.00</td>
<td>0.00</td>
<td>58.5</td>
<td>.116</td>
</tr>
<tr>
<td>Exam table</td>
<td>1.27</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-assessment</td>
<td>1.31</td>
<td>0.63</td>
<td>17.5</td>
<td>.001*</td>
</tr>
<tr>
<td>Parent's lap</td>
<td>2.82</td>
<td>1.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exam table</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 24.

*p < .05.

Pre-assessment infant behaviors of pulse rate, facial expression, and crying time were not significantly different from infants examined in the parent's lap and infants examined on the examination table. However, post-assessment infant behaviors of pulse rate, facial expression, and crying time were significantly different.
between infants examined in the parent’s lap and on an examination table.

Parental satisfaction was scored with a t test to compare the level of satisfaction for parents who held their infants during the examination and the level of satisfaction for parents whose infants were examined on the examination table. There was no statistically significant difference in the level of satisfaction between the two parent groups \( t = -0.148, \text{ df } = 0.883 \). All parents reported a high to very satisfied level of satisfaction with the examination process. Parental satisfaction was done on a rating scale of 0 to 4, with 0 being not satisfied to 4 being highly satisfied.

Satisfaction of the parents was evaluated by how they thought their infant acted during the examination by ranking the infant’s behavior as happy, content, angry, or fussy. A t test analysis using a cross-tabulation method evaluated the level of parental satisfaction. Table 6 illustrates the level of parental satisfaction.
Table 6

Comparison of Parental Satisfaction Levels using t Tests

<table>
<thead>
<tr>
<th>Group</th>
<th>M</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent’s lap</td>
<td>4.23</td>
<td>0.73</td>
<td>-0.148</td>
<td>22</td>
<td>.883</td>
</tr>
<tr>
<td>Exam table</td>
<td>4.27</td>
<td>0.65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. N = 24.

a n = 13. b n = 11.

Summary

In this chapter, the findings were presented and a description of the sample and the results of data analysis were given. These discussions were imperative in evaluating the purpose to this research study.
Chapter V

The Outcomes

This two-group, quasi-experimental study was designed to evaluate changes in infant behavior during examination in the parent’s lap or on an examination table. Barnard’s Parent-Child Interaction Model provided the theoretical framework for the study.

The sample consisted of 24 infants ranging in age from 2 months to 12 months and their parents. The participants of the study were obtained from a private pediatrician’s office in an urban community of a southern state. Three instruments were used to gather data. Demographics were obtained using a survey and analyzed with means and percentages. Parental satisfaction was measured by a survey and analyzed with t tests. Infant behaviors were measured with a researcher-developed recording tool and analyzed with a t test and Mann-Whitney U. This chapter presents a summary and discussion of the findings for this study. Conclusions are made related to
these findings, the implications for nursing are examined, and recommendations for future study are offered.

Summary of Findings

Statistical analysis consisted of descriptive statistics using percentages, frequencies, and means. t tests and Mann-Whitney U analysis were also utilized. The sample consisted of primarily white infants ages 2 to 12 months and their mothers. The infants participating in the study were primarily cared for by the mother, or if the mother was not available another family member or family friend cared for the infant in their absence.

A statistically significant outcome emerged between the relationship of infant behaviors during examination in the parent’s lap or on an examination table. Therefore, the null hypothesis that stated there would be differences in behaviors for the infant examined in the parent’s lap and for the infant examined on the examination table was rejected.

There was no significant difference relating to the level of parental satisfaction of an examination performed in the parent’s lap or on an examination table. The null hypothesis stating that there would be no difference in the level of satisfaction for a parent who held an infant
during an examination and a parent whose infant examination was conducted on an examination table failed to be rejected.

Additional Findings

The study revealed that infants remained calmer and showed less evidence of behavioral changes if examined in the parent's lap. Also, mild illness did not seem to alter the results of the study. Five of the infants during the course of the well-child exam were found to have a mild cold or an early otitis media. None of these infants had an elevated temperature. The ability of the parent or caregiver to comfort the child in the course of examination seemed to display a more soothing and calmer infant, as expressed by little or no changes in pulse rate, facial changes, or cry responses. Some of the infants even smiled and cooed while in the parents' laps during examination.

Discussion

The changes in infant behavior during examination may be linked with the theory of how attachment is involved with evaluating infant behaviors. In a study by Anisfeld et al. (1990), the researchers found that the causal
relationship of physical touch between mother and infant had an impact on the parental-infant attachment process. The results of the current study supported the conclusions of Anisfeld et al. (1990) by incorporating the act of touch with the infants being held by the parent during the examination. The infants who were held by the primary caregiver in this study repeatedly had lower heart rates and displayed little, if any, changes in their facial expressions and few cry responses. The median age group for this study was 6-month-old infants.

The researcher’s findings demonstrated that the infants displayed few changes in behavior during examination in the parent’s lap. These findings support the theory that a secure attachment had formed between the infant and caregiver, which contributed to a calmer infant during examination. Whereas, infants who were examined on the table displayed greater changes in pulse, cry responses, and facial rating scores, thus displaying a higher degree of emotion when removed from their attachment figure.

Field (1994) postulated that separations of the infant from the parent could provide and promote emotional dysregulation in the infant. Field (1994) stated that
demonstration of changes in measurable behaviors could aid in the research of emotional development in infancy. Thus, by evaluating infant behaviors, such as pulse rates, facial changes, and cry responses, the research in the current study supported Field's theory that when infants were removed from the parent an emotional dysregulation occurred as evidenced in changing infant behaviors. The infant behavioral changes were also recounted in the research of Christensson et al. (1995). These researchers evaluated various cry responses and found the amount of time an infant cried was a good indicator of parental attachment. The infants of the current research study displayed increased crying times when removed from their parent and examination was performed on the examination table.

The reaction the infant displays within their environment was another aspect involved with analyzing infant behaviors. Many infants, especially older infants, have had previous experiences with examinations, whether sick or well, and may have formed a fear of examination of certain events, such as immunizations. Thus, these infants might display greater changes in their behavior and bring with them some form of memory of a previous examination
experience. The pediatrician, who conducted the examinations in this study, primarily conducted infant examination in the parent's lap. She consistently paid particular attention to the level of parental attachment, level of development, and experiences of the older infants. The younger infants, for example the 2-month-olds, have limited experience with examination, thus may not respond significantly to changes with the use of the parent's lap or the table for an examination. However, the findings in this study demonstrated that no matter what age the infants displayed a greater stress behavior if examined away from the primary caregiver.

The second null hypothesis used in this research stated there would be no difference in the level of parental satisfaction of exams conducted in the parent's lap or on an examination table. Mumme et al. (1996) supported this hypothesis by including the importance of the aspect of infant socialization within their environment. Mumme et al. (1996) stated that the social experiences an infant underwent might have an effect on the attachment between parent and infant. The researchers of that study determined that the social behaviors an infant displayed had an influence on the parental figure
of the infants involved in their study. Mumme et al. (1996) postulated that the behavior of the infants and parents had a direct relation on one another. The parents involved in the current research study showed no differences in their level of satisfaction with either type of examination performed. This finding was not significant in relation to the parents, perhaps because a trusting relationship had already developed between the pediatrician caring for their children and the parents. The number of 6-month-olds in this study also might account for the high level of parental satisfaction with examination techniques. The parents and the infants who were over 6 months have had longer time to establish a firm attachment to one another and establish greater confidence in the pediatrician because of repeated exposure to examinations. Parents of older infants are also more secure with the physical and emotional development of their infants. The ability of the parent and infant to be separated from one another for brief time periods indicated the confidence of attachment between the parent and infant.

Fuller and Conner (1995) explored the aspects of infant development and behavior associated with painful
stimuli and experiences and postulated that the separation from the parent during painful procedures caused an increase in negative infant behaviors. Casey and Whitt (1980) studied how the influence of a pediatrician's interventions was utilized in relation to attachment formation during infant exam. The researchers concluded that pediatricians were effective in aiding the development of healthy relationships between parent and infant.

Implications for Nursing

The findings of this study can be utilized by nurse practitioners in primary care settings to evaluate ways in which they might perform examinations on their patients. The ability of the practitioner to be cognizant of the attachment needs of infants is one way in which his or her role as a health care provider may aid in developing a positive relationship with his or her patients. If a parent feels his or her infant was comfortable during an examination, the parent will be more likely to return for subsequent appointments and more confident in the practitioner. The parent's ability to feel as though he or she are a part of the examination process may allow them to have some degree of control and guidance with the
child's examination process. Lobar and Phillips (1992) and Oehler et al. (1992) both suggested that direct impact of parental stimulation and bonding influences how infants react to changes in their environment. Observing the parents holding, kissing, and stroking their infants during examination allows emotional and physical behaviors to be observed, as well as observing the attachment between the parent and infant. The ability of the parent to demonstrate attachment behaviors enhances the active participation of the parent in the examination process. Understanding infant behavior and development allows the nurse practitioner to understand more readily the needs of the patients.

The application of Barnard's Parent-Child Interaction Model assisted the researcher in viewing the parent, infant, health care provider, and the environment as an interactive entity. Barnard (1982) postulated that the environment of the infant plays a primary role in stimulating the growth, development, and well-being of an infant. Barnard's theoretical framework allowed the researcher to view the changes made in a physical examination to be a factor affecting an infant's environment. The removal of an infant from the parent
allows the inanimate environment to affect the emotional and physical well-being of the infant. The environmental stimulation that the infant was subjected to results in stress changes in the infant’s behavior. Although most of the infants in this study who were on the examination table had changes in infant behavior, some infants who were examined in the parent’s lap did exemplify minor variations in their behavior as well. These behavioral variations included brief moments of crying while having their ears and throats examined; however, these infants were easily comforted back to a calm state by the parent’s displays of stroking, talking to, and hugging the infants. Thus, the interactive availability of parental attachment was expressed through these changes in infant behaviors. The belief that the parents should hold their infant during examination can be applied to nursing practice and education, allowing the practitioner to guide and foster attachment formation between parent and child.

Recommendations for Further Study

Additional research can further determine the effects of examination on infant behaviors, parental satisfaction, parental behavior, and further involvement of well-child
health care. Therefore, the following recommendations were made:

1. Conduction of a study utilizing a larger, more diverse sample.
2. Conduction of a study evaluating changes in the parent's behavior during examination of infants.
3. Conduction of a study comparing the changes between well infants and ill infants.
4. Conduction of a survey of clinicians' preferences of the examination technique in which they utilize for infant examination.

Further evaluation of infant behaviors during examination settings could be conducted by qualitative research to provide an open, personal effect of how changes in examination technique might affect the infant's behavior as well as the parent's level of satisfaction with the infant's examination.

Summary

In this chapter, an outcome presentation of the conducted research was presented. The results of this study indicated that infants who were examined on the parent's lap were less likely to demonstrate stress changes in infant behaviors, regardless of the age of the
infant. Parental satisfaction of the examination performance was not affected regarding the type of examination. A discussion of the research findings was explicated, as well as additional findings observed over the course of research. All parents were satisfied to some degree with the examination of their infants. Although the sample size in the current study was small and may not have been representative of the general population, this study indicated that examinations in the parent’s lap were less likely to cause changes in infant behavior during examination. Discussions of pertinent previous research studies were made in relation to the findings of this research study. Implications for nursing practice and education, nursing theory, and nursing research were also presented.
References


Barnard, K. (1982). The research cycle: Nursing, the profession, the discipline. Western Journal of Nursing Research, 4, 1-12.


APPENDIX A

DEMOGRAPHIC DATA FORM
Demographic Data Form

Infant’s number: __________  Infant’s date of birth: __________

Infant’s sex
☐ 1. Male
☐ 2. Female

Race (please check one)
☐ 1. African American
☐ 2. Caucasian
☐ 3. Hispanic
☐ 4. Asian
☐ 5. Other. Please specify: __________

A. What is your relationship to the infant? Please check one.
☐ 1. Mother
☐ 2. Father
☐ 3. Brother/sister
☐ 4. Grandparent or relative. Please specify: __________
☐ 5. Other. Please specify: __________

B. Who is the person that cares for this infant most of the time? Please check one.
☐ 1. Infant’s mother
☐ 2. Infant’s father
☐ 3. Infant’s brother/sister
☐ 4. Infant’s grandparent or relative. Please specify: __________
☐ 5. Other. Please specify: __________

C. If the person who primarily cares for the child is gone, where does the infant stay?
☐ 1. Daycare center
☐ 2. Friends or relatives
☐ 3. With a baby sitter at home
☐ 4. Other. Please specify: __________
Davidson Physiologic Assessment Record

Infant’s number: __________________________ Infant’s date of birth: __________________________

Infant’s sex
☐ 1. Male ☐ 2. Female

Group assignment
☐ 1. Parent’s lap
☐ 2. Examination table

Pre-assessment vital signs
1. Pulse: __________________________
2. Face expression rating:
3. Crying time
   ☐ a. 0 seconds
   ☐ b. 1 to 10 seconds
   ☐ c. 11 to 20 seconds
   ☐ d. 21 to 30 seconds
   ☐ e. More than 30 seconds

Post-assessment vital signs
1. Pulse: __________________________
2. Face expression rating:
3. Crying time
   ☐ a. 0 seconds
   ☐ b. 1 to 10 seconds
   ☐ c. 11 to 20 seconds
   ☐ d. 21 to 30 seconds
   ☐ e. More than 30 seconds

*Face expression rating:
1 = No smile, no frown, i.e. sleeping face
2 = Small smile, corners of mouth turned up
3 = Smile with open mouth--may giggle
4 = Small frown, bottom lip protrudes outward
5 = Frown with open mouth and furrowed brow--may cry
APPENDIX C

POST-EXAMINATION SURVEY
Post-Examination Survey

Infant’s number: ___________________ Infant’s date of birth: ___________________

Please place a check (√) by your response to the following questions:

A. Was your infant examined in the lap or on the examination table?
   □ 1. Lap
   □ 2. Examination table

B. If the infant was examined in the lap, whose lap was the infant examined on?
   □ 1. Infant’s mother
   □ 2. Infant’s father
   □ 3. Infant’s brother/sister
   □ 4. Infant’s grandparent or relative. Please specify: ___________________________
   □ 5. Other. Please specify: __________________________

C. How do you think your baby acted with this examination?
   □ 1. Happy
   □ 2. Content
   □ 3. Fussy
   □ 4. Angry

D. What is your level of satisfaction with the way the exam was performed?
   □ 0 = Not satisfied
   □ 1 = Slightly satisfied
   □ 2 = Satisfied
   □ 3 = Very satisfied
   □ 4 = Highly satisfied

Any additional comments:
APPENDIX D

APPROVAL OF MISSISSIPPI UNIVERSITY FOR WOMEN’S COMMITTEE ON USE OF HUMAN SUBJECTS IN EXPERIMENTATION
April 17, 2000

Ms. Kelli Davidson  
P.O. Box W-910  
Campus

Dear Ms. Davidson:

I am pleased to inform you that the members of the Committee on Human Subjects in Experimentation have approved your proposed research provided the word "guardian" is added along with parent unless your intent is only to require parents to sign and not guardians. Further, the committee requires that you obtain the consent of the health department prior to the implementation of any study.

I wish you much success in your research.

Sincerely,

Sheila V. Adams, Ed.D.  
Interim Vice President  
for Academic Affairs

SA:wr

cc: Mr. Jim Davidson  
    Dr. Mary Pat Curtis

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APPENDIX E

SITE PERMISSION LETTER AND CONSENT
Dear Dr. Burns,

I am a registered nurse and a graduate student attending Mississippi University for Women in the Family Nurse Practitioner Program. I am currently working on my thesis entitled Changes in Infant Behavior During Examination in the Parent’s Lap Versus the Examination Table. This study will help define if the difference in examination technique of nurses and practitioners has any effect on changes of infant behavior when examined near their parent or away from their parent. Understanding the behavior changes that infants exhibit during examination may help to determine different tactics or ways in which they may choose to better serve their patient and families. Many times parents who are not satisfied or feel that their child is not comfortable during an exam will not return for further evaluations and check-ups. With this approach, the ultimate goal is to provide an examination in which all people involved are comfortable with the procedures and outcomes of the visit.

I am requesting access to your pediatric clinic and clients to obtain participants for my study. With your approval, I will screen patients on their arrival to the clinic for inclusion in the study based on the following criteria: (a) infants between the ages of 2 and 12 months who are considered full-term, with no documented developmental delays, and no visible physical handicaps, (b) a parent or primary caregiver, grandparent or guardian, and (c) parental permission. A signed consent
will be obtained prior to participation in this study. Once permission is obtained the patient will proceed through the normal process of enrollment into the clinic setting. The children will be assigned to a lap examination group and a table examination group. This researcher will record a baseline pulse rate at the beginning of the exam. A normal well-child, head-to-toe examination will occur and the pulse rate will again be evaluated at the completion of the examination. Facial changes and any cry response(s) will be evaluated before the exam and in the course of the exam and measured with a researcher-developed assessment record. After completion of the examination, the parent will complete a short survey evaluating the research procedure and their level of satisfaction with the procedure. All information collected will be kept strictly confidential and will be used only for the purposes of this study. The only identifying data will be the infant’s date of birth. Numbers will be assigned to the infant member groups for collection and data analysis purposes.

I would greatly appreciate access to this clinic and your clients and welcome any suggestions that you might have. I am enclosing a copy of the consent form, tools, and parent/caregiver satisfaction survey that I will be using in this study. In addition, you will find a letter of approval from the Committee on the Use of Human Subjects in Experimentation of Mississippi University for Women to develop this study. If approved by you, I will gladly provide you with a presentation of my findings. I will answer any questions on this matter that you may have.

Thank you again for your time and consideration in this matter. I can be contacted at the address, telephone number, or e-mail address provided. I eagerly await your response to this matter.

Very sincerely,

Kelli M. Davidson, RN, BSN
May 9, 2000

I, Georgianna Burns, M. D. do grant Kelli M. Davidson, R. N., B. S. N., permission to conduct research in my private pediatric practice. I will perform the examinations of the infants and Ms. Davidson will record the information needed for her study. A signed consent form must be obtained from the participants prior to their inclusion in this study.

Georgianna Burns, M. D.
APPENDIX F

INFORMED CONSENT FORM FOR
PARENTS AND/OR GUARDIAN
Informed Consent Form for Parents

Dear Parent and/or Guardian,

I am a registered nurse and a graduate student at Mississippi University for Women in the Family Nurse Practitioner Program. I am doing a research study to find out if babies show any changes in behavior while being examined. The results of this study will help to determine the best way to examine your baby.

The form that I am asking you to complete asks some simple information about you and your baby. The form at the end of the checkup allows you to let me know if you were pleased with the exam and how your baby did with the exam. The exam will not take any more time. It is a normal checkup like the ones your baby has had before. I will check your baby’s pulse rate and observe your baby’s face for smiles, frowns, and crying during the exam. In no way are you or your baby in any danger or harm. The items being tested are all part of a normal checkup. Your name or your baby’s name will not be used, and the information will be reported as group results. Your baby will be known only with a number and their birth date. Your pediatrician will perform the exam, and I will observe the examination. All information will be kept strictly secret and will be used only with this study. You do not have to be in this study, and you may withdraw at any time. Being in this study will not change the care your baby receives.

If you would like results of this study, they will be at the doctor’s office. Thank you for your time and cooperation. With your help, this study will help nurses, doctors, and other practitioners develop ways in which exams are more comfortable for you as a parent and your baby.

Sincerely,

Kelli M. Davidson, RN, BSN

I have read the above letter and understand the reason for this study. I agree to take part in this study. I understand that I may choose to withdraw from the study.

_________________________    __________________________
Date                              Signature of Parent/Guardian