RELATIONSHIP BETWEEN INFANT REACTIVITY AND MATERNAL EMOTIONAL WELL-BEING DURING THE EARLY POSTPARTUM PERIOD AT TWO POINTS IN TIME

by

Karen Udy Hansen

A thesis submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Family, Consumer, and Human Development

UTAH STATE UNIVERSITY
Logan, Utah

2005
ABSTRACT

Relationship Between Infant Reactivity and Maternal Emotional Well-Being During the Early Postpartum Period at Two Points in Time

by

Karen Udy Hansen, Master of Science
Utah State University, 2005

Major Professor: Dr. Ann M. B. Austin
Department of Family, Consumer, and Human Development

This study examined the relationship between infants' reactivity and mothers' emotionality during the early postpartum period, specifically during the first days of life and again by three months of age. The Clinical Neonatal Behavioral Scale (CLNBAS) was used to evaluate the infants. The mothers were evaluated at the same time by responding to questions on the Edinburgh Postnatal Depression Scale (EPDS).

Forty-six mother-infant dyads were recruited from the Logan Regional Hospital childbirth classes for first-time parents. Minimum criteria for participation were that the mother must be married, be at least 18 years of age, have at least a high school education, with the infant must having a minimum APGAR score of 7 on the second APGAR evaluation and being the firstborn. There were 27 male and 19 female infants in the study.

After the initial sign-up for participation, the mothers were contacted prior to the baby's due date and arrangements were made to visit them for the first evaluation in the home. At the time of the first evaluation (T1), a date was set for the second evaluation (T2).

Several aspects of the mother-infant interactive process and the relationship between mothers' emotionality and the infants' reactivity were noted in the collected data. This study
focused mainly on the infants’ reactivity to the social emotional items of the CLNBAS in relationship to the mothers’ EPDS scores or level of emotionality, but other CLNBAS areas were also studied.

Infants’ reactivity T1 and mothers’ emotionality T2 had a statistically significant relationship for CLNBAS items, “response to face and voice” and “tracking the red ball.” Mothers previously diagnosed with depression scored higher on the EPDS T1 and T2 than mothers not previously diagnosed as depressed, and their infants scored lower on the CLNBAS when compared to the infants whose mothers were not previously diagnosed with depression.

(110 pages)
ACKNOWLEDGMENTS

I would like to thank my advisor, Dr. Ann M. B. Austin, for her countless hours of guidance and support in planning, implementing and overcoming the challenges in this study, from the beginning to its completion. I would like to thank my daughter, Andrea Boyd, for assisting with the project by managing and recording data. Her many hours of help are greatly appreciated. I would also like to thank my son, Dave Hansen, for technological assistance. My thanks to my committee members, Dr. Shelley Lindauer and Dr. Judith Holt, who have given their support to this study. I have appreciated Roxane Pfister’s willingness to provide her time and effort with the statistical analyses of the study.

Special thanks to my husband, Marv, who has been there to provide continued encouragement and suggestions, and who has given of his time by providing hours of reading and discussing ideas with me. Most importantly he has continued to believe in me and the study at times when I had lost some of my enthusiasm and optimism. I would also like to thank my former colleagues, Sue Olsen and Dr. Sarah Rule, with the Up to 3 Program for their support during this project.

I would like to thank the parent education staff at Logan Regional Hospital for their interest and cooperation in the recruitment of the parents and infants for this study. I am grateful to the families who were willing to participate. The mothers, fathers, and babies were enjoyable to work with during the project. Through their interest and support, I was able to complete the needed assessments. It took everyone to make this study happen. Thank you everyone.

Karen Udy Hansen
CONTENTS

Page

ABSTRACT .............................................................................................................. iii
ACKNOWLEDGMENTS .............................................................................................. v
LIST OF TABLES ......................................................................................................... ix
DEFINITIONS ........................................................................................................... xi

CHAPTER

I. INTRODUCTION .................................................................................................. 1

Statement of the Problem ...................................................................................... 2
Theoretical Framework .......................................................................................... 3
Purpose and Objectives ......................................................................................... 4

II. LITERATURE REVIEW ......................................................................................... 6

Early Childhood Development Research on Learning Periods ......................... 6
Early Childhood Reactivity Development .............................................................. 7
Infant Development and Contingencies ................................................................. 8
Self Awareness and Emotional Regulation .......................................................... 10

Insecurity of the Mother and the Child’s Development ......................................... 12

Face-to-Face Interactions of Depressed Mothers and Infants .............................. 13
Impact of Maternal Depression and Infant Emotional Dysregulation .................. 14

Maternal Postpartum History and Concerns .......................................................... 17

Postpartum Emotional Syndrome ......................................................................... 18
Categories of Postpartum Depression ................................................................. 19
Emotional Well-Being of the Mother and Infant Reactivity .................................. 20

III. METHODOLOGY ................................................................................................ 22

Purpose and Objectives ......................................................................................... 22
Study Description .................................................................................................. 22

Demographics ....................................................................................................... 23
Measurements ....................................................................................................... 26
Edinburgh Postnatal Depression Scale (EPDS) ...................................................... 28

EPDS Reliability and Validity ................................................................................ 28
Clinical Neonatal Behavioral Assessment Scale (CLNBAS) .................. 31
NBAS and CLNBAS Reliability and Validity ........................................ 32
Training and Establishing Interrater Reliability ........................................ 34

Procedures and Implementation .......................................................... 35
Confidentiality ....................................................................................... 35
Summary ............................................................................................... 36

IV. RESULTS .......................................................................................... 38

What Is the Relationship Between Infant Reactivity T1 and T2? .................. 39
What Is the Relationship Between the Emotionality of the
Mother T1 and T2? .................................................................................. 39
What Is the Relationship Between Infants' Reactivity T1
and Mothers' Emotionality T1? ................................................................. 41
What Is the Relationship Between Infants' Reactivity T2
and Mothers' Emotionality T1? ................................................................. 41
What Is the Relationship Between Infants' Reactivity T2
and Mothers' Emotionality T2? ................................................................. 43
What Is the Relationship Between Infants' Reactivity T1
and Mothers' Emotionality T2? ................................................................. 44
What Is the Relationship Between Demographic Variables
and T1 & T2 CLNBAS and EPDS? ................................................................. 45

V. DISCUSSION ......................................................................................... 49

Discussion of Results ................................................................................ 49
What Is the Relationship Between Infant Reactivity
T1 and T2? ............................................................................................... 49
What Is the Relationship Between Mothers' Emotionality
T1 and T2? ............................................................................................... 51
What Is the Relationship Between Infants' Reactivity T1
and Mothers' Emotionality T1? ................................................................. 52
What Is the Relationship Between Infants' Reactivity
T2 and Mothers' Emotionality T1? ................................................................. 53
What Is the Relationship Between Infants' Reactivity
T2 and Mothers' Emotionality T2? ................................................................. 53
What Is the Relationship Between Infants' Reactivity
T1 and Mothers' Emotionality T2? ................................................................. 55
What Is the Relationship Between Demographic Variables and T1 & T2 CLNBAS and EPDS? ................................................................. 57
Summary ............................................................................................... 58
Limitations .............................................................................................. 62
Implications ............................................................................................. 62

Interventions for Postpartum Issues .......................................................... 62
Recognition of the Dynamics of the Early Postpartum Period ........................................ 62
Education Needs and Opportunities .................................................................................. 63
Early Postpartum Treatment and Services ....................................................................... 64
Further Research ............................................................................................................... 65

REFERENCES ..................................................................................................................... 67

APPENDICES ..................................................................................................................... 77

Appendix A: Clinical Neonatal Behavioral Assessment Scale .......................................... 78
Appendix B: Edinburgh Postnatal Depression Scale (EPDS) ............................................ 80
Appendix C: Recruitment Brochure .................................................................................. 82
Appendix D: Information Brochure .................................................................................. 85
Appendix E: Personal Information ................................................................................... 88
Appendix F: Infant’s Ages and Total CLNBAS Scores T1 and T2 .................................... 90
Appendix G: Informed Consent Letter and Form ............................................................... 94
Appendix H: APGAR Release Form .................................................................................. 98
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mothers' Frequency, Range, Percentage, Means, and Standard Deviation for Independent Demographic Variables</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>Infants' Frequency, Range, Percentage, Means, and Standard Deviation for Independent Demographic Variables</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>Fathers' Frequency, Range, Percentage, Means, and Standard Deviation for Independent Demographic Variables</td>
<td>26</td>
</tr>
<tr>
<td>4</td>
<td>Correlation of Demographic Variables</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Wilcoxon's Correlation, Mean, and Standard Deviation T1 and T2 CLNBAS for Infant Reactivity</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>Summary of Pearson and Spearman Statistics Between T1 and T2 Individual CLNBAS and EPDS Scores</td>
<td>41</td>
</tr>
<tr>
<td>7</td>
<td>Analysis of Variance for T1 CLNBAS Scores “Tracking the Red Ball” by T2 EPDS</td>
<td>42</td>
</tr>
<tr>
<td>8</td>
<td>Overall Means for T1 CLNBAS “Tracking the Red Ball” by T2 EPDS Scores</td>
<td>42</td>
</tr>
<tr>
<td>9</td>
<td>Paired Samples t Test EPDS T1 and T2 Scores of Mothers Previously Treated for Depression (group 1) and Mothers Not Previously Treated for Depression (group 2)</td>
<td>42</td>
</tr>
<tr>
<td>10</td>
<td>Paired Samples t Test for T1 and T2 “Social Emotional Package” CLNBAS Scores of Infants Whose Mothers Had Previously Been Treated for Depression (group 1) and Mothers Who Had Not Been Previously Treated for Depression (group 2)</td>
<td>43</td>
</tr>
<tr>
<td>11</td>
<td>Significant Spearman Relationship, Means, Standard Deviations, and Infants' Reactivity of Low, Medium, or High, T2 and Mothers' Emotional Well-Being T2 (N = 46)</td>
<td>44</td>
</tr>
<tr>
<td>12</td>
<td>Analysis of Variance for T1 CLNBAS “Response to Face and Voice” by T2 EPDS</td>
<td>45</td>
</tr>
<tr>
<td>13</td>
<td>Overall Means for T1 CLNBAS “Response to Face and Voice” by T2 EPDS</td>
<td>46</td>
</tr>
<tr>
<td>14</td>
<td>Analysis of Variance for T1 CLNBAS “Response to Face Only” by T2 EPDS</td>
<td>46</td>
</tr>
</tbody>
</table>
15 Overall Means for T1 CLNBAS “Response to Face Only” By T2 EPDS ................................................................. 46
16 Analysis of Variance for T1 CLNBAS “Voice Only” by T2 EPDS ................................................................. 47
17 Overall Means for T1 CLNBAS Response to “Voice Only” by T2 EPDS ................................................................. 47
18 Summary of CLNBAS and EPDS Relationships ................................................................. 48
F1 Infant’s Age and Total CLNBAS Score T1 and T2 ................................................................. 91
F2 Infant’s Age and Total CLNBAS Score T1 and T2 ................................................................. 92
F3 Infant’s Age and Total CLNBAS Score T1 and T2 ................................................................. 93
DEFINITIONS

- **CLNBAS**—(Clinical Neonatal Behavioral Assessment Scale). Evaluation used to assess the infants, with scores ranging from 1-3 for each item.

- Dysregulation or emotional dysregulation—inability to control reactions to stimuli (i.e., indicates the mothers who score high on the EPDS, in this study).

- Emotionality—spectrum of reactions to stimuli, from low to high (i.e., mothers experiencing a range of emotions).

- **EPDS**—(Edinburgh Postnatal Depression Scale). Evaluation designed specifically for the postnatal period and the one used in this study.

- Reactive or reactivity—the ability of the infant to respond to stimuli (desirable responses are scored higher and less desirable responses are scored lower with the range of 1-3).

- **T1**—time one. The first evaluation was completed during the first month postpartum.

- **T2**—time two. The second evaluation was completed at up to 3 months postpartum.
CHAPTER I
INTRODUCTION

The concept of infants responding to the stimuli in their environment, especially to the mother, has been studied in past history, but it appears that it had not been studied as part of a relationship until the latter part of the 20th century. Some mention in the late 1800s has been made of the infant's response to the emotions of others through the infant's ability to attend to the features of those attending to the child (Darwin, 1877). As late in our history as the 1970s, it was believed that the newborn infant did not see or hear, but it is now known that the newborn infant can visually track, hear, locate sounds, and remember speech sounds (Nugent & Brazelton, 2000).

Research has found that human beings are social by virtue of their status as individuals who conceive themselves and others to be persons with special properties and special value. Young children acquire an understanding of themselves and others as separate beings through the experience of personal relations. Vygotsky believed that social interactions between the adult and the child provided the necessary information at the appropriate time for the child to continue development in an appropriate way (Crain, 1992; Meadows, 1996). Research by Hamlyn (1974) emphasizes that these relations are constituted by interpersonal transactions in which feelings play a pivotal role. Mead's (1934) research maintains that one prerequisite for a developed concept of self is the infant's ability to recognize itself as a bodily locatable stimulus to and focus for other people's affective attitudes, so that it can take the role of the other towards itself. In less optimal circumstances (e.g., when maternal well-being is compromised or child reactivity is weak), these mutual transactions are less observable (Cohn & Tronick, 1989).

Darwin (1877) paid much attention to the infant's social signaling system and found that an infant understands to a certain extent, and he believed at a very early period, the meaning or feelings of those who tend to him, by the expression of their features. Studies by researchers have also established that there is some individual contingency in face-to-face interactions with
mothers and their infants as young as 2-4 months (Bigelow, 2001). This assumes however, that infant reactivity is typical and maternal well-being is satisfactory. In a study using the Standardized Psychiatric Interview (Spitzer, Endicott, & Robins, 1978) it was found when comparing groups of depressed mothers and non-depressed mothers that depressed mothers were less sensitively attuned to their infants and were less affirming of infant experience. These disturbances in the early infant–mother interactions were predictive of poorer infant cognitive outcomes at 18 months of age, (i.e., depressed mothers had lower scoring children).

Statement of the Problem

The postpartum period is a time when the new mother and her infant are particularly vulnerable to the feelings and emotions that are identifiable as being peculiar to the postnatal period (Kruckman & Smith, 2001). During the postpartum period the mother may experience sadness, weeping, fatigue, and irritability complicating her ability to interact effectively with her new baby (Nugent & Brazelton, 2000; Spinelli, 1998). The new mother may have perceptions and needs that interfere with her ability to interpret her baby’s actions or to react to her baby. The interference from these perceptions and needs may in turn affect the baby’s reactivity to the mother. Likewise, the infant’s reactivity may be weak due to lack of stimulation in the environment and thus less salient in encouraging mother-child interactions (Kruckman & Smith).

The infant’s ability to recognize familiar voices, to visually discriminate the movement of inanimate and animate objects, to maintain eye contact, and to be responsive to other stimuli in the environment appears to be present in the first days of life (Nugent & Brazelton, 2000). With this more recent understanding of the newborn infant’s abilities and readiness to interact, it appears important that the emotional well-being of the mother and her ability to interact with her child are instrumental in the infant’s beginning reactivity patterns. Yet, what happens when circumstances compromise the mother’s well-being precluding her from interacting as effectively
as she would otherwise? Moreover, how is mother-child interaction affected when the child’s reactivity (alertness and readiness of the infant for interaction with and responsiveness to stimuli in the environment) is weak?

The best measure of early infant reactivity is the Brazelton Neonatal Behavior Assessment Scale (Brazelton & Nugent, 1995); however, this scale is difficult to use. Recently the Clinical Neonatal Behavioral Assessment Scale (CLNBAS) has been developed as a more user-friendly instrument measuring infant reactivity. Infant reactivity measured by the CLNBAS (Nugent & Brazelton, 2000), during the first month (T1) and again at 2-3 months (T2) will be the key variable of interest in this study. Maternal well-being is also a variable of interest and will be assessed using the Edinburgh Postnatal Depression Scale (EPDS), developed by Cox, Holden, and Sagovsky (1987).

In extant literature we are unaware of any studies investigating the correlation between the infant’s reactivity during the first month and at 2-3 months using the CLNBAS. In previous research CLNBAS scores and maternal well-being EPDS scores at these ages have not been studied or correlated as in this study. This study lays important groundwork for understanding the correlation between levels of infant reactivity and maternal well-being in the earliest months of life. The two different time periods will provide a baseline and comparison for both mother and infant (Nugent, & Brazelton, 2000).

Theoretical Framework

Lev Vygotsky has provided the theories that lend support to the social cognition learning model. This model asserts that culture is the prime determinant of individual development. He also stressed the importance of the biological determinants as well as interaction within the social environment (Doolittle, 1997). Vygotsky believed that the cognitive development of the child came about thorough biological maturation and experiences with others. Social interactions are
fundamental in promoting cognitive development. Vygotsky believed that interactions between
the adult and child rather than those between the child and the environment, as did Piaget, were
more influential in promoting cognitive development (Meadows, 1996).

Vygotsky’s theory points to the importance of culture in contributing to a child’s
intellectual growth in two ways: (a) through culture children acquire much of the content of their
thinking or their knowledge, and (b) the surrounding culture provides a child with a template or
framework for thinking and for intellectual adaptation (Doolittle, 1997). Culture teaches the child
what to think and how to think.

The child learns through problem solving experiences shared with someone else, usually
a parent or teacher (Doolittle, 1997). The responsibility is assumed by the person interacting with
the child for guiding the problem solving, and gradually this responsibility transfers to the child,
with the parents usually assuming the teaching role and presenting new information to the child at
developmentally appropriate times within the child’s “zone of proximal development” (Crain,
1992; Doolittle).

The difference that exists between what the child can do independently and what the
child can do with help is referred to by Vygotsky as the “zone of proximal development” (Crain,
1992). Since, according to Vygotsky, the child develops mainly through interaction with adults
providing cues and interaction patterns necessary for the developmental steps needed for skill
development, the earliest interactions with the mother during the postpartum period are most key
to early development and acquisition of skills (Doolittle, 1997; Nugent & Brazelton, 2000).

Purpose and Objectives

What is the relationship between infant reactivity (alertness and readiness of the
infant for interaction and responsiveness to stimuli in the environment) as measured by the
Clinical Neonatal Behavioral Assessment (CLNBAS) and maternal well-being during the
early postpartum period as measured by self-report, using the Edinburgh Postnatal Depression Scale (EPDS)? The purpose of this study, using the Edinburgh Postpartum Depression Scale (EPDS) and the Clinical Neonatal Behavior Assessment Scale (CLNBAS) as assessment tools, is to determine the infant’s reactivity and the correlation of the reactivity to the mother’s emotional well-being at the two identified points in time, (T1) during the first month and (T2) by 3 months postpartum (Harris, Huckle, Thomas, Johns, & Fung, 1989).

The two periods will allow for a baseline and follow-up comparison of the correlation between the mother’s emotional regulation and infant reactivity. Analyses of the dyads of those mothers who have been diagnosed as previously depressed and those mothers who have not been previously diagnosed as depressed will also be completed to provide information on the mothers and their infants’ reactivity patterns.

The CLNBAS scores of identified focus items will be looked at rather than a total CLNBAS score for this research. All items (1-18) were implemented, however, for this research items 9-13 referred to as the “social emotional package” were the focus areas for studying infant reactivity, although individual items were also included (i.e., crying, consolability, and others noted in the research; see Appendix A).

This study will investigate: (a) what the relationship is between the infants’ reactivity at T1 and T2 as measured by CLNBAS individual items, (b) what the relationship is between the mothers’ emotionality at T1 and T2 as measured by EPDS total score, (c) what the relationship is between the infants’ reactivity at T1 and the mothers’ emotionality at T1, (d) what the relationship is between the infants’ reactivity at T2 and the mothers’ emotionality at T1, (e) what the relationship is between the infants’ reactivity at T2 and the mothers’ emotionality T2, (f) what the relationship is between the infants’ reactivity T1 mother’s emotionality at T2, and (g) what the relationship is between demographic variables and T1 and T2 CLNBAS and EPDS.
To better understand early childhood development and the response of infants to stimuli in their environment, especially to the mother, this review begins by examining the importance of the early learning periods in a child’s life. Next this review analyzes the studies of infant-mother interactions and young child reactivity. Finally, this review examines research regarding the postpartum emotional well-being of mothers including historical issues and current findings.

Early Childhood Development Research on Learning Periods

Researchers have found that the first three years of a child’s life consist of “critical periods” in the process of brain development (Cynader & Frost, 1999). According to Cynader and Frost, brain development depends on: (a) the genetic make-up of the child, (b) the chemical and physical information on the microscale level (i.e., temperature, chemicals, and so forth), and reactions of the brain cell, and (c) the ecological environmental information that includes the social information obtained through behavior interactions.

As the child matures and begins to become exposed to new environmental experiences brain development is fostered. As the brain becomes more developed through repeated actions, the child’s skills increase and brain development, in turn, becomes even more specific and specialized (Fischer & Bidell, 1998). According to Parmalee and Sigman (1983), during the first three years of life there is more building of the brain pathways (i.e., axons and dendrites) than at any other time in life of the child. At the same time there is a pruning process taking place that eliminates the brain cells that are not stimulated, therefore some pathways may be eliminated if there is no response to stimuli in the environment or no environmental stimuli in the first place (Parmalee & Sigman). The types of stimulation that occur during these earliest child development
periods will determine the pathways that are built and the foundations that will be available to the child for future growth (Parmalee & Sigman).

This early developmental period is important for cognitive (Nelson, 1995), and language development (Savage-Rumbaugh et al., 1993). Health development is also critical during these early periods, including emotional, mental, and physical health. During this early period environmental stress may be particularly detrimental to brain organization and development (Cynader & Frost). Chronic stress may also cause brain cells to deteriorate. Some of the “critical periods” will never be available for the child again because the neurons need to be stimulated for development at a specific time (i.e., development of the eye), or the neurons deteriorate making it impossible to develop that skill at a later time. If there is interference within the infant’s system as with the presence of stress during these critical periods, there may be some loss in skill development. During the “critical periods” if there is no stimulation available in the environment the brain organization and development are not stimulated for the needed skill development and the opportunity to develop the particular skill is lost.

Due to the circular nature of the development of the child’s skills and development of healthy brain pathways, it is very important for the young child to be exposed to a caring and nurturing environment. Because the young child is cared for mainly by the mother during these early periods, the mother’s emotional well-being and her responsiveness to the infant are prime considerations during this time (Campbell & Cohn, 1991).

*Early Childhood Reactivity Development*

The environment influences the reactivity patterns of the infant. The exposure of the infant to an environment in which the mother is experiencing emotion dysregulation is believed by researchers to have a direct effect upon the infant’s reactivity to all other stimuli in the

Due to the social nature of infant reactivity, the infant is affected by the mother’s response style (e.g., the way she touches and handles the baby, her manner of verbal interactions, the eye-to-eye contact she provides, and her feeding and daily care techniques, and so forth). The infant responds to persons and stimuli in the environment, with development being dependent upon infant reactivity and the responses to the child from others (Dunsmore & Halberstadt, 1997). The emotional well-being of the mother is, therefore, a main factor in the infant’s reactivity and any conditions that impair the maternal reactivity would, by extension, also influence the infant’s reactivity (Bowlby, 1980; Svanberg, 1998).

Emotional as well as physical unavailability of mothers during a child’s early development is very detrimental to the child’s development. In a video sequence by Brazelton (1992) it was found that when the communication interaction pattern of an infant and mother was interrupted, the infant became extremely activated in trying to elicit the expected responses. In Brazelton’s research the mother was instructed to remain “still faced,” sober and without expression, not providing the smiles, coos, sounds and touches that the infant expected. This sequence provided a model for studying the infants of depressed mothers.

The infants of mothers who are seriously depressed during the first two years of life show dramatic differences in their emotional development when compared to infants of non-depressed parents. Research has shown that as early as 3 months of age infants of depressed mothers are beginning to mimic their mother’s depressed mood with lower motor activity, less vocalization, and looking away from eye contact more frequently (Karr-Morse & Wiley, 1997).

*Infant Development and Contingencies*

Research into infant development finds that the infant’s early self-knowledge is acquired
most readily through social interactions, in a contingent way. Recent findings indicate that infants are sensitive to social contingency in early life, and in particular to parental interactions (Bigelow, 2001). Murray and Trevarthen (1985) were among the first to demonstrate that infants show sensitivity to social behavior being contingent on their initiated actions. They found that the child responded more readily to those in the environment who imitated the actions made by the infant. The sounds, facial expressions, movements of the tongue, mouth, and so forth, made by the child and mirrored by others, were in turn imitated more readily by the infant than those actions initiated by the adult.

A recent study by Bigelow and DeCoste (2000), addressed the issue of whether infants at two months of age show contingency effect. Two-month-old infants interacted with their mother and with a female stranger (Stranger Phase), with the mother and stranger being presented on video. Each phase consisted of a 90 second episode of face-to-face interaction including: (a) two contingent conditions in which the adult interacted with the infant, and (b) one non-contingent condition that was a video replay of the adult interacting with the infant. In this last condition, the adult displayed infant-directed behavior unrelated to the infant’s current actions. The order of presentation of conditions was as follows: (a) contingent, non-contingent, contingent, (b) contingent, contingent, non-contingent, and (c) non-contingent, contingent, contingent. It was observed on first examination that there was no reaction to the contingent stimulation by some infants. However, when the results were examined closely, it was found that the infants showed the contingency effect by their visual attention, but not by their affect. The results further indicated that the social interaction (imitation of presented stimuli when contingent) was emerging in some infants at two months of age, but was varied among the infants and their partner across the sample (Bigelow, 2001).

The emotional well-being of the adult providing the opportunity for a contingency-based reaction at this young age would appear to have some affect upon the continued interest of the
child in reacting to the adult. Adults reflect the perceived emotions that the infants provide, therefore mirroring the infant’s behavior in a marked and imperfect way (Gergley & Watson, 1996). The infant’s ability to detect the difference between perfect and imperfect contingency is acquired early, and may be one of the first ways they distinguish self from other. With the infant observing and responding to stimuli from the mother at such an early age, it is important that the early developmental period be understood.

Infant-mother interaction provides the child a way of learning: (a) affect regulation, (b) physiological markers, and (c) stress responsiveness (Gergley & Watson, 1996). Infants appear to be sensitive to human facial/vocal displays, and have an in-born capacity to engage in affective interactions with their caregivers (Nichols, Gergely, & Fonagy, 2001). Recent evidence indicates that infants switch sensitivity from internal stimuli to external stimuli at a very early age. Prior to three months of age the infants are most aroused by perfect contingency of their self-actions (i.e., imitating of the infant’s actions by the mother) (Mahler, Pine, & Bergman, 1975). However, as indicated by the study reviewed above (Nichols et al.), it is uncertain whether infants are as sensitive to contingent responses prior to 2 months of age as they are thereafter.

*Self Awareness and Emotional Regulation*

Research has found that personal relations between infants and others are formed by interpersonal interactions based on feelings (Hamlyn, 1974). The reciprocal relations based on feelings allow the infant to know “others” from “self.”

Research has found that parents’ emotional expressions form an integral part of the social learning environment in which the child forms schemes about himself and the world, as well as about emotional expression (Bowlby, 1969, 1980; Dix, 1991; Dunsmore & Halberstadt, 1997; Malatesta, 1990; Sullivan, 1940, 1953). Studies have shown that the child is able to interpret the parents’ emotional expressions to aid in understanding the environment and to decide action to be
taken (Barrett & Campos, 1987; Klinnert, Campos, Sorce, Emde, & Svejda, 1983). Social interaction through the family setting has also been researched and there is strong evidence that positive family expressiveness rather than negative family expressiveness provides general advantages to the child for emotion recognition (Dunsmore & Smollen, 2001).

As the family members respond positively toward the infant, the infant responds in a more positive way to the family members. The infant provides communication in a way that is pleasing to the family and is therefore responded to more positively. The infant is more engaging with eye contact, less fussiness, physical activity that signals pleasure, cooing and imitation of family member’s positive expressiveness. The infant’s emotional regulation is therefore better regulated as their environment is expressed more positively.

It has been found that mothers’ characteristic ways of expressing their emotions are influential in infant development. The emotional environment to which a child is repeatedly exposed can be calming or dysregulating, and can contribute to children’s general social-emotional competence (Denham & Grout, 1992). For example, children whose mothers are continually angry or sad may have difficulty as they become older with independence, assertiveness, and friendliness. Recent research has affirmed that mothers’ expression of emotions and their patterns of coping with emotions in turn influence their children’s expression, understanding and coping with emotions (Denham & Grout).

Research by Brazelton studied interactions of mothers and infants, their patterns of communications, and what happened when the infant’s expectancy was violated. The mother was instructed to provide no familiar interactions with the infant after a brief normal play period with the infant. Interactions of the mother were patterned after depressive attributes (i.e., stilled face without expression, no smiles, no vocal interactions or touch). It was found that when the mother reacted positively by engaging in expected communication, the infant responded by widening his eyes, raising the eyebrows, “talking” back, and was animated, happy, and eager to
interact. However, when the mother withheld interactions using a still face without expression and didn’t engage in the infants’ responses with the mother, the infant became anxious and eventually withdrew or became violent in efforts to communicate with the mother. In extant research this type of sequence is a version that researchers are using to study infants of depressed mothers (Karr-Morse & Wiley, 1997).

Insecurity of the Mother and the Child’s Development

Research has demonstrated that the future well-being of the infant is threatened by the insecurity of the mother (Belsky & Isabella 1988; Crittenden, 1995; Cummings & Davies, 1996; Manassis, Bradley, Goldberg, Hood, & Swinson, 1995). Insecurity may be expressed, among other ways, through the mother’s depressive symptoms or dysfunction in caring toward the child, (Broussard, 1979; Lieberman, Vanhorn, Grandison, & Pekarsky, 1997; Milgrom & McCloud, 1996; Murray & Cooper, 1996; Murray, Fiori-Cowley, Hooper, & Cooper, 1996: Teti, Gelfand, Messinger, & Isabella, 1995).

Following birth, the lack of sensitive care by the mother is a central threat to the child’s well-being. This is manifest by the mother who is withdrawn, intrusive, inconsistent, and who has dysfunctional attributions. A particular threat to the infant’s well-being may arise from the mother’s postpartum emotional dysregulation, or taken to the extreme, postpartum depression (Kumar & Robson, 1984), or emotional dysfunction in giving birth. There is strong empirical evidence showing that significant characteristics of infants’ emotionality, (i.e., irritability) can be substantially modified by mother’s behavior and personality (Fish & Belsky, 1992; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996).

It appears that the reactivity of the mother toward the infant is influenced by the infant’s emotions, therefore a baby who is less securely involved with the mother, may be more difficult for the mother to understand and respond to in a positive way (Nachmias et al., 1996). If the
mother is not emotionally stable, she may respond to the baby in inappropriate ways therefore causing more irritability in the child. The emotional well-being of the mother is recognized in research as being of primary importance in the safety and well-being of the infant (Bowlby, 1980).

*Face-to-Face Interactions of Depressed Mothers and Infants*

Recent empirical studies have focused on mother-infant interactions of depressed mothers. A 4 ½ year longitudinal study by Phillips and O’ Hara (1991), focused on 70 women recruited in the second trimester of pregnancy. Mother’s depression was measured by semi-structured interviews adapted from the Schedule of Affective Disorders and Schizophrenia (Phillips & O’ Hara).

Major or minor depressions during the 4 ½ year follow-up period, and those depressive episodes at the time of follow-up interview were diagnosed according to research diagnostic criteria. In this study, the women who had experienced a postpartum depression were predicted to be at increased risk for subsequent depression and poor adjustment of their child. It was concluded that postpartum depression may increase risk for later maternal depression and in turn increases risks for child behavior problems. Women who experienced postpartum depression were at an increased risk for later depression in this study. This was evidenced by what the researchers believed to be significant association \( p \leq .06 \) between the occurrence of depression sometime during the 4 ½ year follow-up period. Findings from this study suggested that postpartum depression may influence child behaviors by increasing a woman’s risk for later non-postpartum depressions, a point similar to that made by Ghodsian, Zajicek, and Wolkind (1984).

Campbell and Cohn (1991) identified the occurrence of depression in first-time mothers. Primiparous women who delivered full-term singleton infants without major complications were
recruited. They met the following criteria: (a) Caucasian, (b) married and at least 18 years of age, and (c) at least a high school education. In this study, mothers and infants were videotaped during face-to-face interaction at 2, 4, and 6 months. When depression was defined in terms of transitory or “Baby Blues,” as opposed to the non-transient postpartum depression and postpartum psychoses, there were no differences between depressed mothers and comparison mothers or babies in either positive or negative interaction during feeding, face-to-face interaction, or toy play. However women whose depression lasted six months or who were “non-transitory,” were less positive with their infants in all three settings: (a) face-to-face interactions, (b) feeding interactions, and (c) toy play. These findings illustrate the need to determine the difference between transient and protracted depression in evaluating depression effects on the mother-infant relationship.

Research literature has documented that the child’s behavior may be dependent upon the emotional well-being of the mother. The relationship between the mother and child was shown to be less positive if the depression lasted longer than six months. However, if the depression was transitory the relationships were the same with comparison and depressed mothers, when video taped at 2, 4, and 6 months.

Impact of Maternal Depression and Infant Emotional Dysregulation

The interactions of depressed mothers, as defined by the Edinburgh Postnatal Depression Scale (Cox et al., 1987) and the Life Events and Difficulties Schedule (LEDS) (i.e., finances, housing, unemployment, relationships with partners, and so forth; Brown & Harris, 1978), appear to have an effect on the infant’s reactivity when measuring the mother-infant face-to-face interactions at two months postpartum (Murray et al., 1996). This research found that subsequent infant cognitive development and attachment were also impacted by the emotional well-being of the mother.
The impact of maternal depression and adversity (as identified by the LEDS) on mother-infant face-to-face interactions at this young age were also studied. The mothers were initially identified by using the Edinburgh Postnatal Depression Scale (EPDS) at 6 weeks postpartum. A follow-up assessment was made by using the Standardized Psychiatric Interviews (Spitzer et al., 1978). Findings of importance for the present study include findings that, when compared to well women, the depressed mothers were less sensitively attuned to their infants and were less affirming of infant experience. It also found that the two groups of mothers did not differ in the degree of intrusiveness of remote or withdrawn behavior when interacting with the infant. The study also found that disturbances in the early infant mother-infant interactions were predictive of poorer infant cognitive outcome at 18 months of age, (i.e., depressed mothers had lower scoring children), and that infant attachment was not related to the 2 month interactions, but was significantly associated with the adversity (as identified by the LEDS) occurrences and postpartum depression.

According to Stern (1985), the period of two to six months postpartum is one of the most active and social periods of a child's life. The foundation for a sense of self is formed during this time. Therefore, the importance of the mother's emotional availability for social emotional communication is very important. The mother's skills impact the development of the child's interactive skills and cognitive processes, as measured by Early Childhood Developmental Testing: (a) Hawaii Early Learning Profile (HELP; Furno & Parks, 1984-1994), (b) the Early Learning Accomplishment Profile (ELAP; Chapel Hill Training-Outreach Project, 1988-1995), and (c) the Brigance Inventory of Early Development (Brigance, 1991).

Maternal responsiveness to child cues and the amount of interaction between the mother and child enhance the attachment relationship. If maternal responsiveness is compromised, due to dysregulation of emotional well-being or maternal depression, the child's regulation and
attention are also compromised (Cohn, Campbell, Matias, & Hopkins, 1990; Field, 1992; Field et al., 1988).

Findings indicate that children of high EPDS scorers were less curious and less focused in the free play situation than the children of the low EPDS scorers. The infants of high scoring mothers were less inclined to move away from their mothers to explore the surrounding play area and became fussy if the mothers were not close to them. In contrast the infants of the lower scoring mothers were more secure in moving about independently to explore the play area for play opportunities. They were also more tolerable of the mother not being in close proximity to them. This type of activity points out how the development of children is influenced by early maternal dysregulation. The findings also indicate that children of mothers with symptoms of postpartum dysregulation experience their relations with their mothers as less playful and less joyful than do children of low EPDS scorers. In summary, there is not only a relationship between maternal emotional dysregulation and infant reactivity, but other kinds of maternal emotions also impact infant behavior. This has been studied with children at early ages with emotionally stable and emotionally unstable mothers. However, the age of 2 months is the earliest age that has been studied, without consideration of the earlier weeks of a child’s life.

Research has substantiated the impact upon the child’s emotional well-being by the following phenomena: (a) the child’s well-being as affected by maternal insecurity and the personal relations formed between the child and parent based on feelings (Belsky & Isabella, 1988; Crittenden, 1995; Cummings & Davies, 1996; Hamlyn, 1974; Manassis et al., 1995), (b) maternal expression of emotion and feelings as it affects the social learning environment of the child (Denham & Grout, 1992; Hamlyn), (c) the child’s awareness of “self” as it is acquired through social interaction, and the forming of personal relationships (Crain, 1992), (d) the infant’s interaction with the mother and changes in the infant in learning self-regulation through
interaction, and (e) the infant’s ability to acquire self-knowledge and social interaction particularly to parent interactions that occur most effectively in a contingent way (Bigelow, 2001).

Studies by Murray, Cox, Chapman, and Jones (1995) found that women with postnatal depression were distinguishable from women without postnatal depression by the presence of a poor relationship with their own mothers more than by social adversity (i.e., negative interaction with husband and child, or negative self-evaluation). They interpreted their findings as evidence that postnatal depression is related to acute biopsychological stress of having a new family member as opposed to longer-term social adversity (Bradley, 2000). This indicates that the relationship between the mother and infant would therefore be a main consideration in infant development and maternal emotional well-being.

Maternal Postpartum History and Concerns

Postpartum emotional well-being has been recognized throughout history as early as 45 B.C. (Thurtle, 1995), during the 11th century, and during the 18th century (Steiner, 1990). However, there have been periods in more recent history that postpartum depression has not been recognized as a separate illness (Warner, Appleby, Whitton, & Faragher, 1997). It appears that there has been no progress over the recent years toward having the condition recognized as a separate state of illness in the postpartum woman. It is verified through the literature that throughout the ages there have been recognizable phenomena that the new mother experiences accompanying the birth of a child. While this study investigates maternal well-being rather than postpartum depression per se, it is worth noting that depressive feelings after birth are not always acknowledged clinically (Kruckman & Smith, 2001).

Throughout history, specific symptoms in some new mothers, (i.e., depression, disinterest in their children, weeping uncontrollably, confusion, and the inability to manage due to feelings
of being overwhelmed) have been recognized (Steiner, 1990). Hippocrates recognized puerperal fever and psychiatric disorders in some new mothers and theorized that the vaginal fluids discharged after childbirth were also transported to the brain, therefore causing manic behavior for some new mothers (Thurtle, 1995). Trotula, a gynecologist of the 11th century, hypothesized that the condition of some new mothers’ involuntary shedding tears with childbirth was due to the womb being too moist and the moisture running over into the eyes. In the 18th century, Marce’ documented puerperal psychosis and depression in his “Tretise on Insanity in Pregnant and Lactating Women” (Steiner, 1990).

Many early psychiatrists concluded that extreme postpartum emotional symptoms did not exist as a separate syndrome (Brockington, 1996). By 1940 it appears that the general consensus was that every reaction type may occur during the puerperium, therefore puerperal psychosis as a clinical entity did not exist (Jackson, 1943). Marvin Foundeur (1957) was even more insistent that the results did not appear to justify terming the postpartum illness as a separate illness.

Postpartum Emotional Syndrome

The uncertainty of a postpartum emotional syndrome as a clinical entity continues today. A definition of psychosis with childbirth first appeared in the DSM-II (American Psychological Association, 1968), section 294.4 as “Psychosis with Childbirth,” that recognized the condition as a separate entity occurring at birth in some women. The DSM-III (American Psychological Association, 1980) also had a classification for postpartum depression that was later removed. The most recent edition, DSM-IV-R (American Psychological Association, 1994) has no useful category for psychiatric disorders of the postnatal period (Walther, 1997). It offers a classification of mood disorder onset, with a “Postpartum Onset Specifier.” However, the criterion is limited to the fourth postpartum week. The misunderstanding of postpartum emotional needs over the past centuries has created attitudes and false perceptions that continue to
be harmful to mothers who are unable to adjust as quickly as others to the birth of a child. This is true for extreme cases of depression and psychoses as well as the milder cases of emotional dysregulation.

**Categories of Postpartum Depression**

Emotional distress after the birth of a child can be differentiated into three categories: (1) Baby Blues, which is a transitory affective disorder occurring in 40% to 85% of new mothers, lasting approximately up to 14 days postpartum, but varies with the individual mother (Harris, 1996; Johnson & Apgar 2001; Spinelli, 1998), (2) postpartum depression, which is a chronic depressive syndrome, with an estimated rate of recurrence estimated at 10-35% (Cox, Murray, & Chapman, 1993; Kruckman & Smith, 2001), and (3) postpartum psychosis that occurs in 1 per 1000 births (Kruckman & Smith). All three categories of emotional distress are postulated to influence infant reactivity because in every case maternal behavior is impacted.

The etiology of the mother’s condition is recognized at three levels: (a) biological, or what is happening to the body on a physiological level (i.e., hormone fluctuation and the accompanying changes in the functioning of the systems of the body; George & Sandler, 1982; Hamilton & Sichel, 1992), (b) anthropological, or what is happening to the mother as an individual within her particular culture and social group regarding customs and beliefs for support of the mother and the newborn (Cox et al., 1993; Kruckman & Smith, 2001), and (c) psychosocial, or what is happening with the mother in her processing of information and feelings and her interpretation of what she is experiencing and feeling (Brown & Shereshefsky, 1972; Cooper & Murray, 1998; Jenkins & Tiggeman, 1997; Warner et al., 1997). The three levels intertwine to become the determinants of the emotional well-being of the mother, and contribute to the interactivity pattern that is established between the mother and infant (Kruckman & Smith). The biological or hormonal fluctuations causing the physiological phenomena within the mother
combined with the social-emotional needs and support systems of the mother that are available in her particular culture, and her individual interpretation of what is happening to her influence her emotional well-being. This emotional well-being, in turn, affects interaction capabilities with the infant and the reactivity patterns that the child develops (Kruckman & Smith).

Emotional Well-Being of the Mother and Infant Reactivity

The emotional well-being of the mother is a main factor in the infant’s reactivity and any conditions that impair the maternal reactivity would, by extension, also influence the infant’s reactivity (Klinnert et al., 1983). Extant research has been found that depression lasting more than six months postpartum impacts the quality of the mother-infant relationship (Campbell & Cohn, 1991), and that the importance of touch in the mother-infant dyad is determined to be of great importance in increasing the positive affect of the child (Pelaez-Nogueras et al., 1996). Research supports that the interaction of depressed mothers seems to have adverse affects in the mother-infant face-to-face interactions in the very young infant from two to six months of age (Murray et al., 1996), as the most active time is beginning for social development and the forming of sense of self (Stern, 1995). If the mother is compromised due to emotional depression or emotional dysregulation, the responsiveness between the mother and infant, and the child’s ability to regulate “self” and to “attend” is affected. The child appears less attached, and has a lower level of joy and play (Cohn & Tronick, 1989; Field et al., 1988).

To summarize, research in these areas: (a) early childhood development, (b) mother-infant interactivity, and (c) the maternal emotional well-being of the mother following childbirth, has established the importance of the mother-infant dyad from birth on. The mother–infant dyad is influenced by the mother’s ability to cope with life situations. Due to the emotional disruptions that may occur during the postpartum period, the child’s ability to react to the stimuli in the environment may be compromised due to the emotional state of the mother. The infant’s skill and
brain development are also dependent upon the stimuli present in the environment and the regulation of interactivity by the mother’s presence and her emotional well-being.

Infant-mother relations during the postpartum period have been examined with regard to infant-mother interactions (i.e., self-awareness, contingency studies, interaction studies, studies of insecurity issues of the postpartum mother, and research on the importance of touch). However, none of these studies, to our knowledge, has examined infant reactivity at the earliest possible age during the first month postpartum using the systematic approach offered by the Brazelton Clinical Neonatal Behavioral Assessment Scale (CLNBAS; Brazelton, Nugent, & Lester, 1987), and the mother’s emotionality using the Edinburgh Postnatal Depression Scale (EPDS; Cox, et al., 1987; Gelfand & Teti, 1990; Gergley & Watson, 1996; Mahler et al., 1975). The CLNBAS measures the child’s reactivity in several different areas at these earliest ages, and thus assesses the child’s earliest potential for reactivity. The EPDS measures the mother’s evaluation of her emotions at these earliest times.

This study will investigate: (a) what the relationship is between the infants’ reactivity at T1 and T2 as measured by CLNBAS individual items, (b) what the relationship is between the mothers’ emotionality at T1 and T2 as measured by EPDS total score, (c) what the relationship is between the infants’ reactivity at T1 and the mothers’ emotionality at T1, (d) what the relationship is between the infants’ reactivity at T2 and the mothers’ emotionality at T1, (e) what the relationship is between the infants’ reactivity at T2 and the mothers’ emotionality T2, (f) what the relationship is between the infants’ reactivity T1 mother’s emotionality at T2, and (g) what the relationship is between demographic variables and T1 and T2 CLNBAS and EPDS.
CHAPTER III

METHODOLOGY

Purpose and Objectives

The purpose of this study, using the Clinical Neonatal Behavioral Assessment Scale (see Appendix A) and the Edinburgh Postpartum Depression Scale (see Appendix B) as assessment tools, was to determine the infant’s reactivity and the correlation of reactivity to the mother’s emotional well-being at the two identified points in time, (T1) within the first month of life and (T2) by three months postpartum. The use of rating scales has been implemented in research to identify postnatal depression (Harris et al., 1989). The two periods will allow for a baseline and follow-up comparison of the correlation between the mother’s emotional regulation and infant reactivity.

Study Description

Forty-eight mother-infant dyads were recruited through the Logan Regional Hospital childbirth classes for new parents. Criteria for participating in the study were: (a) birth was singleton, (b) mother was at least 18 years of age, (c) mother was at least a high school graduate, (d) birth was the mother’s first child, (e) mother was married, and (f) the infant was a healthy full-term infant with an APGAR score of 7 or above at the second observation of the APGAR. The APGAR scores were obtained from the physician through a written release from the parents. The study was advertised through the use of a brochure that was given to the new mothers and fathers at the time they attended the birthing classes at the hospital (see Appendix C). Sign-up for interested parents was obtained at the different classes throughout a three month period. Participants could phone the numbers listed on the brochure or speak with the researchers directly. The parents were contacted near the projected birth date of their child to set up an
appointment for the first evaluation. At the time of the first evaluation in the home the second assessment time was arranged. All participants were given a brochure of information about symptoms of emotional dysregulation, and resources for their protection. Those who scored twelve points or above on the EPDS were informed of their potential risk by letter, and were urged to consult their physician. They were also given a brochure with additional resources and information for their use (see Appendix D).

Demographics

Demographic information was obtained at the time of the first assessment. The following information was collected: (a) mother’s birth date, (b) baby’s birth date and due date, (c) mother’s highest education obtained, (d) race/ethnic group, (e) marital status, (f) type of delivery, (g) history of being treated for depression as reported by mother, (h) father’s birth date, (i) mother’s employment, (j) father’s employment, (k) father’s highest education obtained, (l) family income, and (m) how baby was being fed (see Appendix E).

Forty-eight mother-infant dyads were recruited from the parent education classes for first-time parents at the Logan Regional Hospital, Logan Utah. Mothers and babies were recruited throughout the months of September to December 2003. Of the 48 dyads one family moved out of the state and the second mother withdrew due to personal reasons; both were unable to complete the second evaluation. Forty-six mother-infant dyads completed the study. Individual CLNBAS scores of all items T1 and T2, and the age of the infant T1 and T2 were recorded (see Appendix F).

Ethnicity of the mothers included 43 Caucasian, 2 Hispanic, and 1 Caribbean Islander/Black. Nine mothers reported a history of being treated for depression prior to their participation in the study. All participants were married with marriages ranging from 3 months to 12 years 8 months. There were 42 vaginal deliveries and four Caesarean sections. Mothers were
between 19-36 years of age. Education of the mothers varied from a minimum of completion of high school only \((n = 3)\), to some college \((n = 22)\) to four years or more of college with a degree \((n = 21)\). Twenty-one of the mothers were not continuing work while 25 continued with some type of work from full-time to part-time. Mothers who were working reported a variety of occupations (see Table 1).

Table 1

*Mothers' Frequency, Range, Percentage, Means, and Standard Deviation for Independent Demographic Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>(N)</th>
<th>Variables</th>
<th>Range</th>
<th>(n/%)</th>
<th>Mean</th>
<th>(SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td>46</td>
<td>Caucasian</td>
<td>43 / 93.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hispanic</td>
<td>2 / 4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Black</td>
<td>1 / 2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years married</td>
<td>46</td>
<td>3 months-12 years 8 months</td>
<td></td>
<td></td>
<td>2.5</td>
<td>2.27</td>
</tr>
<tr>
<td>Employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 / 54.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not employed</td>
<td></td>
<td>21 / 45.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>46</td>
<td>HS only</td>
<td>3 / 6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some college</td>
<td>22 / 47.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Four year degree or more</td>
<td>21 / 45.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td>Teacher</td>
<td>3 / 6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurse</td>
<td>2 / 4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Professional</td>
<td>1 / 2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Own business</td>
<td>13 / 28.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>6 / 13.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>46</td>
<td>19-36</td>
<td></td>
<td></td>
<td>24.63</td>
<td>3.61</td>
</tr>
</tbody>
</table>
Infants' APGAR scores were recorded at one and five minutes after birth. The participating child received APGAR scores of seven or above on the second APGAR and was the firstborn of the parents. There were 27 males and 19 females, with gestation age ranging from 35-41 weeks and a mean gestation of 39.2 (SD 1.43 weeks). More of the infants were being breastfed (27), or a combination of breast and bottle feeding (12), than were being bottle-fed only (7; see Table 2).

Father’s age ranged from 20-39 years with a mean age of 26 years 7 months. Fathers’ occupations were across a wide spectrum including a variety of skills from laborer to professional. Income levels were from below $14,000 to above $50,000 (see Table 3).

Mothers’ education level correlated with mothers’ age, Pearson r = .42 (p = .000) as did the fathers’ education and age, Pearson r = .41 (p = .000). Mothers’ age and income correlated, Pearson r = .33 (p ≤ .03), as did the fathers’ age and income, Pearson r = .35 (p ≤ .03). T1 EPDS correlated with mothers who had reported a history of depression at r = .37 (p ≤ .01), and again at T2 r = .32 (p ≤ .03). There were no other correlations with the demographic variables (see Table 4).

Table 2
Infants’ Frequency, Range, Percentage, Means, and Standard Deviation for Independent Demographic Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Variable</th>
<th>Range</th>
<th>n/%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>46</td>
<td>Male</td>
<td></td>
<td>27/58.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td></td>
<td>19/41.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gestation</td>
<td>46</td>
<td>Gestation Weeks</td>
<td>35-41</td>
<td></td>
<td>39.2</td>
<td>1.43</td>
</tr>
<tr>
<td>Feeding</td>
<td>46</td>
<td>Breast</td>
<td></td>
<td>27/58.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottle</td>
<td></td>
<td>7/14.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Combination</td>
<td></td>
<td>12/26.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Measurements

The measurements used in this study include the Edinburgh Postnatal Depression Scale (EPDS) and the Clinical Neonatal Behavioral Assessment Scale (CLNBAS). The EPDS is designed specifically for evaluating postpartum mothers, and the CLNBAS is an interactive evaluation scale used to evaluate the infants when very young (i.e., the first days of birth up to three months of age.

Table 3

Father’s Frequency, Range, Percentage, Means, and Standard Deviation for Independent Demographic Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Variables</th>
<th>Range</th>
<th>n/%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>46</td>
<td>Years</td>
<td>20-39</td>
<td></td>
<td>26.7</td>
<td>3.95</td>
</tr>
<tr>
<td>Education</td>
<td>46</td>
<td>HS only</td>
<td>4/8.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Some College</td>
<td>19/41.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Four year degree</td>
<td>18/39.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>or more</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other training</td>
<td>5/10.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>46</td>
<td>Teacher</td>
<td>1/2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nurse</td>
<td>1/2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Secretary</td>
<td>1/2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Administrative/</td>
<td>3/6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manager</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Farmer</td>
<td>2/4.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Professional</td>
<td>5/10.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skilled Labor</td>
<td>6/13.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Own business</td>
<td>3/6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>24/52.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Income</td>
<td>46</td>
<td>Yearly Income</td>
<td>$14-19,000</td>
<td>14/30.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$20-29,000</td>
<td>16/34.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$30-49,000</td>
<td>6/13.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>$50/above</td>
<td>7/15.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>3/6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4

Correlation of Demographic Variables

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. EPDS T1</td>
<td>0.50</td>
<td>-0.17</td>
<td>0.07</td>
<td>0.13</td>
<td>0.18</td>
<td>0.09</td>
<td>0.18</td>
<td>0.02</td>
<td>0.37**</td>
<td></td>
</tr>
<tr>
<td>2. EPDS T2</td>
<td>-0.37</td>
<td>-0.12</td>
<td>0.17</td>
<td>0.09</td>
<td>0.19</td>
<td>0.25</td>
<td>0.07</td>
<td>0.32*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. CLNBAS (Social Emotional T1)</td>
<td>0.12</td>
<td>-0.10</td>
<td>0.02</td>
<td>0.09</td>
<td>0.16</td>
<td>0.17</td>
<td>0.27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. CLNBAS (Social Emotional T2)</td>
<td>0.04</td>
<td>-0.07</td>
<td>0.01</td>
<td>-0.01</td>
<td>-0.15</td>
<td>-0.02</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Mother's Education</td>
<td>-0.05</td>
<td>0.42***</td>
<td>0.41***</td>
<td>0.17</td>
<td>-0.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Family Income</td>
<td>0.33*</td>
<td>0.35*</td>
<td>0.14</td>
<td>-0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Mother's Age</td>
<td>0.77</td>
<td>0.68</td>
<td>0.22</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Father's Age</td>
<td>0.66</td>
<td>0.04</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Years Married</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. History of Depression</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p ≤ .03 **p ≤ .01 ***p ≤ .000
Edinburgh Postnatal Depression Scale (EPDS)

The EPDS (Cox et al., 1987) has 10 questions that are specifically designed for use with the mother during the postnatal period, and the questionnaire was usually completed in 5-10 minutes. The questionnaire was in a Likert scale format that was independently completed by the mother. Responses varied in wording: as much as I ever could, not quite so much now, definitely not as much now, not hardly ever, yes, sometimes yes, and very often. Example questions are: “I have been anxious or worried for no good reason,” “I have been able to laugh at the funny side of things,” “I have felt sad or miserable,” “and I have been so unhappy that I have been crying.” The mother chose the response that most clearly reflected her experiences over the immediate 7 days prior to the time of the assessment date. The EPDS was administered at two identified points in time (i.e., the first month postpartum and again by three months postpartum) to determine possible changes in the mother’s assessment of her own state of emotions.

The items on the EPDS are scored 0, 1, 2, or 3, with the increasing values indicating an increased amount of dysregulation. Items 1, 2 and 4 are scored from top to bottom from 0-3. Items 3, 5, 6, 7, 8, 9, 10 are scored from top to bottom in reverse order 3-0. A total of all responses may be obtained by adding all responses. A cut off score of 12 indicated mothers with emotional dysregulation concerns. The possible scoring ranges from 0-30 (see Appendix B).

EPDS Reliability and Validity

The Edinburgh Postnatal Depression Scale (EPDS) was developed in 1987 by Cox et al. to detect postnatal emotional dysregulation and depression. The scale was developed because the existing depression scales were assumed to be sub-optimal when applied to postnatal women (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), since normal postnatal symptoms, such as loss of sleep and changes in appetite, could easily be misunderstood to be depressive symptomatology.
The validity of the EPDS was originally established on a 13-item scale on a sample of 63 puerperal women who attended a health center in Livingston, England (Cox et al., 1987). Prior to the 13-item test a detailed analysis of the Irritability, Depression and Anxiety Scale (IDA; Snaith, 1981), the Hospital Anxiety and Depression Scale (HAD), and the Anxiety and Depression Scale of Bedford and Foulds (1978) was carried out. Twenty-one items were originally chosen from the scales or constructed by the researchers that were thought to be appropriate for the detection of postnatal depression. These items were tested during extensive pilot interviews with mothers of young babies. The detailed wording of the items, the acceptability of the items to the mothers and health workers, and the likelihood of the ability of the questions to detect postnatal depression were evaluated. Thirteen items were adapted from these original 21 items, with 6 being adapted from the IDA and the HAD, and 7 items being constructed by the researchers (Cox et al.).

The research by Cox and colleagues (1987), with 63 puerperal women showed that the 13 items distinguished clearly between depressed and non-depressed women. However, a rotated factor analysis revealed that two items from the IDA and one item concerning the enjoyment of motherhood formed a separate depression factor. Through analysis of the data of the three items, and to increase the specificity of the scale these three items were omitted. Further validation of the 10 item scale was then carried out on 84 mothers living in Edinburgh or Livingston. The mothers were identified as “possibly having problems,” “depressed,” or “normal” by health workers, and it was anticipated by the researchers that a useful function of the scale would be to confirm the “diagnosis of depression” as reported by the health workers. The scale was also developed to be used in the domestic setting.

Mothers in the sample were interviewed using Goldberg’s Standardized Psychiatric Interview (SPI; Goldberg, 1972) in the home setting. The EPDS was first completed by the mother and placed in a sealed envelope. The interviewer then completed the SPI, being blind to
the score of the EPDS. Twelve normal women were also included in the study to prevent possible bias effect caused by the interviewer knowing that the subject may have been regarded as depressed. The criteria used for the diagnosis of depression were the Research Diagnostic Criteria (Spitzer et al., 1975).

Sensitivity (i.e., the percentage of depressed women correctly identified), specificity (i.e., the percentage of non-depressed women correctly identified) and positive predictive value (PPV; i.e., the percentage of women correctly identified), were examined by Cox et al. (1987). They validated the EPDS using the SPI and found 86.0 sensitivity, 78.0 specificity, with a positive predictive value (PPV) of 73 with a cut off of 12-13 total score on the EPDS. Murray and Carothers (1990) also examined the sensitivity and specificity with the SPI. They found 86.7 sensitivity, and 82.3 specificity with a cut off point of 9-10. Harris and colleagues (1989) who validated the items using the DSM III, found 95.0 sensitivity and 93.0 specificity at a cut-off point of 12-13.

According to Coyle and Adams (2002), it is recommended that the EPDS should be used with supporting professional judgment, be carried out in a place where the mother is ensured privacy, and be considered for possible factors of comprehension by the mother due to literacy level, cultural background, and language difficulties. The nine symptoms in the DSM-IV may be explored to determine the degree of depression present. It has been recommended by the National Screening Committee that the EPDS may be used as a checklist for mood assessment in the context research studies (Coyle & Adams). It also provides a useful framework for assessing the common symptoms affecting depressed mothers, and as such remains a useful tool for health visitors to support detection of PND in their clients (Coyle & Adams).

The study by Cox et al., (1987) showed that the 10-item Postnatal Depression Scale, which was derived from the earlier work of Snaith (1981), had satisfactory validity and reliability that were sensitive to changes in the severity of depression over time. It was also found that the
scale was fully acceptable to the childbearing women and was usually completed in 5 minutes. The data also suggested that sensitivity and specificity of the scale may be increased if it is completed when other family members are not present. Moreover women scoring above the threshold of 12/13 were most likely to be suffering from a depressive illness of varying severity, and should, therefore, be assessed to determine whether or not clinical depression was present.

The sensitivity, specificity, and predictive value of the EPDS are dependent on the cut-off scores chosen for its administration. For example, if the cut-off score chosen is greater than 12, some cases of PND will be missed, whereas, if the lower score of 9 is chosen few will be missed and there will be a high false positive rate (Benevenuti, Ferrara, Niccolai, Valoriani, & Cox, 1999; Boyce, Stubbs, & Todd, 1993). This disparity in cut-off score gives rise to marked variation in the positive predictive value from 44%-73% (Coyle and Adams, 2002).

The EPDS that has been designed specifically for use during the postnatal period, which enables a more accurate measure of emotional well-being of the mother than other scales designed specifically for diagnosing clinical depression (Beck et al., 1961). Similar studies have used the Edinburgh Postnatal Depression Scale (Cox et al., 1987), or a general depression scale, such as the Beck Depression Inventory (Beck et al.). It appears that the use of general depression scales during the postpartum period is not advised since general scales identify normal postpartum events as cause for concern (Cox et al.).

Clinical Neonatal Behavioral Assessment Scale (CLNBAS)

The CLNBAS consists of 18 items that are rated on a Likert-type scale from 1-3. The ratings range from “weak, great difficulty, not responsive, and so forth,” to “some difficulty, fairly strong moderate,” and “with ease, strong, very responsive, and so forth.” The CLNBAS is designed to evaluate the infant’s behavioral repertoire and reactivity as the infant responds to human and non-human stimuli. The CLNBAS is a more recent revision of the Neonatal
Behavioral Assessment Scale (NBAS), which has been used in research over the past 25 years. Both assessments were developed by the Brazelton Institute in Boston, Massachusetts (Nugent & Brazelton, 2000). The evaluation treats the child as an active participant, not relying on parent report or a non-interactive examination of the infant. It measures the infant’s abilities to react socially and emotionally, to organize sleep and awake states, to control outside stimuli, to exhibit strengths in motor skills, to control the autonomic system, and to console or comfort self. The areas evaluated indicate the degree of reactivity and reveal the infant’s ability to adapt to stimuli in the environment. The assessment identifies the infant’s capacity for coping with presented stimuli, and assesses the reactivity level of the infant.

Correlating CLNBAS and the EPDS scores may show a relationship between the mother’s emotional well-being and the reactivity of the child in the developmental areas identified on the CLNBAS. Examining these items at two points in time will provide a look at the stability of these correlations across time as well as the relationship between the variables.

*NBAS and CLNBAS Reliability and Validity*

The CLNBAS does not yet have enough data to establish reliability, however Dr. J. Kevin Nugent stated that he is looking for results from researchers to establish reliability for the assessment (J. K. Nugent, personal communication, January 26, 2003). Since the CLNBAS is a direct adaptation of the NBAS, the psychometric properties of the NBAS will next be discussed. The items of the NBAS and CLNBAS have no direct correlation (i.e., there are no corresponding numbers being the same items on both assessments), for comparisons to be made. The assessments cover the same items: (a) habituation, (b) motor assessment, (c) reactivity, (d) crying and consolability, (e) organization of state, (f) autonomic indicators, and (g) activity throughout the exam.
Because reliability has not been established for the CLNBAS, the NBAS from which the CLNBAS has corresponding items, will be discussed. Studies that have examined test-retest reliability of the NBAS across repeated examinations have low to moderate test-retest correlations (Brazelton & Nugent, 1995; Lester, 1984). However, the test-retest reliability may not be an appropriate question for the NBAS and in turn the CLNBAS due to the rapid changes in physiological, behavior, and physical systems taking place during the neonatal period (Horowitz & Linn, 1982). It is believed by the authors of the NBAS and CLNBAS, that change not stability, characterizes healthy development in this period. Brazelton’s original concept was that the NBAS would measure dynamic aspects of the organization of neonatal behavior and that this required repeated examinations (Brazelton, 1973).

The idea of the NBAS was that it would measure the coping capacities and adaptive strategies of the infant, that become apparent as the infant recovers from the stresses of labor and delivery and begins to adjust to the demands of the extra-uterine environment during the first weeks of life. The adaptation was studied and measured by the patterns of change noted over repeated examinations (Lester, 1984). The authors also believe that behavioral processes such as habituation reflected earlier phases of biological development and were more stable across time than were the attention and state behaviors, which are newly emerging and may be more susceptible to environmental influences.

The authors of the assessment believe that understanding the neonate by the patterns of change may be the researcher’s best index of the infant’s current status and that the changing of the patterns are also predictive of future outcome. There is growing evidence that when scores are combined with measures of caregiving environment the prediction of later development is enhanced (Bakeman & Brown, 1980; Horowitz & Linn, 1982). Longitudinal studies suggest that predictive validity depends on the use of repeated assessment as well as ongoing measures of the concurrent contributions of the infant’s caregiving environment.
Several studies have looked at the contribution of neonatal behavior as measured by the NBAS, parent-infant interactions and future developmental outcomes. Studies using the NBAS may therefore be classified as: (a) studies of risk factors in newborn infants, (b) studies of the effects of obstetric medication and mode of delivery, (c) studies of the effects of maternal substance use, (d) cross-cultural studies, (e) prediction studies, and (f) intervention studies.

*Training and Establishing Interrater Reliability*

The two researchers, Karen Hansen and Ann Austin, have received training at the Brazelton, Institute in association with Harvard University and the Children’s Hospital in Boston, MA. The researchers participated in practical training sessions through interaction with mothers and infants in the hospital setting, as well as observation and evaluation practice, assessment trials, and learning the procedures of the exam. The researchers have located babies in the community and have been using the CLNBAS to assess the reactivity of infants and young babies.

Through assessment of infants (T1) up to 1 month and (T2) up to 3 months of age, the researchers have assessed and scored infants taking turns as implementer and observer to establish interrater reliability. Reliability has been established by identifying a definite protocol for the process (i.e., undressing the infant to the diaper after the habituation package, identifying the assessment period as the only time that responses of the infant will be scored, controlling the lighting of the area in which the observation is being done, and so forth), and refining how to administer criteria. Reliability is being established at 80%, and this process will continue throughout the evaluation process and collection of data. One out of every 10 families will be co-evaluated to maintain reliability.
Procedures and Implementation

The study was explained at the first home visit with the family, and the consent forms were signed (see Appendix G and Appendix H). Demographic information was also completed at the first visit. The CLNBAS was administered to the baby at the designated meeting time within the first month of age by the two researchers, Karen Hansen and/or Ann Austin. The EPDS was completed by the mother on the same date, and forwarded to assistant, Andrea Boyd (psychologist at Logan River Academy), for scoring and recording. The second evaluation date was scheduled at the time of the first evaluation, and the infant and mother were re-evaluated using the EPDS and CLNBAS. Because there were mothers who were at risk (i.e., scoring in the upper one-third of the EPDS) they were alerted by letter suggesting a visit with their doctor, as well as all other mothers being informed by the informational brochure that was provided, suggesting a visit with their doctor, as well as other general information, should any of the EPDS questions give them concerns (see Appendix D).

Confidentiality

Identities of mothers and infants were kept confidential, and the researchers did not know the EPDS scores of the mothers. The EPDS was completed by the assistant, Andrea Boyd, with supervision by Ann Austin. Ms. Boyd was responsible to assign random numbers to the assessments of both infant and mother. All coded assessments were kept in separate locked files. All information will be kept for a period of 2 years and then destroyed. Information requested by the mothers regarding EPDS scores and CLNBAS scores was monitored by Andrea Boyd. Upon mother’s request, additional information was provided for the mothers by the researchers.
In this analysis, T1 refers to the first evaluation time during the first month postpartum, and T2 refers to the second evaluation time up to three months postpartum. Evaluations were not completed during the mother’s hospital stay. It was necessary to wait until the mother had been released from the hospital and returned home to complete the first evaluations. The second evaluation was scheduled up to the third month postpartum at the convenience of the family.

Research by Teti and Gelfand (1991) indicates that clinical depression in the postpartum period impacts the quality of the mother-infant interaction in relatively low risk, first time mothers, when the depression lasts more than 6 months. Therefore, the duration of depression is very important and must be considered in other studies of depressed women and their offspring.

The present study will measure the child’s reactivity to the mother at two points in time, and should give a base for comparing mother’s emotionality and child reactivity. This would support the hypothesis of the correlational relationship between infant reactivity at T1 and the mother’s emotional well-being at T2, although this is not being studied as a causal relationship in this study.

In order to examine child reactivity before the documented onset of contingent response this study will examine infant reactivity within the first month postpartum. This evaluation could provide information about the infant’s readiness for reactivity before environmental exposure as compared to the later T2 after more environmental exposure to stimuli. A second measure of infant reactivity will be recorded up to three months postpartum, after contingent responsiveness is thought to begin. The proposed study will focus on this earliest age, and will provide correlated information about the relationship between postpartum emotional well-being of the mother and infant reactivity. Although the infant may not have established contingent responsiveness at T1, it is assumed to be present by T2, thus offering a glimpse of the potential correlation between infant reactivity and maternal self-reported well-being.
Several questions were answered. “What is the relationship between the reactivity of the infant at T1 to T2?” or “what is the relationship between T1 and T2 individual CLNBAS items?” “What is the relationship between the emotionality of the mother T1 and T2?” or “what is the relationship between the T1 and T2 EPDS?” “What is the relationship between the reactivity of the infant at T1 and the emotionality of the mother at T1?” or “what is the relationship between T1 CLNBAS items and T1 EPDS?” “What is the relationship between the infants’ reactivity T2 and mothers’ emotionality T1?” or “what is the relationship between T2 CLNBAS items and T1 EPDS?” “What is the relationship between the infants’ reactivity T2 and the mothers’ emotionality T2?” or “what is the relationship between the T2 CLNBAS items and the T2 EPDS?” “What is the relationship between infant reactivity T1 and the mother’s emotionality T2?” or “what is the relationship between the T1 CLNBAS and the T2 EPDS?” “What is the relationship between demographic variables and T1 and T2 CLNBAS and EPDS?”

The CLNBAS scores of identified focus items will be looked at rather than a total CLNBAS score for this research. All items (1-18) were implemented (see Appendix F), however for this research items 9-13 referred to as the “social emotional package” were the focus areas for studying infant reactivity, although individual items were also included (i.e., crying, consolability and others noted in the research; see Appendix A).
CHAPTER IV

RESULTS

The Wilcoxon was used to determine the relationship of T1 to T2 individual CLNBAS items. Spearman’s $r$ and Pearson correlation were used to determine relationships at T1 and T2 of the mothers’ total EPDS scores, and their relationship to the infants’ scores on the individual CLNBAS items. ANOVA was used to determine significance of difference between means at T1 and T2 between the mothers’ EPDS total scores and the scores of the infants’ individual CLNBAS items. Paired samples t test was used at T1 and T2 EPDS and CLNBAS for “mothers with a history of being treated for depression” and “mothers not having been previously treated for depression” and their infants.

The CLNBAS consisted of 18 evaluation items that measured the infant’s ability to habituate (reactivity) to stimuli in the environment. Each item was scored from 1-3 with 3 being the highest and most desirable response (see Appendices A & F). Items 9-13, the “social emotional package,” including response to face and voice, tracking the red ball, response to face only, response to voice only and response to rattle were the areas of focus in this study, although other items were looked at individually.

The EPDS was scored from 0-3 in 10 areas of emotional adjustment with the lower scores indicating less emotionality and, therefore, fewer clinical manifestations, and the higher scores indicating more emotionality, or more clinical manifestations (see Appendix B). The score of 12 or above was used to identify mothers who were approaching emotionality within the area of depression as recognized in extant research.
What Is the Relationship Between Infant Reactivity T1 and T2?

The Wilcoxon statistic was used to correlate individual CLNBAS items T1 with T2. There was a significant negative correlation between several items on the CLNBAS. Crawling (i.e., crawling-like movements of the infant's arms and legs and raising of the head when placed on the stomach) correlated at $p \leq .05$. Hand grasp (i.e., the ability of the infant to grasp and hold onto examiners fingers while being pulled to sit) correlated at $p \leq .05$. Responding to face only (i.e., the infant's ability to establish eye contact and track the movement of the examiners face in all quadrants with no vocalization by the examiner) correlated at $p \leq .01$ (see Table 5).

Tracking the red ball (i.e., the infant's ability to visually locate and track the red ball in all quadrants with the ball being moved by the examiner) correlated at $p \leq .00$. Crying (i.e., the amount of crying throughout the exam) correlated at $p \leq .05$. Consolability (i.e., the infant's ability to calm self when crying by responding to different techniques implemented by the examiner) correlated at $p \leq .05$. Control of tremors, startles and other neurological autonomic reactions (i.e., the infant's ability to have smooth muscle movements in the legs and arms when examiner extended the arms and legs and released them, as well as autonomic reactions such as lip tremors and extreme color change of the skin) correlated at $p \leq .00$ (see Table 5).

Rooting between T1 and T2 (i.e., the infant's ability to turn the head toward the cheek or corner of the mouth when touched by the examiner) correlated at $p \leq .05$. Means and standard deviations indicated from T1 to T2 that the infants had higher scores in all skills except rooting which is to be expected as rooting normally declines as the infant matures (see Table 5).

What Is the Relationship Between the Emotionality of the Mother T1 and T2?

EPDS scores T1 ranged from 0-18 with a mean of 6.37 (4.13). Four mothers (8.8%)
scored 12 or above T1. EPDS scores T2 ranged from 0-14 with a mean of 3.98 (3.12). Two mothers (4.4%) scored 12 or above on the T2. The T1 mean score of 6.37 was higher than the T2 mean score of 3.98, indicating that the mothers’ experienced less emotionality as the Baby Blues period passed. Pearson $r$ was used to determine the relationship between EPDS T1 and EPDS T2. There was very strong correlation at $r = .50$ ($p = .00$) indicating a strong relationship between T1 and T2 scores of 12 or above, T1. EPDS scores T2 ranged from 0-14 with a mean of 3.98 (3.12; see Table 6).

Table 5

*Wilcoxon’s Correlation, Mean, and Standard Deviation at T1 and T2 CLNBAS for Infant Reactivity*

<table>
<thead>
<tr>
<th>CLNBAS</th>
<th>N</th>
<th>$z$</th>
<th>$T1$ $M$</th>
<th>$SD$</th>
<th>$T2$ $M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crawling</td>
<td>46</td>
<td>2.13*</td>
<td>2.30</td>
<td>.76</td>
<td>2.98</td>
<td>.53</td>
</tr>
<tr>
<td>Hand Grasp</td>
<td>46</td>
<td>-2.29*</td>
<td>2.64</td>
<td>.60</td>
<td>2.90</td>
<td>.31</td>
</tr>
<tr>
<td>Face only</td>
<td>46</td>
<td>-3.05**</td>
<td>2.13</td>
<td>.95</td>
<td>2.70</td>
<td>.59</td>
</tr>
<tr>
<td>Tracking red ball</td>
<td>46</td>
<td>-3.60***</td>
<td>2.09</td>
<td>.78</td>
<td>2.65</td>
<td>.57</td>
</tr>
<tr>
<td>Crying</td>
<td>46</td>
<td>-2.18*</td>
<td>2.62</td>
<td>.53</td>
<td>2.82</td>
<td>.49</td>
</tr>
<tr>
<td>Consolability</td>
<td>46</td>
<td>-2.16*</td>
<td>2.72</td>
<td>.46</td>
<td>2.89</td>
<td>.38</td>
</tr>
<tr>
<td>Control of</td>
<td>46</td>
<td>-4.04***</td>
<td>2.4</td>
<td>.50</td>
<td>2.9</td>
<td>.34</td>
</tr>
<tr>
<td>tremors/startles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rooting</td>
<td>46</td>
<td>-2.12*</td>
<td>3.0</td>
<td>.88</td>
<td>2.8</td>
<td>.72</td>
</tr>
</tbody>
</table>

*$p \leq .05 \quad **p \leq .01 \quad ***p \leq .000$
What Is the Relationship Between Infants’ Reactivity T1 and Mothers’ Emotionality T1?

Using Pearson $r$ no statistically significant relationship was found between the infants CLNBAS “social emotional package” T1 and the mothers’ EPDS T1 scores, $r = -.17$ ($p = .26$; see Table 6). However, the item tracking the red ball T1, did correlate with mothers’ EPDS T1 at statistically significant level of (Spearman’s $r = -.30$, $p = .04$; see Tables 6, 7, & 8).

What Is the Relationship Between Infants’ Reactivity T2 and Mothers’ Emotionality T1?

Due to the exploratory nature of this study $p$ values greater than $p = .05$ will be studied. There was no statistical significance between infants’ reactivity, or T2 CLNBAS “social emotional package” and mothers’ T1 emotionality, Pearson $r = .07$, $p = .63$. However, the paired $t$ test indicated that the T1 and T2 EPDS scores of “mothers previously treated for

Table 6

*Summary of Pearson and Spearman Statistics Between T1 and T2 Individual CLNBAS and EPDS Scores*

<table>
<thead>
<tr>
<th></th>
<th>$N$</th>
<th>Correlation</th>
<th></th>
<th></th>
<th>$N$</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r$</td>
<td></td>
<td></td>
<td>$r$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 and T2 EPDS</td>
<td>46</td>
<td>.50 ($p = .000$)</td>
<td></td>
<td>T1 CLNBAS X T1 EPDS</td>
<td>46</td>
<td>-.30 ($p = .041$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tracking red Ball</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 CLNBAS X T2</td>
<td>46</td>
<td>-.37 ($p = .011$)</td>
<td>T2 CLNBAS X T2 EPDS</td>
<td>46</td>
<td>.32 ($p = .031$)</td>
<td></td>
</tr>
<tr>
<td>EPDS</td>
<td></td>
<td></td>
<td>Infants’ state regulation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Infant activity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rooting</td>
<td></td>
<td></td>
<td>.26 ($p = .079$)</td>
</tr>
<tr>
<td>T1 CLNBAS X T1</td>
<td>46</td>
<td>-.17 ($p = .258$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 CLNBAS X T1</td>
<td>46</td>
<td>.072 ($p = .633$)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 7

Analysis of Variance for T1 CLNBAS Scores “Tracking the Red Ball” by T2 EPDS

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>η</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking the red ball</td>
<td>2</td>
<td>3.511</td>
<td>.140</td>
<td>.039</td>
</tr>
<tr>
<td>S within group error</td>
<td>43</td>
<td>(8.78)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MS = 30.81

Table 8

Overall Means for T1 CLNBAS “Tracking the Red Ball” by T2 EPDS Scores

<table>
<thead>
<tr>
<th>Tracking the Red Ball</th>
<th>N</th>
<th>EPDS M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Responsive</td>
<td>12</td>
<td>5.92</td>
<td>4.34</td>
</tr>
<tr>
<td>Moderately Responsive</td>
<td>18</td>
<td>3.17</td>
<td>1.82</td>
</tr>
<tr>
<td>Very Responsive</td>
<td>16</td>
<td>3.44</td>
<td>2.76</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>4.00</td>
<td>3.12</td>
</tr>
</tbody>
</table>

Table 9

Paired Samples t Test EPDS T1 and T2 Scores of Mothers Previously Treated for Depression (group 1) and Mothers Not Previously Treated for Depression (group 2)

<table>
<thead>
<tr>
<th>EPDS GROUP</th>
<th>N</th>
<th>EPDS T1 M (SD)</th>
<th>EPDS T2 M (SD)</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>9.44 (5.08)</td>
<td>6.00 (4.74)</td>
<td>2.65</td>
<td>44</td>
<td>.011</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>5.62 (3.56)</td>
<td>3.49 (2.43)</td>
<td>1.54</td>
<td>9.05</td>
<td>.157</td>
</tr>
</tbody>
</table>

a-Unequal variances
depression” were related at T1 \( t = 9.44 \) (5.08), and at T2 \( t = 6.00 \) (4.74) \( p = .011 \). The CLNBAS “social emotional package” scores of the infants whose mothers were previously treated for depression also indicated a relationship at T1 \( t = 10.56 \) (3.13) to T2 \( t = 13.44 \) (2.24) \( p = .069 \) (see Tables 6, 9, and 10).

What Is the Relationship Between Infants’ Reactivity T2 and Mothers’ Emotionality T2?

Of individual items T2 CLNBAS, only one was statistically significantly related to the T2 EPDS. There was a statistically significant negative correlation between T2 CLNBAS “state regulation” and T2 EPDS (Spearman’s \( r = .32, p = .03 \)). Other T2 EPDS and T2 CLNBAS comparisons while not statistically significant indicated a similar pattern of less reactivity of the infant at T2 correlating with higher EPDS scores of the mother T2. This pattern included the T2 CLNBAS “activity of the infant” and T2 EPDS (Spearman’s \( r = -.24 \) (\( p = .11 \); see Tables 6 and 11).

Table 10

*Paired Sample t Test for T1 and T2 “Social Emotional Package” CLNBAS Scores of Infants Whose Mothers Had Previously Been Treated for Depression (group 1) and Mothers Who Had Not Been Previously Treated for Depression (group 2)*

<table>
<thead>
<tr>
<th>EPDS GROUP</th>
<th>N</th>
<th>CLNBAS T1 M</th>
<th>SD</th>
<th>CLNBAS T2 M</th>
<th>SD</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9</td>
<td>10.56 (3.13)</td>
<td></td>
<td>13.44 (2.24)</td>
<td></td>
<td>-1.866</td>
<td></td>
<td>.069</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>12.41 (2.55)</td>
<td></td>
<td>13.51 (1.64)</td>
<td></td>
<td>-.105</td>
<td></td>
<td>.917</td>
</tr>
</tbody>
</table>
What Is the Relationship Between Infants' Reactivity T1 and Mothers' Emotionality T2?

Pearson $r$ indicated a statistically significant negative correlation between "social emotional package" T1 CLNBAS and T2 EPDS, $r = -0.374$ ($p = 0.01$). As the infant scored higher on the "social emotional package" T1 CLNBAS, the mother scored lower on the EPDS T2. Using one-way ANOVA and comparing EPDS T2 and "individual items from the social emotional package" T1 CLNBAS, it was found that there was a relationship between CLNBAS items "responding to face and voice" and "tracking the red ball," and the EPDS scores of the mother. As the infants scored higher on the mothers' scored lower. When comparing mean scores of the infant's responses ranging from a high (3.00), moderate (2.00), and low (1.00) on the individual "social emotional package items" T1 CLNBAS, a statistically significant relationship between the infants' reactivity to "face and voice" and "tracking the red ball."
ball’" and the mothers’ T2 EPDS scores was indicated. Results also indicated a similar pattern in the infants’ reactivity to ‘‘face only’’ and ‘‘voice only’’ social emotional package T1 CLNBAS items, although not statistically significant. The LSD’s indicated that the non-responsive group was significantly higher than the responsive and moderately responsive groups (see Tables 7, 8, 12, 13, 14, 15, 16, 17, and 18).

What Is the Relationship Between Demographic Variables and T1 & T2 CLNBAS and EPDS?

Fathers’ occupations were across a wide spectrum including a variety of skills. Income levels were from below $14,000 to above $50,000. Mothers’ education level correlated with the mothers’ age, Pearson $r = .42$ ($p = .000$) as did the fathers’ education and age, Pearson $r = .41$ ($p = .000$). Mothers’ age and income correlated, Pearson $r = .33$ ($p \leq .03$), as did the fathers’ age and income, Pearson $r = .35$ ($p \leq .03$). T1 EPDS correlated with mothers who had reported a history of depression at $r = .37$ ($p \leq .01$), and again at T2 $r = .32$ ($p \leq .03$). There were no other correlations with demographic variables (see Table 4).

There were nine mothers who reported being treated for depression prior to participating in the study. Prior depression was coded as 1 and no prior depression as 2. Lower EPDS scores indicated less emotionality (group 2) and higher EPDS scores indicated more emotionality (group

<table>
<thead>
<tr>
<th>Source</th>
<th>$df$</th>
<th>$F$</th>
<th>$\eta$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to &quot;face and voice&quot;</td>
<td>2</td>
<td>4.190</td>
<td>.163</td>
<td>.022</td>
</tr>
<tr>
<td>S within group-error</td>
<td>43</td>
<td>(8.54)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS = 35.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 13

*Overall Means for T1 CLNBAS “Response to Face and Voice” by T2 EPDS*

<table>
<thead>
<tr>
<th>Face and Voice</th>
<th>N</th>
<th>EPDS M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Responsive</td>
<td>2</td>
<td>9.50</td>
<td>.71</td>
</tr>
<tr>
<td>Moderately Responsive</td>
<td>12</td>
<td>4.42</td>
<td>2.97</td>
</tr>
<tr>
<td>Very Responsive</td>
<td>32</td>
<td>3.47</td>
<td>3.00</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>3.98</td>
<td>3.12</td>
</tr>
</tbody>
</table>

Table 14

*Analysis of Variance for T1 CLNBAS “Response to Face Only” by T2 EPDS*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>F</th>
<th>$\eta$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to “face only”</td>
<td>2</td>
<td>3.098</td>
<td>.126</td>
<td>.055</td>
</tr>
<tr>
<td>S within group-error</td>
<td>43</td>
<td>(8.92)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS</td>
<td></td>
<td>27.64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 15

*Overall Means for T1 CLNBAS “Response to “Face Only” by T2 EPDS*

<table>
<thead>
<tr>
<th>Face Only</th>
<th>N</th>
<th>EPDS M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Responsive</td>
<td>18</td>
<td>5.22</td>
<td>3.83</td>
</tr>
<tr>
<td>Moderately Responsive</td>
<td>4</td>
<td>1.75</td>
<td>2.22</td>
</tr>
<tr>
<td>Very Responsive</td>
<td>24</td>
<td>3.42</td>
<td>2.28</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>4.00</td>
<td>3.12</td>
</tr>
</tbody>
</table>
1). The t test T1 indicated statistically significance differences for overall CLNBAS scores between infants of "mothers previously treated for depression" and infants whose mothers had "not been "previously treated depression." The mean EPDS scores T1 and T2 were higher for the "previously depressed mothers" (T1 9.44 and T2 6.00), than the "not previously depressed mothers" (T1 5.62 and T2 3.49). The mean infant CLNBAS scores T1 for the infants were lower for those whose mothers were "previously treated for depression" (10.56), than those whose mothers were not previously treated for depression (12.41). According to results of t tests between T2 EPDS scores there were no statistically significant differences, \( t = 1.54, \) \( 9.05 \) df \( (p = \) .

Table 16

*Analysis of Variance for T1 CLNBAS "Voice Only" by T2 EPDS*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>( F )</th>
<th>( \eta )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to &quot;voice only&quot;</td>
<td>2</td>
<td>2.592</td>
<td>.108</td>
<td>.087</td>
</tr>
<tr>
<td>S within group error</td>
<td>43</td>
<td>(9.11)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MS = 23.62

Table 17

*Overall Means for T1 CLNBAS Response to "Voice Only" by T2 EPDS*

<table>
<thead>
<tr>
<th>Voice Only</th>
<th>( N )</th>
<th>( \text{EPDS} M )</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Responsive</td>
<td>3</td>
<td>6.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Moderately Responsive</td>
<td>7</td>
<td>5.86</td>
<td>4.45</td>
</tr>
<tr>
<td>Very Responsive</td>
<td>36</td>
<td>3.44</td>
<td>2.24</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>4.00</td>
<td>3.12</td>
</tr>
</tbody>
</table>
.157) with equal variances, however there were statistically significant differences between EPDS scores T1, \( t = 2.65, 44 \, df (p = .011); \) see Tables 9 & 10.

Table 18

**Summary of CNLBAS and EPDS Relationships**

<table>
<thead>
<tr>
<th>CNLBAS T1 X EPDS T1</th>
<th>“Summary of Pearson and Spearman Statistics Between T1 and T2 Individual CNLBAS and EPDS Scores”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Significance</td>
</tr>
<tr>
<td>CLNBAS T1 X EPDS T2</td>
<td>“Analysis of Variance for T1 CLNBAS “Response to Face and Voice” by T2 EPDS”</td>
</tr>
<tr>
<td></td>
<td>Significant: Face and voice CNLBAS T1 by EPDS T2</td>
</tr>
<tr>
<td></td>
<td>“Analysis of T1 CLNBAS Scores “Tracking the Red Ball” by T2 EPDS”</td>
</tr>
<tr>
<td></td>
<td>Significant: Tracking the Red Ball CNLBAS T1 by EPDS T2</td>
</tr>
<tr>
<td></td>
<td>“Analysis of Variance for T1 CLNBAS “Response to Face Only” by T2 EPDS”</td>
</tr>
<tr>
<td></td>
<td>*Similar Pattern: Face only T1 by EPDS T2</td>
</tr>
<tr>
<td></td>
<td>“Analysis of Variance for T1 CLNBAS “Voice Only” by T2 EPDS”</td>
</tr>
<tr>
<td></td>
<td>*Similar Pattern: Voice T1 by EPDS T2</td>
</tr>
<tr>
<td>CLNBAS T2 X EPDS T2</td>
<td>“Summary for Pearson and Spearman Statistics Between T1 and T2 Individual CNLBAS and EPDS Scores”</td>
</tr>
<tr>
<td></td>
<td>No Significance</td>
</tr>
</tbody>
</table>

* Items not significant at \( p <= .05, \) but with similar pattern
CHAPTER V

DISCUSSION

This study was designed to study the relationship between postpartum mothers’ emotionality and their infants’ reactivity to stimuli at two different times in the first 3 months of life. The first evaluation was completed within the first days of life and the second evaluation was completed at up to three months of age. Previous research has not focused on the first few weeks of life as we did in this study. The research questions focused on looking at the relationship between time one (T) time two (T2) data on the Clinical Neonatal Behavioral Scale (CLNBAS) and the Edinburgh Postnatal Depression Scale (EPDS).

Research questions were created to look at the relationship between mothers’ emotionality and infants’ reactivity at two points in time. What is the relationship between infant reactivity T1 and T2? What is the relationship between emotionality of the mother T1 and T2? What is the relationship between infants’ reactivity T1 and mothers’ emotionality T1? What is the relationship between infants’ reactivity T2 and mothers’ emotionality T1? What is the relationship between infants’ reactivity T2 and mothers’ emotionality T2? What is the relationship between infants’ reactivity T1 and mothers’ emotionality T2? What is the relationship between demographic variables and T1 and T2 CLNBAS and EPDS?

Discussion of Results

What Is the Relationship Between Infant Reactivity T1 and T2?

The Wilcoxon statistic was used to correlate individual CLNBAS items T1 with T2. There was a relationship between several items on the CLNBAS. Crawling (i.e., crawling-like movements of the infant’s arms and legs and raising of the head, when placed on the stomach) indicated a relationship. There was a relationship between hand grasp (i.e., the ability of the
infant to grasp and hold onto examiners fingers while being pulled to sit). Responding to face only (i.e., the infant’s ability to establish eye contact and track the movement of the examiners face in all quadrants with no vocalization by the examiner) indicated that there was relationship. Tracking the red ball (i.e., the infant’s ability to visually locate and track the red ball in all quadrants, with the ball being moved by the examiner) had a relationship between T1 and T2. A relationship between T1 and T2 crying (i.e., the amount of crying throughout the exam) was indicated, as was consolability (i.e., the infant’s ability to calm self when crying by responding to different techniques implemented by the examiner). Control of tremors, startles and other neurological autonomic reactions (i.e., the infant’s ability to have smooth muscle movements in the legs and arms when examiner extended the arms and legs and released them, as well as autonomic reactions such as lip tremors and extreme color change of the skin) also indicated a relationship. A relationship was also noted with rooting (i.e., the infant’s ability to turn head to the touch of the examiner on the cheek or corner of the mouth), with the rooting decreasing from T1 to T2.

Research supports our findings that the infant is ready to interact at this earliest age (Brazelton, 1992). Research has stated that the infant’s ability to recognize familiar voices, to visually discriminate the movement of inanimate and animate objects, to maintain eye contact, and to be responsive to other stimuli in the environment appears to be present in the first days of life (Nugent & Brazelton, 2000). It has been found that mothers’ characteristic ways of expressing their emotions are influential in infant development. This is supported by research that, as the infant matures and begins to become exposed to new environmental experiences, the brain becomes more developed through repeated actions. The child’s skills increase as brain development becomes more specific and specialized (Fischer & Bidell, 1998).

Research has found that as infants mature they became more responsive to external stimuli, and due to the social nature of the infant they are being affected by the mother’s response
style (Bowlby, 1980; Svanberg, 1998). The earlier studies of Bigelow (2001) indicate that there was an emerging of imitation in a contingent way at two months of age. This would be supported by our research that indicates there is evidence that infants’ switch from internal stimuli and begin responding to external stimuli at a very early age. Responses to external stimuli are present at T1 and T2 as the infant responds to the “face and voice,” “red ball,” “face only,” and “voice only” stimuli.

Research has also found that prior to two months of age (T1) the infants are mostly aroused by perfect contingency of their self-actions (i.e., imitating the infant’s actions; Mahler et al., 1975). The infants in this study were beginning to be responsive to the “face and voice” and “tracking the red ball” as they responded to external stimuli (T1) within the environment. Nichols et al. (2001) reviewed the study by Mahler et al., and concluded that their study indicated that it was uncertain whether infants were as sensitive to contingent responses prior to two months of age as they were thereafter. But contingency has a beginning at T1 with the reactivity indicated by the CLNBAS items “face and voice” and “red ball,” “face only,” and “voice only.” Our findings also indicated that overall the mother and infant were not as responsive to each other when measured at T1 EPDS by T1 CLNBAS (prior to 2 months of age) as they were at T2 CLNBAS by T2 EPDS (after two months of age), and at T1 CLNBAS and T2 EPDS. These are discussed in the following sections.

*What Is the Relationship Between Mothers' Emotionality T1 and T2?*

There was a statistically significant correlation between EPDS scores T1 and T2 indicating that the mothers’ T2 scores were related to their T1 emotionality. The range of scores from 0-18 at T1 to 0-14 at T2 had decreased as did the mean scores T2 indicating that the mothers were experiencing more emotionality T1, or immediately after the euphoric period (approximately three days after delivery) than at T2 several months later.
What is happening during this period? The emotionality was most likely decreasing at T2 partly due to the transitory nature of the early postpartum period. The number of mothers experiencing emotionality above 12 on the EPDS had decreased from four mothers at T1 to two at T2. This is similar to extant research that has found that in the early postpartum period (4-14 days postpartum) mothers may experience emotional distress, but it is transitory in nature (Baby Blues; Harris, 1996; Johnson & Apgar, 2001; Spinelli, 1998). This study extends previous work by examining earliest specific variables that may impact the “Baby Blues” period.

**What is the Relationship Between Infants’ Reactivity T1 and Mothers’ Emotionality T1?**

There was no significant relationship found between the infants’ “social emotional package” T1 CLNBAS and the mothers’ T1 EPDS score, but when dividing the mothers into “previously treated for depression” and “not previously treated for depression” there were significant differences. It was found that the more responsive or higher scoring the infant was to visually tracking the red ball T1, the lower or more desirable were the mother’s T1 EPDS scores. In contrast the higher the mothers’ T1 EPDS scores, the lower were the infants’ scores in reactivity to “tracking the red ball T1.” This suggests that previously diagnosed mothers may react to normative experiences with more emotionality. Across time the emotionality typically declined for both groups of mothers but remained at a higher level for the diagnosed mothers.

This new research may indicate that there was something going on with the infants’ response at T1 that indicated they were switching from internal to external stimuli as they responded to CLNBAS items at this early time. Extant research has indicated that the switching of the infant to external stimuli begins at two months of age as the infant is responsive to the environment and, and is responding in a social way (Dunsmore & Halberstandt, 1997; Hamlyn, 1994). Their strong response to “tracking the red ball” may have indicated an early switching from internal to external stimuli as they were very responsive to this stimulus at T1. Findings
also indicate that there is a correlation between the mother's non-responsiveness to the infant and the infant's non-responsiveness to the mother. Therefore the infant could remain internally stimulated during this earliest period and be protected from negative affect therefore not exhibiting responses affected by the mother as indicated in T1 EPDS and T1 CLNBAS data.

What Is the Relationship Between Infants' Reactivity T2 and Mothers' Emotionality T1?

Pearson's $r$ indicated no statistical significance between mothers' T1 emotionality and the infants' reactivity to the “social emotional package” T2 CLNBAS. However, the paired t test did indicate that there was a statistically significant relationship between the EPDS scores for the “mothers’ previously treated for depression” at T1 and T2, and that there was a relationship between CLNBAS scores T1 and T2 for the infants of the “mothers previously treated for depression.” Although not statistically significant at $p = .05$, the infants’ T1 and T2 CLNBAS scores indicated a relationship. The T1 CLNBAS scores were lower for the infants of mothers “previously treated for depression,” than were the scores of the infants of the “mothers not previously treated for depression.” Similar findings have been found in previous research where exposure of the infant to an environment in which the mother was experiencing emotional dysregulation, was believed by researchers to have been a direct effect upon the infant's reactivity to all other stimuli in the environment (Campbell & Cohn, 1991; Pelaez-Nogueras et al., 1996; Phillips & O’Hara, 1991). The dysregulation of the mothers’ emotions could, therefore, have an impact on the infant's ability to respond to other stimuli in the environment, and may indicate the influence upon the total environmental experience as influenced by the mother-infant interaction.

What Is the Relationship Between Infants' Reactivity T2 and Mothers' Emotionality T2?

According to Nichols and colleagues (2001) infants may not be as sensitive to contingency responses before 2 months of age as they are after 2 months of age. CLNBAS and
EPDS correlations in this study examined the two to three month time period and the relationship between variables was evaluated. This gives information and a better understanding of the infant-mother relationship at a time the development of contingency responses are occurring as studied in previous research. This study indicated that there is a relationship between the infants’ ability to be stimulated to interact contingently as indicated by the correlation between T2 EPDS and the individual items T2 CLNBAS. The T2 EPDS scores of the mothers and the T2 CLNBAS scores of the infants had a significant relationship between the infants’ “state regulation” and the mothers’ T2 EPDS scores (see Table II). When looking at the individual CLNBAS items, this study indicated that the infant’s “state regulation” was well-defined and transitions were smooth and predictable. The states are considered less defined and transitions less predictable as the infant becomes less organized. The lower scores of the infants in “state regulation” corresponded with higher T2 EPDS scores for the mothers. These were the mothers with more emotional dysregulation. Research has found that maternal responsiveness to child cues and the amount of interaction between the mother and child form the attachment. If the responsiveness is compromised due to maternal well-being or emotionality, the child’s regulation and attention are also compromised (Cohn et al., 1990; Field, 1992; Field et al., 1998).

Although not statistically significant a similar pattern was noted in the individual CLNBAS item “infant activity.” A relationship was indicated between the infants’ reactivity T2 and the mothers’ emotional well-being T2. As the mothers scored with more emotionality, or higher T2 EPDS scores, the corresponding T2 CLNBAS scores were lower (see Table II).

Research by Brazelton (Karr-Morse & Wiley, 1997) indicates that emotional as well as physical unavailability of mothers takes a huge toll on babies. He found through videotaped sessions, by comparing mothers with their infants, that as the mother withheld positive interactions the infant became more frustrated. This corresponds with the present study that
found as the infants were less reactive to “state regulation” T2 the mothers were experiencing more emotionality T2.

Research indicates that the infants may not be as sensitive to contingency responses before two months of age as they are after two months (Nichols et al., 2001). But there may be an indication of the relationship beginning at T1 CLNBAS and T1 EPDS when the mother-infant relationship is beginning. This study looked at these first months of the infant’s life and evaluated the relationship between variables to give more information and a better understanding of the earlier developmental period.

What Is the Relationship between Infants’ Reactivity T1 and Mothers Emotionality T2?

This study indicates that there is a carryover effect in the relationship between the infant’s reactivity and mother’s emotionality; the infants scored lower on the “social emotional package” T1 CLNBAS as the mothers scored higher on the T2 EPDS. This phenomenon has been reported in extant studies of mothers not being reinforced by their child’s positive behavior toward them. The reactivity of the mother toward the infant is related to the infant’s emotions, therefore a baby who is less securely involved with the mother may be more difficult for the mother to understand, and she responds in a less positive way (Nachmias et al., 1996). In this sample the emotionality of the mothers increased (higher T2 EPDS scores) as the reactivity of the infant decreased (lower T1 CLNBAS scores), indicating that there was relationship between the infants’ reactivity and the mothers’ emotionality. Through research it has been found that significant characteristics of infant’s emotionality, (i.e., irritability) can be substantially modified by mother’s behavior and personality (Fish & Belsky, 1992; Nachmias et al.). Mother’s emotional well-being for social emotional communication is very important at these early times.

Research by Nugent and Brazelton (2000) has found that the infant’s ability to recognize familiar voices, to visually discriminate the movement of inanimate and animate objects, to
maintain eye contact, and to be responsive to other stimuli in the environment appears to be present in the first days of life. This is a critical time for the mother-infant relationship to be positive and nurturing. There is a rapid change in the physiology of the infant’s brain due to neurological development from stimulation both physical and emotional at these early times. It has been found that mothers’ characteristic ways of expressing their emotions are influential in early infant development. The emotional environment that a child is repeatedly exposed to can be calming or dysregulating, and can contribute to children’s general social-emotional competence (Denham & Grout 1992; Dunsmore & Halberstandt, 1997). In this study the higher T2 scores of the mothers’ emotionality indicated a relationship to lower T1 scores of the infants.

The T2 EPDS and the “social emotional package” T1 CLNBAS indicated that when comparing individual items (i.e., “response to “face and voice” and “tracking the red ball”) on the CLNBAS with the EPDS scores, there were statistically significant findings. Infants’ reactivity was higher as the mothers were scoring lower on the EPDS, or were experiencing less emotionality. This could also indicate that the infants need to be social as in Bowlby’s (1969 and 1980) research, and contingent interactions as in the research of Mahler et al. (1975) were beginning to take place during T1 when the infants were switching from internal to external stimuli. Although not statistically significant the same pattern was noted in the categories of “face only” and “voice only.”

Research indicates that the infants may not be as sensitive to contingency responses before two months of age as they are after two months (Nichols et al., 2001). Responses to the individual “social emotional package” items at T1 CLNBAS may indicate the relationship between T1 CLNBAS and T2 EPDS, when the mother-infant relationship is beginning. We were able to look at these first months and evaluate the relationship between variables to better understand the possible relationships.
What Is the Relationship Between Demographic Variables and T1 & T2 CLNBAS and EPDS?

Demographic information indicated that there was a significant correlation between the mothers’ education level and age and between the fathers’ education level and age, indicating that as age increased so did education levels. Education among the mothers ranged across high school only to those with some college, and to those who had four-year degrees or more. Education among the fathers ranged from high school only to some college, four-year degree or more or technological training. There was also a significant correlation between fathers’ age and income and mothers’ age and income. As the fathers’ and mothers’ age increased the income increased. This sample consisted of income levels from less than $14,000 to over $50,000 annually. The T1 EPDS and T2 EPDS scores and mothers “previously treated for depression” were related, indicating a relationship between the mothers’ emotionality and T1 and T2 scores (see Table 4).

There was a significant correlation between those mothers “previously treated for depression” and the mother’s T1 and T2 EPDS scores (i.e., all mothers in the sample), although this research did not indicate direction of effects between mother and child. Those mothers who had been “treated for depression” prior to participation in the study scored with more emotionality T1 and T2 EPDS, compared to mothers who had “not been treated for depression” whose scores T1 and T2 EPDS were lower (see Tables 9 and 10). Research supports that the emotional well-being of the mother is a main factor in infant reactivity and any conditions that impact the maternal reactivity would, by extension also influence the reactivity of the infant (Bowlby, 1980; Svanberg, 1998).

Research has found that the lack of sensitive empathic care threatens the well-being of the infant (Broussard, 1979; Milgrom & McCloud, 1996). As the child interacts with those in the environment, infant skills are developed and brain development occurs. If there is a lack of interaction (i.e., eye contact, vocalizations, touching, care, and responding to infant cues) by those
caring for the infant, the development of the infant is compromised possibly placing the infant’s well-being at risk.

This research project found that maternal emotionality correlated with the infants’ reactivity. By using t test data it was found that the nine mothers who were “previously treated for depression,” reported more emotionality at T1, and that their infants’ “social emotional package” T1 CLNBAS was showing a relationship. Their emotionality had a significant relationship with their infants’ reactivity T1 (i.e., the T1 CLNBAS scores were lower than the infants of “mothers not previously treated for depression.”) The infants of the “mothers not previously treated” were more reactive to stimuli and these mothers had less emotionality. These are being discussed due to the exploratory nature of this study although the $p = .069$. Research by Fish and Belsky (1992) and Nachmias et al. (1996), found strong empirical evidence that the characteristics of infants’ reactivity can be substantially modified by mothers’ behavior and personality. The T2 EPDS scores of the “previously treated” mothers decreased from T1 to T2 indicating the transitory nature of the postpartum period as in previous research by Campbell and Cohn (1991). However, the emotionality remained higher among the “previously treated” mothers than “mothers not treated.” Therefore, the infants of the “treated mothers” may be at risk.

Summary

Why did the infants whose mothers had higher EPDS scores track at a lower rate? What would this indicate for mother-infant relationships? When infants of “mothers treated for depression” and “mothers not treated for depression” were examined there was a significant difference in their reactivity to the items “face and voice”. Why was this and what does this mean for mother-infant relationships? What was happening with the child at this earliest time of development before two months of age?
Findings in this study showed a relationship between infant reactivity at T1 and T2. Infants increased their reactivity at T2, especially if the mothers were “not previously treated for depression,” or had lower scores on the EPDS. T1 and T2 “social emotional” CLNBS items indicated that the higher scoring infants had lower scoring EPDS mothers, (i.e., 3.42-3.47, or very responsive; see Tables 8, 13, 15, and 17). The infants of mothers with higher EPDS scores (i.e., 5.92, 9.50, 5.22 and 6.00) (see Tables 8, 13, 15, and 17), scored as “not responsive.” Infants of mothers who had been “treated for of depression,” did not score as high on the CLNBAS T2 as the infants of the “mothers not treated for depression,” or lower scoring mothers. At T2 CLNBAS there was a switching from internal to external stimuli. The infant was reacting to external stimuli (i.e., establishing eye contact and tracking animate and inanimate objects, searching for voice, brightening to sounds, and so forth) and in a social and contingent way.

This study indicated that there was a strong relationship between the mothers’ emotionality (EPDS scores) at T1 and T2. The overall range of emotionality scores was lower T2 than at T1, and supports research that there is a transitory nature of early postpartum emotionality symptoms with mothers manifesting less emotionality at T2 than at T1. However, this research also indicated that “previously treated” mothers remained at a higher level of emotionality at T2, than those mothers not previously treated.

When looking at the relationship of T1 emotionality of the mother and T1 infant reactivity it was found that there were significant relationships when looking at individual items on the CLNBAS and the “depressed and non-depressed mothers.” When looking at the individual items “tracking the red ball,” “face and voice,” “face only,” and “voice only” there was a significant correlation with higher scores on the CLNBAS that corresponded to lower EPDS scores for the mothers. The infants responded with more reactivity as the mothers responded with less emotionality.
Infant reactivity T2 and mothers' emotionality T1 indicated a corresponding relationship between the infants' reactivity to T2 CLNBAS items and the mothers' emotionality T1 (EPDS score) when looking at "mothers treated" for depression and those "not treated" for depression. As the infants scored lower, the mothers scored higher, indicating a negative relationship between the two scores. The foundation for self is forming during this earliest period, and requires the emotional availability of the mother and infant for social-emotional interaction. This study indicated that there is a relationship between T1 EPDS (emotionality) and T2 CLNBAS (reactivity) during this early time of the infant's development of self.

Infant reactivity T1 and the mothers' emotionality T2 indicted a relationship between individual CLNBAS items "face and voice," "face only," "voice only," "and tracking the red ball." The mother scored lower on the T2 EPDS as the infants scored higher on the T1 CLNBAS items. Mothers' T2 EPDS scores correlated with infants' T2 CLNBAS scores in individual items "state regulation" and "infant activity." Again, this study indicates that there is a relationship between mothers' emotionality and infants' reactivity. Contingent interactions that research has proved to more likely to occur during T2 would be a factor in increasing the reactivity between the mother-infant interactions at this time.

There was a statistically significant correlation between the mothers who were "previously treated" for depression and emotionality and their EPDS scores. Those mothers who had been treated for depression prior to participation in the study had a significant relationship to their scores T1 and T2 and were higher in emotionality. Their infants also indicated a relationship in T1 CLNBAS scores and scored lower than the infants of the "not previously treated" group. However there was no significant difference between the infant's scores when comparing the groups at time T2 (see Tables 9 and 10). Findings in this study indicated that there was a relationship between the mothers' emotionality and the infants' reactivity for the
“previously treated” mothers, and indicates that as in previous research the emotional environment that a child is repeatedly exposed to can be calming or dysregulating.

The first few weeks of life are also a most crucial time for the development of the infant’s brain. The brain is developing rapidly during the first weeks and it is very important that the infant is exposed to care providers who are responsive and stimulating. This first postnatal period of beginning brain development provides the foundations for future brain development, and during this early period environmental stress may be particularly detrimental to brain organization and development (Cynader & Frost, 1999). Research has shown that at six to eight months the infant can perceive distress and signal for response, that the abilities to perceive and regulate basic physical and emotional states through planned behavior are expanding dramatically, and that infants are also exhibiting goal-directed activity including eye contact and vocalizations. The baby is beginning to communicate feelings intentionally and is obtaining information about how others are feeling (Karr-Morse & Wiley, 1997). The present study has evaluated these same types of responses (i.e., eye contact, early distress signals including increased activity levels, state regulation, and moderation of crying), in the infant as early as the first week of life and again at the third month of life.

The importance of reinforcing brain development at the earliest postpartum period cannot be ignored. Research by Karr-Morse and Wiley (1997) has found that the infant’s brain is a dynamic organism that is constantly reflecting and adjusting to the environment that is being experienced. By the eighteenth week of gestation the infant has already developed all one to two hundred billion basic brain cells or neurons that he will ever have in a lifetime. Therefore the mother-infant interaction from the first moments after birth cannot be underestimated in importance. This study has indicated that there is a relationship between some of these earliest types of interactions and the effects on both mother and infant.
Limitations

This study may be limited due to being implemented in one geographical area, and the educational level of the sample being comparatively high. There was no clinical verification of the mother’s self-reported treatment for depression. Another limitation is that the CLNBAS is a relatively new assessment tool and reliability and validity have not been established for the CLNBAS. However, the CLNBAS is closely associated with the Neonatal Behavior Assessment Scale (NBAS) that has been used in research.

Implications

The implications from this study could be far reaching in the recognition of the relationship between the mother’s emotionality and infant’s reactivity at this early age. It has been proven by earlier research that there are interactions between the mother and infant at two months of age, and that the interactions are influenced by the mother-infant interaction pattern. This study showed that there is a relationship between the mothers’ emotionality and the infants’ reactivity at the very early postpartum times before two months and up to three months of age, and that the relationship is influenced by the emotionality of the mother and the reactivity of the infant. The relationship of the interactions was represented by the EPDS scores of the mothers and the reactivity of the infants by the CLNBAS scores. Therefore, with the relationship between the mother’s emotionality and the infant’s reactivity at this early time, it is increasingly important that this early time be studied and understood so that support and services may be received.

Interventions for Postpartum Issues

Recognition of the Dynamics of the Early Postpartum Period

Recognition of the dynamics of the early postpartum is a most important issue to face. There are specific needs of the mother and infant beyond what is normally available, especially
with the short term hospitalizations at birth and the lack of follow-up with the mothers and infants after going home. The postpartum period is not widely supported as a period of any greater emotional need by the mother and infant. Unless the mother, a family member, or someone close to the family recognizes the symptoms of postpartum dysregulation, the mother and infant may not receive the help that they need. Postpartum screenings upon discharge from the hospital and after the mother returns to the home would help to identify mothers who are experiencing emotionality and infants who may be experiencing difficulty in responding to their mother.

As this study indicates the early postpartum period is a most important time for the mother-infant relationship to be responsive. More positive reactivity between the mother and infant was seen to influence the emotionality of the mother and reactivity of the infant.

**Education Needs and Opportunities**

Education of the mothers and fathers prior to delivery and soon after would be a step toward more understanding of the postpartum period. Support groups, activity groups, information, and forums for exchange of ideas would add to mothers’ and fathers’ ability to recognize emotionality concerns and possible treatment.

Education is needed in the community as well about this early period in the lives of mothers and infants as being more than a time when women experience elevated and accentuated emotions. If community leaders (i.e., doctors, nurses, social workers, political leaders, and so forth) more of an understanding about this time as being crucial to the relationship between mothers and infants, perhaps more intervention services would be made available.

This study has indicated that there is a relationship between the emotionality of the mother and the reactivity of the infant in many instances. Strengthening of the mother’s ability to recognize postpartum symptoms and to access resources would help with her ability to modulate
emotional issues during this early period. Education of the father and other family members
would also strengthen the mother’s resources. Professionals and parents could be more proactive
in working with and educating legislators and other professionals in establishing programs for the
mothers and infants at this early time. Early intervention programs teaching parenting skills and
addressing emotional needs of the mothers would strengthen the mother-infant relationship. The
community politicians could provide more education to their legislators to seek legislations and
funding to allow for postpartum care follow-up care for the mother and infant.

Early Postpartum Treatment and Services

We need to move beyond the stigma that surrounds postpartum emotionality so those
mothers will come forward with concerns and receive treatment. Acceptance of the presence of
the sometimes extreme emotions that surround this time and understanding the needs of the
mother and infant is essential. The hiding of emotionality that occurs during this time is a harmful
practice and may cause delayed development of the mother-infant relationship at this earliest time
as well as over a longer period of time. More public awareness among the community about the
causes of postpartum emotionality, the available treatments, and the insight into “mother infant”
relationships during this earliest time as found in this study would be helpful.

Treatment and available services are most important due to the amount of stress that the
infant experiences if the mother is experiencing emotionality and the possible detriment to the
development of the infant’s brain at this earliest time. Early intervention program expansion is
needed so that services for treatment of infants and children may be made available to parents as
early as possible. At first diagnosis of infant involvement, or if there is a disability, referral is
needed so that early intervention services may be implemented with the parents to enhance infant
reactivity. Referral for intervention for the mother regarding her emotionality is also needed.
Recognition of the uniqueness of the “postpartum mother and child relationship” is an important concept in recognizing interventions that would be helpful in building stronger relationships beginning at this earliest postpartum time. This and other recent research has affirmed that mothers’ expression of emotions and their patterns of coping with emotions have a relationship to their infant’s expression, understanding and coping with emotions (Campbell & Cohn, 1991).

**Further Research**

Further research into the earliest postpartum period needs to continue. Research is needed in studying the early relationship between mother’s emotionality and infant reactivity. This study has indicated that the relationship between the infant’s reactivity and the mother’s emotionality occurs at T1 postpartum (i.e., up to the first month of life). Research could be continued into the relationships between mothers and infants with more emotionality and mothers and infants with less emotionality at these earliest times of one to three months. Research findings could help in understanding mothers and infants at these earliest times when there are so many beginnings of interactions and relationships between the mother and infant.

Research provides a foundation for intervention. For action to take place within the communities there will need to be the support of documented research stating needs that could support legislation, proposals, interventions and services needed at this most important time for the mothers and infants. Providing support at this earliest possible time would provide the most beneficial outcomes for the mothers, infants, families and communities through recognition, education, acceptance, and intervention starting at the earliest postpartum time. Research has found that postpartum depression may influence child behaviors by increasing a woman’s risk for later non-postpartum depression (Ghodsian et al., 1984). In this study with first time mothers it
has been noted that mothers’ emotionality and the infants’ reactivity, in many instances, does show a relationship.
REFERENCES


APPENDICES
Appendix A. Clinical Neonatal Behavioral Assessment Scale
### Clinical Neonatal Behavioral Assessment Scale

**RECORDING FORM**

<table>
<thead>
<tr>
<th>Item</th>
<th>Record 3</th>
<th>Record 2</th>
<th>Record 1</th>
<th>Follow-Up Checklist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habituation to light</td>
<td>with ease difficulty</td>
<td>some difficulty</td>
<td>great</td>
<td>Sleep protection</td>
</tr>
<tr>
<td>Habituation to sound</td>
<td>with ease difficulty</td>
<td>some difficulty</td>
<td>great</td>
<td>Sleep protection</td>
</tr>
<tr>
<td>Tone: Arms and Legs</td>
<td>strong</td>
<td>fairly strong</td>
<td>weak</td>
<td>Motor Flexibility</td>
</tr>
<tr>
<td>Rooting</td>
<td>strong</td>
<td>fairly strong</td>
<td>weak</td>
<td>Feeding</td>
</tr>
<tr>
<td>Sucking</td>
<td>strong</td>
<td>fairly strong</td>
<td>weak</td>
<td>Feeding</td>
</tr>
<tr>
<td>Hand grasp</td>
<td>strong</td>
<td>fairly strong</td>
<td>weak</td>
<td>Strength/Contact</td>
</tr>
<tr>
<td>Pull-to-sit</td>
<td>strong</td>
<td>fairly strong</td>
<td>weak</td>
<td>Strength/Robustness</td>
</tr>
<tr>
<td>Crawl</td>
<td>strong</td>
<td>fairly strong</td>
<td>weak</td>
<td>Sleep/positioning</td>
</tr>
<tr>
<td>Responding to face and voice</td>
<td>very responsive</td>
<td>moderate</td>
<td>not responsive</td>
<td>Social readiness</td>
</tr>
<tr>
<td>Responding to face</td>
<td>very responsive</td>
<td>moderate</td>
<td>not responsive</td>
<td>Social readiness</td>
</tr>
<tr>
<td>Turning to voice</td>
<td>very responsive</td>
<td>moderate</td>
<td>not responsive</td>
<td>Vision</td>
</tr>
<tr>
<td>Turning to rattle</td>
<td>very responsive</td>
<td>moderate</td>
<td>not responsive</td>
<td>Alerting to sound</td>
</tr>
<tr>
<td>Tracking the red ball</td>
<td>very responsive</td>
<td>moderate</td>
<td>not responsive</td>
<td>Hearing</td>
</tr>
<tr>
<td>Crying</td>
<td>very responsive</td>
<td>moderate amount</td>
<td>a lot</td>
<td>Crying</td>
</tr>
<tr>
<td>Consolability</td>
<td>easily consoled</td>
<td>moderate</td>
<td>with difficulty</td>
<td>Consolability</td>
</tr>
<tr>
<td>State regulation</td>
<td>well-organized</td>
<td>moderate</td>
<td>not organized</td>
<td>Predictability</td>
</tr>
<tr>
<td>Autonomic: color, tremors startles</td>
<td>well-organized</td>
<td>moderate</td>
<td>very stressed</td>
<td>Stress cues</td>
</tr>
<tr>
<td>Activity</td>
<td>well modulated mixed</td>
<td>very high/very low</td>
<td></td>
<td>Motor organization</td>
</tr>
</tbody>
</table>
Appendix B. Edinburgh Postnatal Depression Scale (EPDS)
EDINBURGH POSTNATAL DEPRESSION SCALE (EPDS)
J. L. Cox, J. M. Holden, R. Sagovsky
Department of Psychiatry, University of Edinburgh

Name: ___________________ Address: ___________________ Baby’s date of birth: ____________

As you have recently had a baby, we would like to know how you are feeling. Please UNDERLINE the answer which comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

Here is an example, already completed.

I have felt happy.

Yes, all the time
Yes, most of the time.
No, not very often.
No, not at all.

This would mean: “I have felt happy most of the time” during the past week. Please complete the other questions in the same way.

In the past 7 days:

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer Options</th>
</tr>
</thead>
</table>
| 1. I have been able to laugh and see the funny side of things.           | As much as I always could
                                              Not quite so much now, Definitely not so much now, Not at all |
| 2. I have looked forward with enjoyment to things                         | As much as I ever did
                                              Rather less than I used to Definitely less than I used to
                                              Hardly at all                                                |
| 3. I have blamed myself unnecessarily when things went wrong             | Yes, most of the time
                                              Yes, some of the time Not very often
                                              No, never                                                  |
| 4. I have been anxious or worried for no good reason                     | No, not at all
                                              Hardly ever
                                              Yes, sometimes
                                              Yes, very often                                             |
| 5. I have felt scared or panicky for no very good reason.                | Yes, quite often
                                              Yes, sometimes
                                              No, not much
                                              No, not at all                                              |
| 6. Things have been getting on top of me.                                | Yes, most of the time
                                              Yes, sometimes
                                              No, not very often
                                              No, not at all                                              |
| 7. I have been so unhappy that I have difficulty sleeping                | Yes, most of the time
                                              Yes, sometimes
                                              No, not very often
                                              No, not at all                                              |
| 8. I have felt sad or miserable                                          | Yes, most of the time
                                              Yes, quite often
                                              No, not very often
                                              No, not at all                                              |
| 9. I have been so unhappy that I have been crying.                       | Yes, most of the time
                                              Yes, quite often
                                              No, only occasionally
                                              No, never                                                    |
| 10. The thought of harming myself has occurred to me                     | Yes, quite often
                                              Sometimes
                                              Hardly ever
                                              Never                                                       |
Appendix C. Recruitment Brochure
Beginnings

YOU AND YOUR CHILD ARE
BEGINNING A LIFE TIME OF
LEARNING AND
UNDERSTANDING EACH OTHER.

- Do you want to better understand your emotions and feelings as the mother of a new baby?
- Do you want to better understand the emotions and cues of your new baby?
- Do you want to know what your baby’s abilities are for communicating with you at birth and the first weeks of life?
- Do you want to know how your baby learns and develops over the first two months of life?

I (name) ______________________ agree to the participation of myself and my baby in the research project “Well Being of the Postpartum Mother and Infant.”

I understand that this project is not endorsed by the Logan Regional Hospital, but is an independent research study through the Family and Human Development Department, and is endorsed by Utah State University.

I understand that our identities will be kept confidential and will not be revealed in any of the shared information.

Date________________________
Signature____________________

You will receive....

- Information about your feelings and emotions....
- Information about your baby’s readiness to learn....
- Referrals for concerns that you may have....
- Thanks for your willingness to participate....
Would you like to participate in a research study to answer these questions?

Our study is looking at:

- The readiness of your baby for interaction and learning at the first or second day of life....
- Your feelings and emotions regarding the birth of your baby...
- Two time periods for comparison of the baby’s interaction with you, and the development of his/her skills.
- Your emotional adjustment to the baby over the two time periods of 2 and 8 weeks.

What you will need to do to participate....

- Tell one of the nurses on the unit as soon as possible, so that we may be contacted...
- Sign the release form in this brochure, on the last page.

What we will do....

First...We will visit with you at one or two days after the birth of your baby.

Second...At the first visit we will assess your child’s emotional readiness for learning and development.

Third...At two weeks after the birth of your baby we will visit with you, or contact you by phone to assess your emotions and concerns regarding the birth of your new baby.

Fourth... At six to eight weeks after the birth of your baby we will once again assess your baby’s readiness for learning, and your emotions and concerns about the birth of the baby. We will assess your child in person, and your assessment may be done by the phone or in the home.

Most importantly...We will take only 12-20 minutes per assessment.
Appendix D. Information Brochure
My Priority List...

Some signs and symptoms that may indicate the need for help...

- Rapid mood swings
- Increase or decrease in appetite
- Inability to concentrate
- Irritability: feeling out-of-control
- Obsessive thoughts
- Severe anxiety, agitation, or panic attacks
- Feelings of guilt or shame that you're not a good mother
- Unusual fears and/or new phobias
- Thoughts of harming yourself or your baby

Utah State University

Dr. Ann Austin 757-1527
Karen Hansen B.S., GSW, 797-2043
Department of Family, Consumer, and Human Development

Where can you get help if you have any questions about the feelings you are experiencing?

- Choose a doctor you are comfortable with.
- Get information about postpartum emotional issues.
- Make sure your doctor knows exactly how you feel.
- Ask your doctor to check your thyroid functioning & blood count.
- Make sure you understand your treatment and medication if needed.
Things You Can Do To Feel Better

- Take a walk.
- Set some small goals for yourself.
- Set boundaries with people you can’t avoid.
- Eat well (healthy foods).
- Avoid caffeine and alcohol.
- Stay on all medications you have been instructed to take.
- Don’t be afraid to ask for help.
- Get out of the house.
- Don’t feel guilty, it wastes energy.
- Play.
- Expect some good days and some bad days.
- Prioritize what needs to be done and what can wait.
- Do the best you can.

Where You Can Get Help

1) Obstetrician
2) Pediatrician
3) General Practitioner or family doctor
4) Breastfeeding support group
5) Local mental health agency or private therapist
6) Parenting or new mother support group
7) Logan Regional Hospital, Social Services Dept., Women’s Center.
8) Church resources
9) Postpartum Support International
   www.Postpartum.com
Appendix E. Personal Information
<table>
<thead>
<tr>
<th><strong>Personal Information</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Name</strong></td>
</tr>
<tr>
<td><strong>Date of Birth</strong></td>
</tr>
<tr>
<td><strong>What is the highest education you have earned?</strong></td>
</tr>
<tr>
<td><strong>What is your ethnic group?</strong></td>
</tr>
<tr>
<td><strong>What is your marital status?</strong></td>
</tr>
<tr>
<td><strong>What type of delivery did you have?</strong></td>
</tr>
<tr>
<td><strong>What was the date of your baby’s birth?</strong></td>
</tr>
<tr>
<td><strong>What was the due date for your baby’s birth?</strong></td>
</tr>
<tr>
<td><strong>How are you feeding your baby?</strong></td>
</tr>
<tr>
<td><strong>Are you employed?</strong></td>
</tr>
<tr>
<td><strong>What type of work do you do if you are employed?</strong></td>
</tr>
<tr>
<td><strong>What level of education has your husband completed?</strong></td>
</tr>
<tr>
<td><strong>Husband’s date of birth.</strong></td>
</tr>
<tr>
<td><strong>What is your husband’s occupation?</strong></td>
</tr>
<tr>
<td><strong>What is your family income?</strong></td>
</tr>
<tr>
<td><strong>Have you ever been treated for depression?</strong></td>
</tr>
<tr>
<td><strong>How long have you been married?</strong></td>
</tr>
</tbody>
</table>
Appendix F. Infant’s Ages and Total CLNBAS Scores T1 and T2
Table F1

*Infant’s Age and Total CLNBAS Score T1 and T2*

<table>
<thead>
<tr>
<th>Infant #</th>
<th>T1 Age (Mo. Days)</th>
<th>T2 Age (Mo. Days)</th>
<th>T1 CLNBAS (Total 54)</th>
<th>T2 CLNBAS (Total 54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>08 02</td>
<td>02 29</td>
<td>48</td>
<td>47</td>
</tr>
<tr>
<td>2</td>
<td>08 03</td>
<td>02 29</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>3</td>
<td>13 10</td>
<td>02 28</td>
<td>44</td>
<td>48</td>
</tr>
<tr>
<td>4</td>
<td>16 10</td>
<td>02 25</td>
<td>47</td>
<td>42</td>
</tr>
<tr>
<td>5</td>
<td>16 11</td>
<td>02 16</td>
<td>47</td>
<td>45</td>
</tr>
<tr>
<td>6</td>
<td>01 06</td>
<td>02 06</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>7</td>
<td>11 02</td>
<td>02 12</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>8</td>
<td>15 13</td>
<td>02 10</td>
<td>45</td>
<td>43</td>
</tr>
<tr>
<td>9</td>
<td>19 10</td>
<td>03 09</td>
<td>50</td>
<td>34</td>
</tr>
<tr>
<td>10</td>
<td>13 13</td>
<td>03 25</td>
<td>42</td>
<td>41</td>
</tr>
<tr>
<td>11</td>
<td>28 14</td>
<td>03 14</td>
<td>53</td>
<td>44</td>
</tr>
<tr>
<td>12</td>
<td>12 02</td>
<td>01 29</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>13</td>
<td>11 02</td>
<td>02 29</td>
<td>50</td>
<td>42</td>
</tr>
<tr>
<td>14</td>
<td>01 04</td>
<td>02 16</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td>15</td>
<td>01 02</td>
<td>03 12</td>
<td>44</td>
<td>47</td>
</tr>
<tr>
<td>16</td>
<td>06 12</td>
<td>02 22</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>17</td>
<td>15 13</td>
<td>03 04</td>
<td>40</td>
<td>41</td>
</tr>
<tr>
<td>18</td>
<td>20 15</td>
<td>02 18</td>
<td>49</td>
<td>49</td>
</tr>
<tr>
<td>19</td>
<td>11 03</td>
<td>02 08</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>20</td>
<td>15 03</td>
<td>03 07</td>
<td>43</td>
<td>45</td>
</tr>
<tr>
<td>Infant #</td>
<td>T1 Age</td>
<td>T2 Age</td>
<td>T1 CLNBAS (Total 54)</td>
<td>T2 CLNBAS (Total 54)</td>
</tr>
<tr>
<td>---------</td>
<td>--------</td>
<td>--------</td>
<td>----------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td></td>
<td>Mo.</td>
<td>Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>03</td>
<td>02</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td>22</td>
<td>07</td>
<td>02</td>
<td>25</td>
<td>49</td>
</tr>
<tr>
<td>23</td>
<td>22</td>
<td>03</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>24</td>
<td>17</td>
<td>03</td>
<td>18</td>
<td>46</td>
</tr>
<tr>
<td>25</td>
<td>10</td>
<td>02</td>
<td>14</td>
<td>43</td>
</tr>
<tr>
<td>26</td>
<td>28</td>
<td>02</td>
<td>07</td>
<td>42</td>
</tr>
<tr>
<td>27</td>
<td>17</td>
<td>02</td>
<td>13</td>
<td>45</td>
</tr>
<tr>
<td>28</td>
<td>01</td>
<td>04</td>
<td>03</td>
<td>45</td>
</tr>
<tr>
<td>29</td>
<td>23</td>
<td>03</td>
<td>05</td>
<td>36</td>
</tr>
<tr>
<td>30</td>
<td>09</td>
<td>03</td>
<td>28</td>
<td>46</td>
</tr>
<tr>
<td>31</td>
<td>08</td>
<td>02</td>
<td>27</td>
<td>41</td>
</tr>
<tr>
<td>32</td>
<td>22</td>
<td>01</td>
<td>29</td>
<td>41</td>
</tr>
<tr>
<td>33</td>
<td>10</td>
<td>02</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>34</td>
<td>18</td>
<td>02</td>
<td>17</td>
<td>44</td>
</tr>
<tr>
<td>35</td>
<td>19</td>
<td>03</td>
<td>04</td>
<td>45</td>
</tr>
<tr>
<td>36</td>
<td>18</td>
<td>02</td>
<td>21</td>
<td>45</td>
</tr>
<tr>
<td>37</td>
<td>09</td>
<td>02</td>
<td>03</td>
<td>44</td>
</tr>
<tr>
<td>38</td>
<td>26</td>
<td>02</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>39</td>
<td>09</td>
<td>01</td>
<td>24</td>
<td>44</td>
</tr>
<tr>
<td>40</td>
<td>22</td>
<td>02</td>
<td>11</td>
<td>30</td>
</tr>
</tbody>
</table>
Table F3

**Infant’s Age and Total CLNBAS Scores T1 and T1**

<table>
<thead>
<tr>
<th>Infant #</th>
<th>T1 Age Mo. Days</th>
<th>T2 Age Mo. Days</th>
<th>T1 CLNBAS (Total 54)</th>
<th>T2 CLNBAS (Total 54)</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>07</td>
<td>01 07</td>
<td>44</td>
<td>43</td>
</tr>
<tr>
<td>42</td>
<td>12</td>
<td>01 16</td>
<td>38</td>
<td>41</td>
</tr>
<tr>
<td>43</td>
<td>11</td>
<td>01 25</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>44</td>
<td>07</td>
<td>02 13</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>45</td>
<td>13</td>
<td>02 02</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>46</td>
<td>16</td>
<td>01 07</td>
<td>42</td>
<td>39</td>
</tr>
</tbody>
</table>
Appendix G. Informed Consent Letter and Form
Informed Consent

Title of Study: Relationship Between Infant Reactivity and Maternal Emotional Well-Being During the Early Postpartum Period at Two Points in Time

**Date Created**
July 16, 2003

**Introduction**

We are studying the relationship between a mother's emotional well-being and her baby's ability to interact and to respond to his/her surrounding. We are doing this during the first few days after the baby's birth and again two or three months later. We will be studying about 40 mothers and their babies at hospital and in their homes. The researchers in this study are Dr. Ann Austin and Karen Hansen from the Department of Family, Consumer and Human Development at Utah State University. Ms Andrea Boyd, a psychologist, is helping them.

**Purpose**

If you agree to participate in this study, the following will happen:

1. You will be asked to give written permission for your doctor to tell us your baby's APGAR score, which tells us the general health of your baby

2. You will complete a questionnaire called the Edinburgh Postnatal Depression Scale (EPDS) that is designed to tell us about your emotional well-being. You will fill out the questionnaire in your own home. You will complete this questionnaire twice during your involvement in the study. The first time will be shortly after your baby's birth and the second time will be two or three months later. This questionnaire will take approximately 5-10 minutes to fill out. Ms. Andrea Boyd will score the questionnaire at a later time and if she finds that you may be distressed based on your score, will notify you in a letter. At the same time Ms. Boyd will also mail you information about contacting your doctor or other health professional to help you with your distress.

3. The only people who will know about your score will be Ms. Boyd and whomever you decide to tell. All EPDS scores will be recorded on a separate piece of paper from the paper that lists the names of the participants. These papers will be kept in separate locked file cabinets in a locked research office. The researchers, Dr. Ann Austin and Ms. Hansen and anyone else who helps them will not see your name or be able to connect it to your EPDS score. This score will not be reported to your doctor or anyone else unless you decide to do so.

4. Dr. Austin and/or Ms. Hansen will visit you twice to play with your baby. These play periods will tell us how your baby responds to others, how Your baby responds to the sound of a rattle and the human voice, and how your baby reacts to light and sound while asleep. These play routines are called the Clinical Neonatal Behavioral Scale (CLNBAS) and will be done shortly after your baby is born and again about two to three months later. The CLNBAS will take about 20-25 minutes and you will be near your baby while it is being done. As with the EPDS, all CLNBAS scores will be recorded on a separate piece of paper from the
Title: Relationship Between Infant Reactivity and Maternal Emotional Well-Being During the Early Postpartum Period at Two Points in Time

There are few risks involved in participating in this study. While completing the EPDS, you may become aware of emotions that are uncomfortable. You may decide to talk to your doctor about these emotions. After your questionnaire is scored, MS. Andrea Boyd may contact you in writing with information about depression and how you can get help.

You will learn more about your baby’s ability to respond to people and situations and how well she or he may learn new things. If we are concerned that your baby may have some needs, we will give you information about how to get help for these needs. There may be other benefits to you that we have not identified. We hope that what we learn in this study will help other mothers and their new babies.

If, while we are doing this study, we learn new things that might affect your willingness to participate, we will tell you. These things might include new benefits or new risks. If we change the way we do the study, we will ask for new permission from you. You will not be compensated in any other way nor are there any costs to you for participating in this study.

Your participation is voluntary and you may refuse or stop being in this study at anytime without consequence or loss of benefits.

Please be assured that your name and any other personal information will be kept confidential. Data that could identify you or your baby cannot and will not be shared with any individual or agency. You will be assigned a unique code number in place of your name and the key to the name identification codes along with all of the data information will be locked in filing cabinets in a locked office, in a separate place from the EPDS questionnaires or the CLNBAS results.
INFORMED CONSENT

Research Title
Relationship Between Infant Reactivity and Maternal Emotional Well Being During the Early Postpartum Period: Measured at Two Points in Time.

Signature of the PI & student or Co-PI
(Signature of PI) (Signature of student)
Dr. Ann Austin Karen Udy Hansen
Principal Investigator Student Researcher
797-1527 797-2043

Signature of Subject(s)
By signing below, I agree to participate in the study.

Subject’s Name

Subject’s signature Date

Enrollment of infants who are unable to provide their own consent:

Signature Date
Duly Authorized Representative

Relationship to the Infant
Appendix H. APGAR Release Form
RELEASE OF APGAR SCORES

To: (Name of your physician) ________________________________.

I _______________________________________, the parent of _______________________

born(date) ______________ am requesting the release of the APGAR scores of my
child for purposes of research being conducted by Karen Hansen, Dr. Ann Austin, and
Andrea Boyd for a research project for the Department of Family and Human
Development of Utah State University.

______________________________
Signature