

THE PERCEPTION OF INFANT TEMPERAMENT IN FATIGUED, ANXIOUS,  
AND/OR DEPRESSED LOW-INCOME, URBAN, POSTPARTUM WOMEN AND  
THE ROLE OF SOCIAL SUPPORT: A SECONDARY ANALYSIS OF DATA

by

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Analysis of Data

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## **DEDICATION**

This is dedicated to my father, Eugene Clarence Kozlowski, who taught me by his example the meaning of hard work and perseverance.

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I would like to humbly acknowledge the influence of Divine intervention and the work of the Holy Spirit undergirding me throughout the creation of this document. I would also like to express my deepest thanks and gratitude to my committee members, Dr. Renee Milligan, Dr. Margie Rodan and Dr. Cara Frankenfeld for their invaluable counsel and encouragement throughout this process. Sincere appreciation goes to Dr. James Vail who without his initial insistence and inspiration, none of this may ever have come to fruition. I also express my gratefulness to my dear friends Linda Coffey and Kelly Kern for believing in me and spurring me on toward the finish line. Loving thanks to all my children for allowing me the time to complete this task. My deepest appreciation is given to my husband, Jerry, for his love and assistance in helping me to maintain perspective. And finally to my parents, to whom I owe a world of thanks, for fostering in me a strong work ethic and belief in God.

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## LIST OF ABBREVIATIONS AND/OR SYMBOLS

|   |       |
|---|-------|
| Agency for Healthcare Research and Quality .....        | AHRQ  |
| Breastfeeding Support Team.....                         | BST   |
| Center for Epidemiologic Studies Depression Scale ..... | CES-D |
| Infant Characteristics Questionnaire.....               | ICQ   |
| Maternal Perception of Infant Difficultness .....       | MPID  |
| Modified Fatigue Symptom Checklist.....                 | MFSC  |
| Postpartum Depression .....                             | PPD   |
| Randomized Controlled Trial .....                       | RCT   |
| State-Trait Anxiety Inventory .....                     | STAI  |
| Support Behaviors Inventory .....                       | SBI   |
| Theory of Unpleasant Symptoms.....                      | TOUS  |
| Women, Infants and Children .....                       | WIC   |

## **ABSTRACT**

### **THE PERCEPTION OF INFANT TEMPERAMENT IN FATIGUED, ANXIOUS, AND/OR DEPRESSED LOW-INCOME, URBAN, POSTPARTUM WOMEN AND THE ROLE OF SOCIAL SUPPORT: A SECONDARY ANALYSIS OF DATA**

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George Mason University, 2015

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Low-income, urban, minority mothers face disproportionate healthcare challenges. Accordingly, they have increased rates of morbidity following childbirth and are at risk for negative outcomes associated with postnatal fatigue, anxiety and depression. The maternal state can affect the relationship between mother and infant. Mothers who are depressed, anxious or fatigued have a tendency to assign a negative value to their infant's behavior. Infants who are perceived by their mother as fussy/difficult are likely to experience less physical closeness, have a shorter duration of breastfeeding and are at risk for abuse. This study explored predictors of maternal perception of difficult infant temperament. Through regression analysis, maternal age and fatigue were identified as being significant predictors. Among low-income, urban, minority mothers at twelve weeks postpartum, those who were younger and fatigued were more likely to perceive their infant as temperamentally difficult. However, satisfaction with the support received

from an identified “partner” or “other” appeared to buffer the effects of fatigue on maternal perception of infant difficultness at varying levels of support satisfaction.

## **CHAPTER 1**

### **INTRODUCTION**

Fatigue, anxiety and depression in the postnatal period are relatively common among mothers and have been shown to be consistently correlated in the research literature. A cyclical model of these constructs was proposed by Pugh and Milligan (1995) and supported in part by Thome and Adler (1999). Because the maternal state has the propensity to affect the relationship between mother and infant, these psychophysiologic factors have been cause for concern. Studies have linked postpartum fatigue and anxiety to the development of depression (Bozoky & Corwin, 2002; Correia & Linhares, 2007; Corwin, Brownstead, Barton, Heckard, & Morin, 2005; Giallo, Wade, Cooklin, & Rose, 2011; Runquist, Morin, & Stetzer, 2009; Sayil, Gure, & Ucanok, 2006; Teissedre & Chabol, 2003) and maternal depression to dysfunctional maternal-child relationships (Horowitz et al., 2001; Logsdon, Wisner, & Pinto-Foltz, 2006) leading to poor cognitive and emotional outcomes in the child (Beck, 1998; McMahon, Barnett, Kowalenko, Tennant, & Don, 2001; Moses-Kolko & Roth, 2004; Muzik & Borovska, 2010; Walker, Davis, Al-Sahab, & Tamim, 2013).

The relationship between a mother and her infant can be affected by both maternal (fatigue, anxiety, depression) and infant (temperament) factors. Temperament, as defined as an “habitual inclination or mode of emotional response” (*Merriam-*

*Webster's*, 2004), is one significant characteristic that the infant brings to the relationship. While many challenges face women as they transition to motherhood (Kanotra et al., 2007), perhaps no greater challenge exists than caring for an infant who is perceived as being temperamentally difficult. Mothers who struggle with postpartum fatigue, anxiety and depression also struggle to care for their infants because of their tendency to assign a negative value to their infant's behavior. Notably, one of the most common reasons that mothers seek health care provider counsel during the first twelve weeks following birth is to procure assistance for challenges associated with temperamentally difficult infant behaviors (e.g. an infant who exhibits excessive irritability and crying) (Oberklaid, 2000).

Infant temperament affects maternal mood and plays an instrumental part in a mother's postnatal experience (McMahon, Barnett, Kowalenko, Tennant, & Don, 2001). Understandably, infants who are perceived as being temperamentally difficult deplete maternal reserve and leave new mothers feeling ineffective in their parenting abilities (Cutrona & Troutman, 1986). Maternal appraisal of infant behavior over time sometimes precedes maternal psycho-physiologic symptoms. As such, mothers of fussy/difficult infants are at increased risk for the development of fatigue, anxiety and/or depression (Britton, 2011; Cutrona & Troutman, 1986; Milligan, Lenz, Parks, Pugh, & Kitzman, 1996). In a study conducted by Cutrona and Troutman (1986) nearly one-third of the variance in postpartum depression scores could be attributed to difficult infant temperament. Milligan et al. (1996) discovered that infant difficulty predicted fatigue at six and twelve weeks postpartum. Further, Britton (2011) isolated difficult infant

temperament as a significant contributor to postnatal anxiety and depression. However, the literature reveals that this paradigm of influencing factors between mother and infant can be observed to occur in a reciprocal fashion.

Just as infant factors are known to influence mood and fatigue status in mothers, conversely, alterations in maternal psycho-physiologic status can cause changes in how a mother perceives her infant. There is evidence to suggest that maternal perceptions are based on the interactive experience with her infant (Hane, Fox, Polak-Toste, Ghera, & Guner, 2006). As such, a mother's anxious, depressed, and/or fatigued state can predispose her to negative thought processes which reflect unfavorably upon her infant (Andrews, 1990). Mothers with these psycho-physiologic disturbances tend to view life circumstances more negatively and therefore, are more likely to perceive their infants as being more temperamentally difficult than non-afflicted mothers (Britton, 2011; Daniels, Plomin, & Greenhalgh, 1984; Edhborg, Seimyr, Lundh & Widstrom, 2000; McGrath, Records, & Rice, 2008; Pesonen, Raikkonen, Strandberg, Jarvinen, & Jarvenpaa, 2004). Their ratings may be influenced by a tendency toward a negative evaluation of their parenting abilities and their infants' mannerisms. In turn, maternal depression-related behaviors exacerbate the infant's distress (Wiffen & Gotlib, 1989). It may be that new mothers who are fatigued, anxious or depressed have less reserve for coping and if left without resources of support (physical, emotional and financial), fair less well than those who have support available to them.

In addition, a mother's perception of her infant's temperament has the ability to impact the care that she provides. Infants who are perceived as "fussy" or "difficult" by

their mother may receive less physical bonding, less attention and have less interaction with their mother (Fish, Stifter, & Belsky, 1991; Hane, Fox, Polak-Toste, Ghera, & Guner, 2006). The result of this physical and psychological distancing has been identified as sub-nurturing and has effects that last long beyond infancy. Attention seeking behaviors including acting out and lack of social skills later affect school performance and the ability to initiate and maintain relationships (Andrews, 1990).

Within this sub-population of postnatal women, measures aimed at decreasing psycho-physiologic effects in the mother and improving mother-infant interaction may have a direct impact on how the mother perceives her child. Logically, interventions that alleviate or reduce fatigue, anxiety and depression in new mothers would also provide benefits for the developing infant as well. While cognitive-behavioral therapy in conjunction with telephone counseling (Thome & Alder, 1999), interpersonal and mother-infant psychotherapy (Cramer, 1993; Stuart & O'Hara, 1995), individual counseling (Holden, Sagovsky, & Cox, 1989), home visits with a coached behavioral intervention (Horowitz et al., 2001), use of a support group (Fleming, Klein, & Corter, 1992), and a residential care unit (McMahon, Barnett, Kowalenko, Tennant, & Don, 2001) are interventions that have been explored over the span of a dozen years, a consensus on one best practice has not been achieved, leaving room for further exploration.

Social support, by way of a key individual or individuals who provide assistance and counsel, is essential to postpartum mothers. The effects of social support on maternal perception of infant temperament have only been minimally investigated. Andrews

(1990) concluded that maternal depression, anxiety, stress, and parenting attitudes and practices in conjunction with lower levels of social support, have a predictive relationship with the mother perceiving her infant as temperamentally difficult. The author further posed that increasing access to social support in the form of parenting education may prevent a mother from developing a negative perception of her infant's temperament.

The benefits of support during the postpartum transition cannot be understated. Postpartum women need support to be able to care for their infant and themselves in a manner that fosters physical and emotional well-being. In general, women first look to their partners to be their main source of help and encouragement. Hildingsson, Tingvall and Rubertsson (2008) found an association between partner support, maternal emotional well-being and duration of breastfeeding. When partner support was lacking, mothers breastfed less and experienced a decline in their overall emotional health. Another important within family form of support is, naturally, the mother's own mother who has also been identified as a quality source of support when present (Leahy-Warren, McCarthy, & Corcoran, 2011).

Unfortunately, low-income minority mothers are often in uncommitted relationships and may not have the support of family or friends (Keating-Lefler, Hudson, Campbell-Grossman, Fleck, & Westfall, 2004). Without support, these women often feel anxious, overwhelmed and alone (Cairney, Boyle, Offord, & Racine, 2003). This can lead to maternal depression and infant neglect. Further, the lack of support available to low-income minority mothers places them at increased risk for fatigue, anxiety and depressive symptoms (Aktan, 2012; Henshaw, Sabourin, & Warning, 2013; Howell,

Mora, & Leventhal, 2006; McGovern et al., 2007). Infants of mothers who are psychosocially compromised fare less well and receive less nurturing and bonding, are less likely to be breastfed, and are more likely to be perceived as having a difficult temperament (Britton, 2011; Hamdan & Tamim, 2012; Knitzer et al., 2008; McCarter-Spaulding & Horowitz, 2007; McGrath, Records, & Rice, 2008).

It has been identified that support in all of its dimensions as defined by Cohen and Syme (1985) is instrumental in preventing psychological and physiologic ailments. Women of socio-economic disadvantage often lack the necessary support needed to navigate through postpartum stressors related to newborn care and as such have an increased rate of morbidity (especially depression) following childbirth (Manuel, Martinson, Bledsoe-Mansori, & Bellamy, 2012).

Without question, mothers of low-income minority status face disproportionate health care challenges during the postpartum period and have a decreased likelihood of receiving health care services (de Graaf, Steegers, & Bonsel, 2013; Knitzer, Theberge, & Johnson, 2008). Some mothers may be at greater risk related to cultural or socioeconomic issues that prevent their access to care i.e. poverty, stigma, shame, fear, or cultural beliefs (Abrams, Doring, & Curran, 2009; Beck, 2001; Dennis & Chung-Lee, 2006; Kristofco, Stewart, & Vega, 2007; Nadeem, Lange, & Miranda, 2008). In addition to these personal challenges, the availability of community resources for low-income, minority mothers is extremely limited (Miranda, McGuire, Williams, & Wang, 2008).

While there are physical needs of rest and nutrition to promote recovery from labor and birth, significant attention has been paid to the psychosocial aspects of the

postpartum period, particularly from birth through the first year. Social support, fatigue/tiredness, anxiety, depression and breastfeeding have been identified as critical areas requiring ongoing assessment and intervention (Cheng et al., 2006; Pugh, Milligan, & Brown, 2001). The relationship of these constructs to one another has been of interest to researchers, and in particular how they relate to low-income, minority mothers because of their increased risk for negative outcomes associated with postnatal fatigue, anxiety, depression and the like (Kiernan & Huerta, 2008).

Although ongoing research has supported this observation (Baker & Taylor, 1997; Fikree, Ali, Durocher, & Rahbar, 2004; Hannan, 2012), few steps have been made toward providing and sustaining programs for women that offer screening and treatment. The minimal attention that this topic receives prior to discharge from the hospital related to individual nurse experience, education and comfort with knowledge has been recently researched by Logsdon, Foltz, Scheetz, and Myers (2010). Often, new mothers' learning needs are unmet prior to discharge and they return home with their newborn feeling unprepared (Bowman, 2005; George, 2005; Mantha, Davies, Moyer, & Crowe, 2008). Post hospital interventions have been identified, but not consistently implemented. And so, the issue remains unresolved.

Identifiably, the postpartum period is a critical time for childbearing women; in particular, for the development of psychological disturbance (Moses-Kolko & Roth, 2004; Ostler, 2009; Stone & Menken, 2008). Maternal mental health prevention and treatment have been slow to emerge as a component of postpartum care in spite of the steady and ongoing research that exists identifying the effects of maternal mental health

on both mother and child (Engle, 2009). Considering the significant changes that postpartum women face, prescribed health care for this population is relatively limited (Albers, 2000). Unlike the recommended schedule of prenatal care visits, the overall prescribed health care that postpartum women receive is minimal (Albers & Williams, 2002; Cheng, Fowles, & Walker, 2006). Although awareness has been heightened, barriers to care exist that vary by race/ethnicity and socioeconomic status, preventing many women from seeking and receiving the treatment that they need (Dennis & Chung-Lee, 2006; Karasz, 2005; Song, Sands, & Wong, 2004).

For this reason, the use of peer counselors has been successfully implemented in countries with universal healthcare; across Europe, Australia, and Canada (Dennis et al., 2009). Within the U.S., peer counseling is well documented in the literature as a topic of research for postpartum women especially of minority and low socioeconomic status often associated with the WIC program (Women Infants and Children) (Raisler, 2000). Peer counselor support is often aimed at prevention of postpartum depression and increasing breastfeeding duration (Pugh et al., 2010). However, peer counseling for postpartum mothers does not appear to be readily available in communities at large and perhaps not widely used in the United States. For example, postpartum education prior to hospital discharge does not typically include instructions on how to locate a peer counselor. The research exists about the benefits of such a support program, however, turning research into evidence based practice often has implementation barriers such as logistics and funding (Aarons, Wells, Zagursky, Fettes, & Palinkas, 2009; Albers & Williams, 2002).

Traditionally, community health nurses have been associated with providing discharge follow-up to low-income, minority populations and there is great opportunity for their use (Hannan, 2012). They work with women and infants in the community setting. However, their effectiveness can be limited because of language and cultural barriers. Peer counselors, on the other hand, have a similar ethnic background to and a cultural understanding of those to whom they provide assistance (Dennis, 2010; Raisler, 2000). Research exploring the use of peer counselors *and* community health nurses as a “breastfeeding support team” has emerged in the nursing literature (Pugh et al., 2010) in an attempt to provide education and assistance to an ethnically diverse and underserved population.

Recent research efforts in the area of breastfeeding support (Pugh et al., 2010) have demonstrated that a team consisting of a registered nurse and a lay person was effective in assisting low-income, minority women to breastfeed their infants for a longer period of time. In addition, the infants who were breastfed longer stayed healthier and consumed less formula. Less need for medical care and decreased need for formula equate to cost saving benefits that were attributed to the intervention (Frick, Pugh, & Milligan, 2012). One might consider what other psychosocial benefits were received from the intervention, but were unintentionally provided; thus, the impetus for this secondary analysis of data.

Breastfeeding support is one intervention that improves mother-infant interaction by assisting with, promoting, and encouraging frequent intimate dyadic proximity which contributes to feelings of mother-infant closeness (McKee, 2004), oxytocin release, and

bonding (Johnson, 2013). Interventions aimed at increasing breastfeeding duration by various support methods using structured education and professional and/or lay support, have been studied in numerous randomized control trials (Chung, Raman, Trikalinos, Lau, & Ip, 2008). However, none have specifically investigated secondary benefits that may be attributed to this interventional type of dyadic social support.

Beck (1996) identified the need for future research to “isolate the effects of mediating and protective factors, such as social support, on...infant temperament” (p. 229). This study addresses the identified literature gap by investigating the role of social support (as a satisfaction rating) with regard to its association to maternal perception of infant difficultness in anxious, depressed and/or fatigued low-income, urban, minority postpartum mothers. Previous research has indicated that a relationship does exist between social support (by community health nurse) and maternal perception of infant temperament (Andrews, 1990). The support provided by a breastfeeding support team (BST) consisting of a nurse *and* a peer counselor, however, has not previously been studied in this context. Therefore, a secondary analysis of data from a randomized controlled trial that used social support in the form of a breastfeeding support team as an intervention to assist low income urban mothers to breastfeed longer (Pugh et al., 2010) will evaluate the effect of social support satisfaction on maternal perception of fussy/difficult infant temperament in relation to fatigue, anxiety and/or depression in the mother. The parent study of this secondary data analysis demonstrated increased breastfeeding rates among women who received a breastfeeding support team intervention versus care as usual at six (66.7% vs. 56.9%,  $p = .05$ ), twelve (49.4% vs.

40.6%,  $p = .07$ ) and twenty-four weeks (29.2% vs. 28.1%,  $p = .46$ ) postpartum (although not statistically significant at weeks twelve and twenty-four). Mothers who received the intervention were 1.72 times more likely to be breastfeeding a six weeks than those who were in the care as usual group. This secondary analysis will explore the physical and psychosocial aspects of the women who participated in the above described study.

The health and well-being of postpartum women and their infants should be of utmost importance to society. New mothers have an array of physiologic, psychologic and situational needs that require tending. Far too often, women are left without many resources or are unable to access or do not understand how to access resources to help them care for themselves and their infants.

The significance of this study is that postpartum women need support. Support in the form of lay individuals and nurses working collaboratively should be accessible to all women who feel that they need assistance. Funding has historically been a barrier to provision/receipt of services. It is, however, available. For example, it has currently been reported that HRSA (Health Resources and Services Administration) grant money in the amount of one hundred-seven million dollars is being distributed to state-based agencies who are involved in the “ObamaCare [Affordable Care Act] Home Visiting Program” (Viebeck, 2014). This program was created to improve parenting and community support through home visits for families considered to be “at-risk”. An intervention that demonstrates multiple benefits for the mother/baby dyad may have greater opportunity for funding. As the U.S. health care system is currently undergoing great transformation, understanding healthcare provision and funding is complex. A

program proposed to benefit new mothers may be given greater consideration if the opportunity for benefit received is more than intended.

### **Purpose**

The purpose of this study is two-fold. First, this study seeks to investigate the relationships between fatigue, anxiety, depression, and maternal perception of difficult infant temperament among low-income, urban mothers who initiated breastfeeding. A second purpose of this study is to explore the effects of social support satisfaction on maternal perception of difficult infant temperament in depressed, anxious, and/or fatigued low-income urban postpartum mothers who either received a breastfeeding intervention or supportive care as usual.

### **Research questions**

At twelve weeks postpartum, within a cohort of low-income, urban, minority mothers who initiated breastfeeding and were assigned to a group receiving a breastfeeding intervention or care as usual:

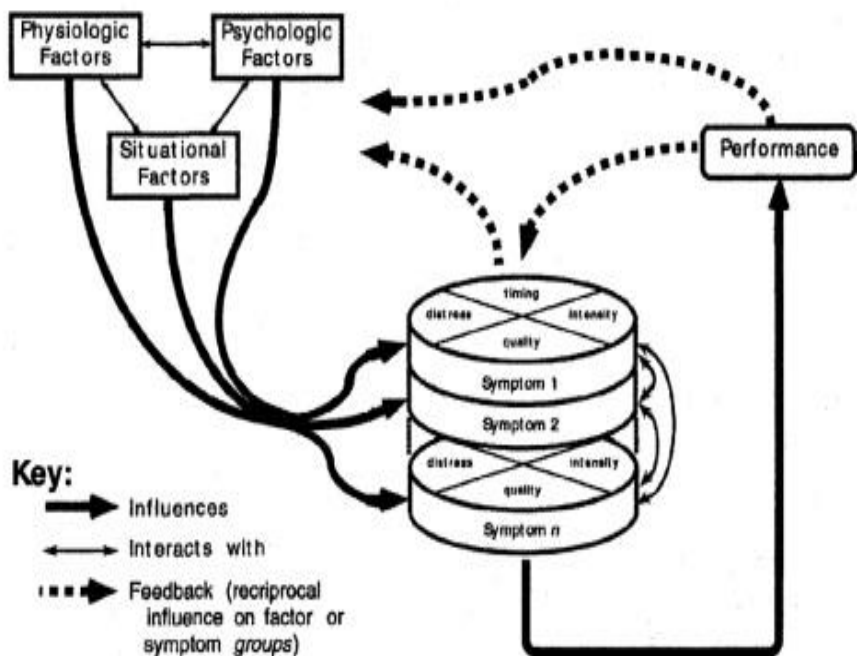
1. Among fatigue, anxiety, depression, social support satisfaction, and significant demographic variables, what predicts maternal perception of fussy/difficult infant temperament? How much of the variation in perceived infant difficultness can be explained by any of the predictor variables?

2. Does satisfaction with social support have any influence on fatigue, anxiety, and/or depression in prediction of maternal perception of difficult infant temperament?

In an attempt to better understand how the symptom cluster of fatigue, anxiety and depression affects low-income urban postpartum mothers and how they perceive

their infant's temperament, a secondary analysis of data collected from a National Institute of Nursing Research funded randomized controlled trial that studied a breastfeeding support team's effect on breastfeeding duration (Pugh et al., 2010) will be analyzed. It is hypothesized that within the twelve week sample, fatigue, anxiety and depression play a predictive role in the way a mother perceives her infant as temperamentally difficult. Further, satisfaction with social support provided by a "partner" or "other" may moderate the effects of any significant predictor variables on maternal perception of infant difficultness.

### Conceptual Underpinnings of the Study



*Figure 1.* Theory of unpleasant symptoms. From "The middle-range theory of unpleasant symptoms: An update," by E. Lenz, L. Pugh, R. Milligan, A. Gift, & F. Suppe, 1997, *Advances in Nursing Science*, 19, p. 16. Copyright 1997 by Aspen Publishers, Inc.

The theory of unpleasant symptoms (TOUS), represented in Figure 1, is a middle range nursing theory that originated as a framework for the study of fatigue during childbearing (Pugh & Milligan, 1993). Initially collaborating on their investigations of fatigue in intrapartum (Pugh, 1990) and postpartum (Milligan, 1989) women, the concept was further expanded by Gift and Cahill (1990) in their study of dyspnea in patients with chronic obstructive pulmonary disease and asthma. In combining these two fields of symptoms research (Gift & Pugh, 1993), the theory of unpleasant symptoms emerged (Lenz, Suppe, Gift, Pugh, & Milligan, 1995). The TOUS is the theoretical basis of the parent RCT from which this secondary analysis stems. An out-growth of clinical practice inquiry and practice-related research of its authors, this theory has been tested in symptoms research specific to those experienced by childbearing women. The theory takes into account factors that influence the symptom experience those being physical, psychological and situational components. In this way, symptoms are seen and addressed as multidimensional phenomena.

The TOUS framework (Lenz & Pugh, 2008) was chosen as the theoretical framework on which to base the scientific inquiry of this research study. Fatigue, anxiety and depression will be addressed as symptoms within an adaptive process influenced by physiologic factors (e.g. type of birth, method of infant feeding), psychological factors (e.g. social support, perceived stress), and situational factors (e.g. quality of life, race/ethnicity, socioeconomic status). See Figure 2. While it is acknowledged that the indicated situational, physical and psychological factors as identified in the diagram are antecedents that occurred and were collected/measured from participants and have

influencing effects on the symptoms, they will not be addressed as part of this analysis, but are solely listed for illustrative purposes. In extrapolating the theoretical logic of the TOUS, the experience of fatigue, anxiety and depression (symptoms) may have an effect on maternal perception of difficult infant temperament (performance outcome).

The relationship between the physio-psychosocial factors fatigue, anxiety and depression and maternal perception of infant temperament are informed by the TOUS in the pathway of analysis. In theory, the TOUS proposes that factors (physiologic, psychologic and situational) influence symptoms which exhibit various dimensions (timing, intensity, quality, and distress) that then lead to a performance outcome. The recursiveness of the theory allows for the performance factor to feed back to the symptom and/or influences (antecedents) so that in this study, theoretically, maternal perception of difficult infant temperament may also affect a mother's fatigue, anxiety or level of depression, the ability to breastfeed or other a priori variables as identified in Figure 2.

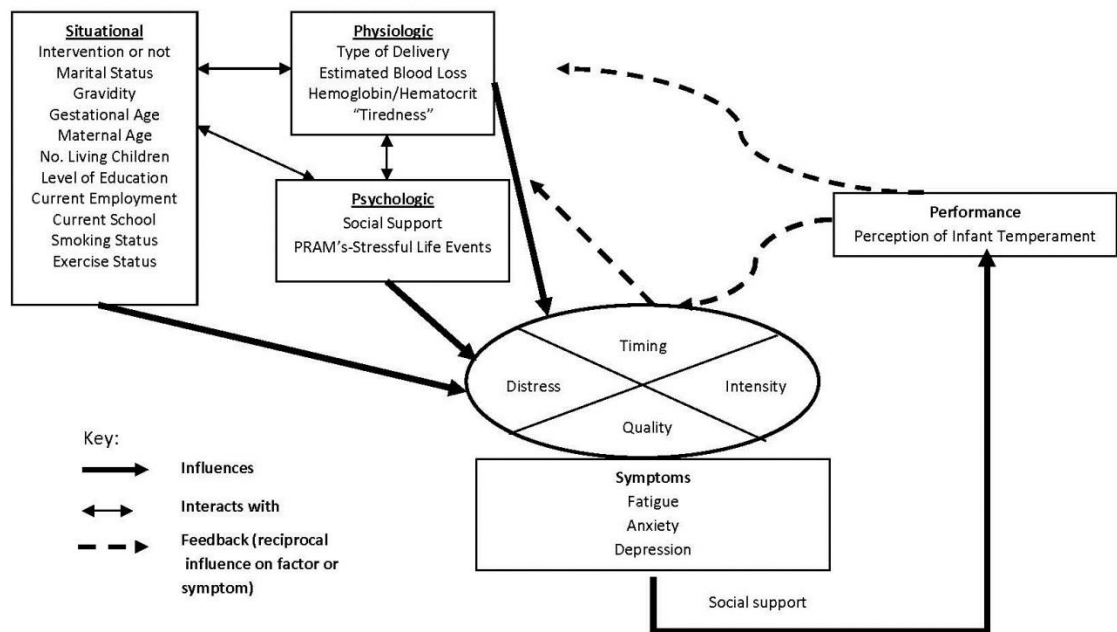


Figure 2. Theoretical conceptualization of the study. Adapted from "The middle-range theory of unpleasant symptoms: An update," by E. Lenz, L. Pugh, R. Milligan, A. Gift, & F. Suppe, 1997, *Advances in Nursing Science*, 19, p. 16. Copyright 1997 by Aspen Publishers, Inc.

## Description of framework

The theory of unpleasant symptoms was based on clinical observation and practice related research of intra- and post-partal women (Lenz, Pugh, Milligan, Gift & Suppe, 1997). This theory is congruent with the understanding that symptoms can exist singularly or in tandem with others. Further, symptoms are subjectively measured and specific to the interpretation of the one encountering the experience (Lenz & Pugh, 2008).

The major assumptions of the framework are:

- Symptoms have a physiologic, psychologic and situational component.

- Symptoms can be described by how long they last (duration), their intensity (pain rating scale), the amount of distress it may cause the sufferer (how much does it interrupt their activities of daily living), and quality (such as aching, stabbing, throbbing, etc.).
- The outcome of the symptom's influence on the individual is in one's ability to function in a societal role relative to the ability to think and problem solve, and perform activities of daily living.
- Symptoms have variations within people and environments, however, certain symptoms share common attributes.
- A symptoms experience is subjective and personal as it relates to an individual within the context of his/her family or community.
- There are three major concepts: symptoms, influencing factors, and performance outcomes.

An increasing number of research inquiries related to symptoms and symptom clusters have been evaluated and studied utilizing the TOUS, thus lending credence to the framework (Motl & McAuley, 2009; Tyler & Pugh, 2009). As stated by the co-authors of the theory, the TOUS is "...sufficiently specific to guide research and practice, yet general [enough] to cross multiple clinical populations and to encompass similar phenomena" (Lenz, Suppe, Gift, Pugh, & Milligan, 1995, p. 11). Notably, other nurse researchers have also shown interest in the study of childbearing fatigue utilizing the TOUS as the theoretical foundation of their research. Corwin, Brownstead, Barton, Heckard, and Morin (2005) investigated fatigue's role in the development of postpartum

depression. Rychnovsky (2007) studied fatigue in postpartum active-duty military women. And, fatigue in breastfeeding first-time mothers specific to the early postpartum period was investigated by Wambach (1998).

The TOUS has also been used as a theoretical framework in other studies of fatigue in patients with varying diagnoses such as cancer (Redeker, Lev, & Ruggiero, 2000), chronic renal failure undergoing hemodialysis (Liu, 2006; McCann & Boore, 2000), and coronary heart disease (Eckhardt, DeVon, Piano, Ryan, & Zerwic, 2014). In addition to the study of fatigue, since its introduction, the theory of unpleasant symptoms has been identified as the theoretical framework for numerous studies across a variety of symptom experiences. For example, it has been used in the investigation of such patient populations as chronic obstructive pulmonary disease (COPD) (Reishtein, 2005), breast cancer (So et al., 2013), multiple sclerosis (Motl & McAuley, 2009), Alzheimer's disease (Hutchinson & Wilson, 1998), Bariatric surgery (Tyler & Pugh, 2009), inflammatory bowel disease (Farrell & Savage, 2010), and pediatric post-operative tonsillectomy (Huth & Broome, 2007).

### **Conceptual and Operational Definition of Terms**

This secondary data analysis stems from a National Institute of Nursing Research funded breastfeeding randomized controlled trial (Pugh et al., 2010). The study investigators of the parent RCT selected the following instruments as a means of measurement for the variables of this study and as such, provide the operational definitions for each. It is noteworthy that these same measurement tools were used

throughout the pilot studies leading to the parent RCT (Pugh & Milligan, 1998; Pugh, Milligan, & Brown, 2001) and was likely the reason for their choosing.

Table 1

*Major Study Variables Conceptual and Operational Definitions*

| Term           | Conceptual Definition   | Operational Definition  |
|----------------|---|---|
| Social Support | A broad term that encompasses esteem, informational, instrumental, companionship, and motivational support as it applies to the needs of the new mother (Cohen & Syme, 1985).   | As measured by the Support Behaviors Inventory (SBI) (Brown, 1986). 11- item version with modified rating scale. <ul style="list-style-type: none"> <li>• Self-report</li> <li>• Assesses amount of satisfaction with selected support behaviors</li> <li>• Allows for three separate scores; “partner”, “other”, and total</li> <li>• 5-point Likert scale</li> <li>• Rating 0-4; 0 = very dissatisfied, 4 = very satisfied</li> <li>• Higher scores indicate greater satisfaction with support</li> </ul> |
| Fatigue        | “An overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work at the usual level” (Herdman, 2012, p.229) in relation to postpartum mothers in the first three months following childbirth. | As measured by the Fatigue Symptom Checklist (FSC) (Yoshitake, 1978) with wording modifications as described in Milligan, Parks, Kitzman & Lenz, 1997. <ul style="list-style-type: none"> <li>• 30 items (fatigue symptoms)</li> </ul>  |

| Term                  | Conceptual Definition   | Operational Definition  |
|-----------------------|---|---|
|                       |   | <ul style="list-style-type: none"> <li>• Dichotomous scoring – Yes (present) = 1/ No (absent) = 0</li> <li>• Sum equals the number of symptoms present</li> <li>• Score range 0-30. Higher scores indicate a higher level of postnatal fatigue.</li> </ul>  |
| Anxiety               | <p>“Unpleasant, consciously perceived feelings of tension, apprehension, nervousness, and worry, with associated activation or arousal of the autonomic nervous system” (Spielberger &amp; Sydeman, 1994, p. 294 )</p>  | <p>As measured by “state” anxiety scores from the State Anxiety Inventory portion of the State-Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch &amp; Lushene, 1970).</p> <ul style="list-style-type: none"> <li>• 20 items</li> <li>• Scores have a possible range from 1-4 (not at all to very much)</li> <li>• Higher scores indicate higher levels of anxiety</li> </ul>        |
| Postpartum Depression | <p>An alteration in maternal mood in which the new mother feels sad or empty with symptoms that may include loss of interest or pleasure in daily activities, weight loss or change in appetite, sleep disturbance, loss of energy, feelings of worthlessness or guilt, diminished ability to think or concentrate, thoughts of death or taking one’s life (Beck &amp; Driscoll, 2006). To include “all types of depressive disorders during the first postpartum months/year” (Reicher-Rossler &amp; Steiner (2005, p. 7).</p> | <p>As measured by the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977).</p> <ul style="list-style-type: none"> <li>• 20 item – self report</li> <li>• Based on frequency of feeling or behavior during number of days in the past week.</li> <li>• Coded 0 (&lt; 1 day), 1 (1-2 days), 2 (3-4 days), 3 (5-7 days)</li> <li>• Higher scores indicate</li> </ul> |

| Term  | Conceptual Definition  | Operational Definition  |
|---|--|---|
|   |  | <p>greater depressive symptoms</p> <ul style="list-style-type: none"> <li>• Scores <math>\geq 16</math> indicate depression</li> </ul>  |
| Perceived Infant Temperament-<br>“Fussy-Difficult subscale” | <p>A mother’s overall perception of her infant’s temperament as more or less difficult with her physical, situational and psychological factors contributing to evaluation bias (Mantymaa, Puura, Luoma, Salmelin, &amp; Tamminen, 2006). “Difficult infants exhibit intense emotional reactions, crying vigorously for long periods of time, and are difficult to console. They are slow to accept new people, foods or routines and their biological functions such as sleep, hunger, and elimination are irregular and difficult to predict” (Cutrona &amp; Troutman, 1986)</p> | <p>As measured by the Bates Infant Characteristic Questionnaire (ICQ) (Bates, Freeland, &amp; Lounsbury, 1979), fussy-difficult subscale; abbreviated as described in Milligan, Parks, Kitzman &amp; Lenz (1997).</p> <ul style="list-style-type: none"> <li>• 5 questions</li> <li>• 7-point scale ranging from (1) “easy” to (7) “difficult”</li> <li>• Higher scores indicate high difficulty; lower scores indicate low difficulty</li> <li>• 85<sup>th</sup> Percentile of the distribution used as cut-off point; equals approximately +1 standard deviation (Mantymaa, Puura, Luoma, Salmelin, &amp; Tamminen, 2006).</li> </ul> |

## Summary

In summary, women of low socio-economic status face great challenges during the childbearing period. Being of low-income and minority status places these mothers at additional risk and disadvantage for psycho-physiologic difficulty because they often lack the resources necessary to care for themselves and their infants in a way that is conducive to health and wellness (Walker et al., 2004). Caring for self and child on limited

resources places great strain on these mothers in every dimension. The literature is clear regarding the necessity and benefits of social support to new mother physiologic and psychological well-being (Ajrouch, Reisine, Lim, Sohn, & Ismail, 2010). Based on the works of Doctors Pugh, Milligan and colleagues (1998, 2000, 2001, 2010) and their research toward interventions to increase breastfeeding duration in this population, this secondary analysis of data was undertaken to investigate situational, physiologic and psychosocial components of the maternal transition to motherhood in low-income, urban, minority women at twelve weeks following birth. As such, this study is a secondary benefit analysis utilizing data from a randomized controlled trial that investigated the use of a Breastfeeding Support Team (BST) to assist low-income, urban, minority mothers to increase their duration of breastfeeding.

In the broadest sense, the parent study was about understanding what effect the provision of social support would have on low-income urban mothers and their ability to sustain the process of breastfeeding over the infant's first year of life. The current study, taking place at the twelve week cross-section, seeks to identify the predictors of maternal perception of difficult infant temperament and any moderating effects of social support within the twelve week sample. While it may be interesting to investigate satisfaction with the support received from providers of the intervention, it was not directly measured. Social support provided by an identified "partner" or "other" in the form of a satisfaction rating will be investigated in this secondary analysis.

Because the parent study was interventional in design, one very important question that should be asked related to the chosen variables is if the intervention (BST)

itself (as a form of social support) had any effect on the study variables; maternal perception of difficult infant temperament, fatigue, anxiety, and depression. Did being in the intervention group make any difference in how mothers perceived their infants' temperament? What are the effects (predictive value) of caretaker influence (maternal fatigue, anxiety and depression) on maternal perception of difficult infant temperament in this cohort of postpartum mothers? Did the intervention have any appreciable effect on maternal fatigue, anxiety and/or depression at twelve weeks postpartum? Is there any secondary benefit to providing a breastfeeding support team to low income minority women, who have limited access to care, beyond providing assistance and encouragement with breastfeeding? The importance of this exploration is that identification of additional benefits may help to promote the intervention and increase the likelihood of acquiring a sustainable funding source.

## **CHAPTER 2**

### **REVIEW OF THE LITERATURE**

#### **Introduction**

The transformational journey that a woman makes as she travels through pregnancy, childbirth and the postpartum period has been described as complex, challenging and especially difficult when traveled alone (Hung, 2004; Kline, Martin, & Deyo, 1998; McConachie et al., 2008). In truth, the process of becoming a mother is a physical, psychologic and for some a spiritual transition (Callister & Khalaf, 2010; Maushart, 2000; McVeigh, 1997; Sethi, 1995; Ward & Mitchell, 2004). Even under the best of circumstances, navigating the early postpartum period can be challenging. While most childbearing women can expect to encounter some unpleasant symptoms associated with their physical repair and emotional transition to motherhood following birth, many encounter the psychosocial paradox between the elation (and to some extent expected happiness) surrounding the event and the reality of what the actual experience is for the woman. Postnatal women often walk a transitory tight rope in attempting to keep the whole motherhood concept together. For a variety of reasons, new mothers may experience unpleasant mental and physical symptoms that are beyond their ability to control or explain, which leave them frightened and bewildered (Beck & Driscoll, 2006; Kleiman & Wenzel, 2011; McIntosh, 1993; Shields, 2005).

Following childbirth, women experience a passage from a pregnant state of independence to a maternal, care giving state where time and freedom are governed by another living being whose very existence depends upon the care and safety provided by a caregiver, usually the mother. Because it is not possible to fully prepare for this passage, postnatal women are highly susceptible to experience feelings of loss of their former daily routine and self (Edhborg, Friberg, Lundh, & Widstrom, 2005; Lawler, & Sinclair, 2003; Mollard, 2014; Sword, 2002). In addition, because the mind and body cannot be separated from one another, physical symptoms and psychological maladies are common; namely fatigue, anxiety, depression and a spectrum of their associates.

Contributions from perinatal research spanning the past two decades have been of great benefit to postnatal women offering some explanation and help to new mothers who find motherhood to be a more miserable than joyful experience (Barclay & Lloyd, 1996). Beck (1993, 1996b, 2008, 2014), Milligan, Lenz, Parks, Pugh, and Kitzman (1996), and Wenzel, Haugen, Jackson and Robinson (2003) have studied postnatal depression, fatigue, and generalized anxiety disorder, respectively. While their research adds to our understanding of specific "unpleasant symptoms" (Lenz & Pugh, 2008) which often accompany a woman's adaptation to motherhood, it does not quite capture in totality the emotional reality that some women may encounter during the adaptive period following childbirth.

Postpartum women are susceptible to mood disorders (Beck & Driscoll, 2006). They are at increased risk for extreme fatigue (Milligan, 1989; Runquist, 2007), and the comorbid disorders of anxiety and depression (Stuart, Couser, Schilder, O'Hara, &

Gorman, 1998). Collectively, perinatal mood and anxiety disorders (PMADs) formerly termed “postpartum depression” or PPD, is the more recent grouping phrase that includes mild to severe mood disorders; baby blues, PPD and postpartum psychosis, as well as the comorbid anxiety disorder spectrum that includes obsessive compulsive behavior, panic, and posttraumatic stress disorders (Beck, 2008; Smith & Kipnis, 2012). This triad or symptom cluster (fatigue, anxiety, and depression) has the potential to affect maternal/infant bonding and lead to a host of other psychosocial problems. If not alleviated, these physiologic and psychosocial maladies can adversely affect the infant (Akman et al., 2006; Johnson, 2013). For example, fatigued, anxious and depressed mothers are less likely to breastfeed their infants or wean early (Britton, 2007; Henderson, Evans, Straton, Priest, & Hagan, 2003; Milligan, Flenniken, & Pugh, 1996). In addition, there is a propensity to develop adverse feelings and thoughts toward the infant.

In an attempt to sort out the effects of postnatal psycho-physiologic disorders in mothers, researchers have looked at a number of experiences that appear to be influenced by them. Of those included is perception of infant temperament (Andrews, 1990; Atella et al., 2003; Beck, 1996a; Pesonen et al., 2004). Fatigue, anxiety and depression have the potential to affect how a mother perceives her infant’s temperament. For instance, a mother who is less fatigued may perceive her fussy infant to be less of a problem than a mother who is severely fatigued. Because of this, maternal perception of infant temperament can also affect the way a mother cares for and bonds with her infant.

Mothers who perceive their infant's negatively are less likely to develop a deep bond and may also be less nurturing (Campbell, 1979; Milliones, 1978; Pearce & Ayers, 2005).

Crockenberg and Acredolo (1983) suggested that "future attempts at identifying determinants of maternal ratings of infant temperament should consider caretaker behavior a likely causal or mediating variable" (p.71). This secondary analysis will focus on four major maternal related independent variables as they are encountered in the postpartum period (fatigue, anxiety, depression, and social support) and their relationship to the mother's perception of difficult infant temperament. The connection that fatigue, anxiety and depression in new mothers share has been explored in numerous research studies and some have identified the impact on perception of infant temperament. In general, there is considerable overlap in the inquiry and discussion of fatigue, anxiety and depression as they are often studied together related to their identified consistent strong correlation to one another, especially in the perinatal population.

Social support is of interest in this context because this study questions the role it plays between these maladaptive psycho-physiologic states in the mother and the impact they share in the way she experiences, perceives, interacts with and subsequently evaluates her infant. It should be understood that for purposes of this study, the flow of inquiry is linear and unidirectional; that is from mother to infant. Thus the interest lies in the effect of the maternal state on the infant not vice versa. Literature was selected based on its congruence with this study's flow of inquiry.

Studies were excluded from this review if they evaluated parental (mother and father) perceptions collectively, as compared to including a separate measure of maternal

perception of infant temperament which has been selected as the dependent variable of this study. For inclusion, the research needed to be specific to the early postpartum period (infancy versus childhood) in keeping with the cross-sectional nature of the intended study at the twelve week data collection time-point. In addition, as new mothers were the only individuals surveyed for data collection in the parent RCT, the review of literature was limited to the research that included the mother/infant dyad.

### ***Perceived Infant Temperament***

Many researchers in the field have attempted to define and give perspective to what constitutes infant temperament. Rothbart (1986) defined infant temperament as, “constitutionally based individual differences in reactivity and self-regulation [of emotionality]... influenced over time by heredity, maturation, and experience” (p. 356). Further, “temperament is a biologically based characteristic evident in an infant’s ability to react to stimuli” (Pizur-Barnekow, 2006, p. 495). These characteristic differences are heritable, biological and developmental in origin (Bornstein, Gaughran, & Homel, 1986). Most recently temperament has been acknowledged as being “a predisposing set of individual characteristics with the potential to systematically change over time as a child develops” (Henderson & Wachs, 2007, p. 399). However encompassing, it appears to be the *negative* emotional aspects of infant temperament that are the most problematic for new mothers (Edhborg, Seimyr, Lundh & Windstrom, 2000).

Perceived infant temperament, specifically fussy/difficult temperament, is the outcome or dependent variable of this secondary data analysis. Britton (2011) credits Thompson (1999), Henderson and Wachs (2007) and Zentner and Bates (2008) for his

synthesis of difficult temperament. He states that “difficult temperament is characterized by negative affect, such as fussiness and crying, frequent and intense negative emotional behavior, irregularity of biological functions, tendency to withdraw from new situations and stimuli, slow adaptability to change, and tendency to display intense expressiveness” (p. 56).

Crockenberg (1981) identified irritable, unpredictable and inadaptible infants as being “difficult” and suggested that these temperamental tendencies are early indicators of behavioral problems. In addition, she observed infant difficultness to be a significant problem because it is disruptive to the interactive bond between mother and infant. In subsequent research, Crockenberg and Acredolo (1983) demonstrated that maternal behavior has a consistent relationship to maternal perception and rating of infant temperament. Their research inferred that caretaker behavior may have a causal or mediating influence among factors that contribute to a mother’s rating of her infant’s temperament, but the supposition needs further investigation.

In a study conducted in 1982, Sameroff, Seifer, and Elias concluded that “individual differences in mothers, rather than differences in infants may be the major contributor to early ratings of temperament” (p.164). Within the sample, children of lower socioeconomic status, black, or mentally ill mothers were reported to have more difficult temperament. The influence of maternal variables was significant and independent of child variables in predicting temperament scores.

The rating of infant temperament has primarily been facilitated by measurement instruments through parental evaluation. An alternative rating process, which some

believe to be more accurate based on the consideration that parental reports may contain bias, are laboratory based or third party observer evaluation in the home (Mantymaa et al., 2006). Some contend that the benefit to parental ratings of the negative aspects to infant temperament is that parents have the lived experience upon which to base their evaluation. They are likely to own the best understanding of their infant's behavior in various circumstances (Clarke-Stewart, Fitzpatrick, Allhusen, & Goldberg, 2000). Yet, controversy exists over whether parental reports of infant negative temperament reflect more the status of the parent or the child (Britton, 2011). However, most investigators continue to rely on the use of parental report measurement because of ease of implementation.

How individuals perceive their surroundings impacts how they choose to interact. Our senses and logic are programmed to be drawn to the pleasant and beautiful. Conversely, it appears to be innate that humans retreat from situations that they find to be unpleasant and difficult to tolerate. However, there are times when these two conditions collide and psychological and physical maladies occur. When ill, the ability to accurately interpret our surroundings or find pleasurable experiences is impeded. As in the case of new mothers struggling with postpartum fatigue, anxiety and/or depression, there is evidence to suggest that an alteration in maternal mood may foster a perception of negative infant temperament (Britton, 2011).

As stated in Atella, Di Pietro, Smith and St. James (2003), "the perception of negative aspects of [infant] temperament [have] the most theoretical and empirical salience to the intersection with parental psychological functioning" (p. 268). In keeping

with this study's direction of inquiry, it has been observed that maternal stress, depression, and anxiety have corresponded to higher parental ratings of difficult infant temperament (Mednick, Hocevar, Baker, & Schulsinger, 1996). There is, however, conflicting findings in the literature. One example appears to be the confounding element of socioeconomic status. Sameroff, Seifer, and Elias (1982) found that maternal psychological and socio-demographic factors were found to be the primary contributors to maternal infant temperament ratings within a sample of socioeconomically disadvantaged mothers with high psychological dysfunction. Conversely, in a well-educated, white (88%), stable home environment sample, only 4-13% of the variance in parental rating of infant temperament could be attributed to parental psychological characteristics (Atella et al., 2003).

Mantymaa et al. (2006) used Bates ICQ and face-to-face, videotaped analysis to evaluate maternal perception of infant temperament. DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) classification was used to rate maternal mental health. One hundred twenty-four, European, predominantly upper middle class (69%), partnered (91%) mothers and their infants were evaluated. Within this socioeconomically privileged sample (stable home and financial means), it was concluded that twenty-four percent of the variance in perceived infant difficultness could be attributed to maternal mental health and parenting distress demonstrating that affluence and familial stability does not preclude women from becoming depressed or having an infant with a perceived difficult disposition. While the current study is dedicated to women who are socioeconomically disadvantaged, it is interesting to note the universal nature of

psychosocial and physiologic maladies of the early postpartum period. One identified implication of the study is that creative use of social support from alternate venues may moderate maternal distress and in turn affect a mother's perception of her infant.

### ***Postpartum Depression***

Postpartum depression (PPD) is a common mood disorder which specifically occurs following childbirth and includes the time period up to one year (Gaynes et al., 2005; Horowitz & Goodman, 2004). While studies have shown some overlap in reported postpartum depression rates, an AHRQ (Agency for Healthcare Research and Quality) report by Gaynes et al. (2005) identified the range to be between five and twenty-five percent. With a wide range of prevalence rates reported, Cheryl Tatano Beck, DNSc who has spent two decades conducting postpartum depression research and a highly respected expert in the field, has provided the most recent PPD rates as being 10-15% of all new mothers (Beck, 2014). Many different risk factors have been found to be correlated with PPD including depression history, high stress and anxiety, and low social support (Beck, 2006). Great strides have been made toward understanding and identifying causes and effects of maternal depression in the postpartum period.

However, researchers agree that the collection of accurate data surrounding cognitively negative postnatal maternal experiences most likely are not a true reflection of the actual number of those who experience them. It has been suggested that maternal fear related to consequences of divulging their psychiatric disturbance may lead to negative outcomes such as being labeled as crazy, having their infant taken away from them or some other consequence that separates them from their infant (Beck & Driscoll,

2006; Kleiman & Wenzel, 2011). Mental health practitioners and researchers contend that the actual numbers who disclose how they feel (fatigued, anxious, depressed) and what they think (possibly thoughts of harm towards their infant) during a therapeutic session are actually much higher than the research suggests.

Another obstacle in the research and study of perinatal mood disorders are problems relating to definition and classification. However, most researchers agree that postnatal mood disorders fall upon a continuum with the mildest “baby blues” to one end, “postpartum depression” in the center, and “postpartum psychosis” to the other far extreme (Riecher-Rossler & Steiner, 2005). The measurement tools themselves are subjective and dependent upon feeling, and therefore, individual scores will vary based upon each individual’s mood and feelings at the time the instrument is administered. Some contend that an actual diagnosis based on DSM-IV criteria provides a more accurate clinical picture and therefore, implies more confidence in study results (Britton, 2011; Wiffen & Gotlib, 1989).

Some evidence in support of the relationship of the proposed study variables comes from Beck (2001). A meta-analysis of eighty-four studies that investigated the risk factors associated with postpartum depression was conducted. Thirteen significant predictors were identified and ordered according to Cohen’s effect size norms (Cohen, 1988). Social support, infant temperament and (prenatal) anxiety were among the strongest predictors of PPD ( $r > 0.30$ ).

### ***Maternal Postpartum Depression and Perception of Infant Temperament***

The results from a meta-analysis performed by Beck (1996) found postpartum depression and infant temperament to have a moderate correlation (weighted  $r$  index = .31). The association between these two constructs has been of interest to a host of researchers who have linked maternal depressive symptoms to reports of difficult infant temperament: Atella, DiPietro, Smith, & St. James-Roberts, 2003; Dudley, Roy, Kelk, & Bernard, 2001; Edhborg, Seimyr, Lundh, & Widstrom, 2000; Pauli-Pott, Mertesacker, Bade, Bauer, & Beckmann, 2000; Pesonen, Raikkonen, Strandberg, Keltikangas-Jarvinen, & Jarvenpaa, 2004; and Whiffen, 1990. Others not listed here have been selected for discussion.

In a longitudinal study of one hundred thirty-nine English speaking perinatal women with a mean age of 27 years and 89% self-identified as Caucasian, were surveyed third trimester through eight months postpartum (McGrath, Records, & Rice, 2008). The study found that depressed mothers rated their infants as being more temperamentally difficult than those who were not depressed at both time point measurements; two and six months postpartum ( $M = .86$ ,  $SD = 1.17$ ;  $M = 1.00$ ,  $SD = 1.30$ ,  $p < .05$ , respectively). Because depression has a profound effect on the way mothers perceive their infants, it was suggested that supportive interventions facilitated by nurses that are aimed at improving maternal mood such as infant massage, increasing maternal sleep time, and assistance in developing synchrony within the mother-baby dyad may also have an effect on maternal perception of infant temperament in the early postpartum period.

A sample of 202 biological, predominantly low-income minority mothers with a mean age of 20.3 years, 63% Black, 69% never married, 51% receiving public assistance, and 66% first time mothers (Andrews, 1990) were investigated using a longitudinal, comparative analysis of maternal characteristics, attitude, and practices that sought to discover changes in maternal perception of infant temperament over time. The variables of interest included: depression, anxiety, self-esteem, parenting attitudes, stress and social support. The sample was divided into two groups of mothers; those who changed their perception of infant temperament from non-difficult to difficult and those who did not (non-difficult at both time points; constant). Nearly 40% of the mothers were identified as depressed at first measurement (T1 = 6 weeks postpartum); with only 8% at the second time point (T2 = 1 year postpartum; both time points were noted as being approximate). Nine percent of the sample were anxious at T1; 12 % at T2. At six weeks postpartum, infant difficultness as measured by Bates' ICQ (Bates et al., 1979) was significantly correlated with maternal depression, stress, social support and race ( $p < .05$ ). At one year, difficult infant temperament was significantly correlated with maternal anxiety, stress and social support. The study concluded that maternal psychological characteristics (including anxiety and postpartum depression), social support and parenting stress in conjunction with parenting attitudes and practices, explained 57% of the variance in the mother's change in perception of infant temperament over time. Community Health Nurses may be able to effect a change in how mothers perceive their infant's by providing education, advice, and venues for social contact.

Britton (2011) investigated the association of difficult infant temperament, maternal anxiety and depression. Participants were 296 primarily white (74%), married (71%), educated (61% college or beyond) postpartum women who completed both an in hospital pre-discharge and one-month postpartum survey. The study explored the relationship between infant temperament and the maternal psychological state in the first postpartum month. The one-month survey assessed postpartum anxiety (State-Trait Anxiety Inventory, “STAI”), depression (Beck Depression Inventory, “BDI”), infant temperament (Early Infancy Temperament Questionnaire, “EITQ”), and social support (Maternal Social Support Index, “MSSI”). Strong correlations were found to exist between the depression and temperament sum score and the state anxiety and temperament sum score ( $r = .20, p < 0.005$ ;  $r = .24, p < 0.001$ , respectively). However, the strongest correlation to overall difficult infant temperament was maternal (state) anxiety. The reported Cronbach’s Alpha for the EITQ sum score was 0.63. The results suggest that maternal postnatal anxiety and depressive symptoms have the ability to influence maternal perception of infant temperament and these associations are detectable in the very early postnatal period.

An exploration of the association between infant characteristics and postnatal depression in early motherhood was the focus of a study conducted by Wiffen and Gotlib (1989). Fifty women, four weeks postpartum, were divided into two groups; depressed and non-depressed based on diagnostic criteria from their scores achieved on the Schedule for Affective Disorders and Schizophrenia (SADS) and self-ratings on a common self-report scale; Beck Depression Inventory (BDI) (Beck, Ward, Mendelson,

Mock, & Erbaugh, 1961). The instruments were administered to all recruits and evaluated by a clinical psychologist. Group placement was based on whether or not the participant met diagnostic criteria for postpartum depression. An objective assessor was used to rate infant temperamental difficulty in addition to the mothers' assessment of their infant's temperament using the ICQ (Bates et al., 1979). Demographically, about one-half of the women in each group were first time mothers. Twenty-seven percent of the depressed group was self-identified as "housewives" as compared to 18% of the non-depressed sample. The non-depressed mothers were slightly older ( $M = 29$  years) as compared to the depressed mothers ( $M = 27$ ). The novelty of this study is that depression was not based on women's self-report alone, but by professional diagnosis which was determined to add credibility to the study. Based on ICQ scores, the depressed mothers did not rate their infants as more temperamentally difficult than non-depressed ( $F(4, 42) = 1.04, p > .05$ ). Examiner ratings were not congruent with maternal reports of infant fussiness. Mothers with depressive symptoms perceived their infants as more bothersome and difficult to care for, than the non-depressed mothers. Consistent with a depressed state, they attributed these perceptions to their own depression and feelings of inadequacy (self-blame), and did not link the struggle in caring for the infant to the infant's fussy/difficult temperament. This demonstrates the effect of maternal depression on infant behavior. Similar to these results, Pesonen et al. (2004) identified that the processing of information is affected by an individual's depressed state. This depressive processing plays a significant part in the way a parent perceives their infant's temperament.

### ***Postnatal Anxiety***

While the risks, causes and effects of PPD on the mother, infant and significant other have been extensively researched over the past two decades by Beck (1993, 1995, 1996a, 1996b, 1998, 2008), Dennis, Janssen, and Singer (2004), Dennis and McQueen (2007), Lawler and Sinclair (2003) and a host of others (see Beck, 2008 for a synthesis), anxiety in women, as it relates to the postnatal period as far as the identification and research of anxiety and its manifestations as separate from PPD is a more recent concept and topic of interest (Henrichs et al., 2009).

Anxiety, as previously conceptually and operationally defined in Chapter 2, when experienced causes great concern as one has little power over the distressing symptoms associated with the state. As with depression, the situational, psychological, and physical factors surrounding the onset of motherhood such as lack of restful sleep, real or perceived deficient mothering skills, unavailable or inadequate assistance in the home, or pain and trauma from childbirth, singularly or in combination, naturally predispose a new mother to an anxious state.

Anxiety and depression are often comorbid factors and several studies have investigated them concurrently. One such study is entitled *Infant Temperament and Maternal Anxiety and Depressed Mood in the Early Postpartum Period* (Britton, 2011). The premise of this inquiry was that anxiety and depression emerge early in new mothers related to the stressors of adjustment to the new maternal role. Mothers who perceive their infant's as more temperamentally difficult have themselves a greater degree of anxiety and depression. However, Britton purported that the perceived infant difficulty

preceded the mother's anxious and depressed state. This exemplifies that the what-comes-first properties of these variables is often a matter of perception, opinion or investigator driven.

### ***Maternal Anxiety and Perception of Infant Temperament***

Maternal state and trait anxiety are both related to maternal perception of infant difficultness. In evaluating characteristics of mothers and infant difficult temperament, a European study conducted by Mednick et al. (1996) found maternal *trait* anxiety to be significantly correlated with infant/child difficultness 2-26 months postnatally. Further, the strength of the relationship became more significant over time with increasing child age ( $r = 0.20$ , 3-12 months;  $r = 0.30$ , 13-24 months;  $r = 0.36$ , 25-36 months). Familial and demographic factors, such as schooling, marital status, family size or child wantedness, revealed no association with difficultness during the same time period. In a separate study, Britton (2011) evaluated infant temperament and maternal anxiety in the very early postpartum period and found an association to exist between maternal *state* anxiety and difficult infant temperament as early as one month of age.

McMahon, Barnett, Kowalenko, Tennant, and Don (2001) found an association between maternal state and trait anxiety and infant difficultness at four months postpartum. Postnatal women were recruited from a residential care unit, where mothers who have significant ongoing difficulties managing their infants receive assistance. Infant characteristics for inclusion were singleton, firstborn, and under the age of four months ( $n = 128$ ). A comparison group of fifty-eight first time mothers were recruited through obstetrician offices. Self-report questionnaires were used to assess maternal

anxiety (Spielberger State-Trait Anxiety inventory, STAI), depression (Edinburgh, Postnatal Depression Scale, EPDS), and infant temperament (Short Temperament Scale for Infants, STSI). Women scoring above 40 on the STAI were defined as highly anxious. Those who fell into the highly anxious category were 35% of residential care and 9% of comparison mothers ( $\chi^2 = 13.4$ ,  $df = 1$ ,  $n = 186$ ,  $p = 0.000$ ). Maternal anxiety symptoms were most strongly correlated with maternal ratings of difficult infant temperament as the residential care mothers also rated their infants as temperamentally more difficult; 20% residential care as compared to 5% in the comparison group ( $\chi^2 = 6.5$ ,  $df = 1$ ,  $n = 184$ ,  $p = 0.01$ ). In addition, mean infant difficulty scores were significantly higher in the residential care group ( $t = 4.26$ ,  $df = 184$ ,  $p = 0.000$ ). Maternal rates of anxiety appear to have a parallel relationship with perception of infant difficulty; the more anxious the mother, the more difficult (negative) was her perception of infant temperament. In extrapolating the logic of the study, interventions aimed at decreasing maternal anxiety may also benefit infant development due to a more positive maternal perception of the infant.

Henrichs et al. (2009) examined whether maternal pre- and postnatal general anxiety are independently related to infant temperament at six months postpartum. Data were collected as part of the *Generation R Study*, which was comprised of a population based cohort. The study was implemented in Rotterdam, The Netherlands. This cohort included perinatal women ( $N = 2997$ ) with a mean age of 31 years, who were well educated (indicated by “higher education”; 58%), and with adequate financial means (90%). Their infants were term with a mean gestational age of 39.9 weeks. Infant

temperament was measured at approximately six months postpartum using a mother scored measurement tool: the IBQ-R (Infant Behavior Questionnaire-Revised; Gartstein & Rothbart, 2003). The study concluded that pre- and postnatal anxiety have independent associations with perceived difficult infant temperament. In addition, similar to the conclusions described in McMahon et al. (2001) above, higher levels of anxiety were indicative of higher ratings of infant difficultness. Because of these findings, the authors surmised that the critical time for relieving anxiety may be best implemented in the prenatal period.

In a study identified as the first that specifically investigated the effects of maternal postpartum *state* anxiety on infant temperament, Coplan, Oneill, and Arbeau (2004) looked at maternal ante-and postnatal state and trait anxiety and the relationship to infant temperament at three months postpartum. In the original sample,  $n = 60$ ; at three months postpartum  $n = 47$ . The sample was predominantly white (96.7 %) and educated with ninety-five percent having an entry level college degree or higher. Postnatal state anxiety was significantly associated with infant distress while maternal trait anxiety predicted difficult soothing.

### ***Postpartum Fatigue***

Fatigue is an extremely common and distressing symptom experienced by new mothers following childbirth (Runquist, 2007). It has been defined by Aaronson et al. (1999) as “the awareness of a decreased capacity for physical and/or mental activity due to an imbalance in the availability, utilization, and/or restoration of resources needed to perform activity” (p. 46). Identified causes of postpartum fatigue include breastfeeding,

loss and fragmentation of sleep related to infant care activities, and post childbirth energy demands for physical repair (Runquist, 2007; Troy, 2003). As with anxiety, it has been identified in the literature that childbearing fatigue is also strongly correlated with depression (Bozoky & Corwin, 2002; Corwin, Brownstead, Barton, Heckard, & Morin, 2005; Giallo, Wade, Cooklin, & Rose, 2011; Milligan, Lenz, Parks, Pugh, & Kitzman, 1996). Fatigue can be a symptom, a predictor or occur independently of postpartum depression (Bozoky & Corwin, 2002; Corwin et al., 2005; Giallo et al., 2011; Milligan, 1989; Runquist, 2007).

As conceptually and operationally defined in Chapter 2, fatigue has contributing situational, psychologic and physiologic antecedents as identified in the theoretical framework of this study. Varricchio (1985) pointed out, anemia (the residual effect of a large blood loss at delivery) precedes physiologic fatigue, anxiety leads to psychological fatigue and stressors in relationships such as those that are perceived as being unsupportive produce situational fatigue. In support of Varricchio's study, Lee and Zaffke's (1999) investigation concluded that forty-seven percent of the variance in fatigue, three months postpartum, could be attributed to ferritin and hemoglobin levels (physiologic identifiers of anemia) and fragmented sleep. Low levels of social support have also been identified as contributing to postnatal fatigue (Gjerdingen & Chaloner, 1994). In addition, Pugh and Milligan (1995) reported a relationship between fatigue, anxiety and depression. These associative descriptors are perpetually relevant to the postpartum period and to this investigation.

Milligan, a pioneer in the research of childbearing fatigue, clarified fatigue as a separate construct from depression in postpartum women (Milligan, 1989; Milligan et al., 1996). Her efforts were furthered by Giallo, Wade, Cooklin and Rose (2011) who identified a two factor model for discriminating fatigue from depression in postpartum women with onset occurring within one year of giving birth. The fatigue of postpartum mothers has been described as something to be endured and to persevere through (Runquist, 2006). The majority of postpartum mothers experience fatigue; some to a lesser degree than others (Lee & Zaffke, 1999). Having a non-supportive partner has a significant relationship with the development of postnatal fatigue (Troy, 2003). Fatigue left unchecked can have devastating effects on the mother and her ability to parent. Sleep disturbance is related to fatigue and has a positive correlation (Rychnovsky, 2007; Rychnovsky & Hunter, 2009).

In truth, postnatal fatigue has clear nursing implications as postpartum nurses can offer interventions that promote physiologic rest. As breastfeeding mothers identify with higher levels of fatigue than non-breastfeeding mothers, Milligan, Flenniken, and Pugh (1996) identified a breastfeeding intervention (maternal positioning) that reduced maternal fatigue. Additional nursing implications were identified by Gardner (1991) concluding that there is an obligatory need for maternal-child nurses to be able to assess for fatigue in postpartum women and to be able to educate and intervene. In addition, it is of significant importance for nurses to be able to differentiate the symptoms of fatigue from those of postnatal depression, if they are going to be effective in their intervention.

### ***Maternal Fatigue and Perception of Infant Temperament***

Nurse researchers have identified maternal fatigue as an outcome of the experience of an infant with difficult temperament (Dennis & Ross, 2005; Milligan, Parks, & Lenz, 1990). However, the impact of postnatal fatigue on maternal perception of infant temperament has not been well reported in the literature. Those who have studied the relationship between fatigue and maternal perception of infant temperament seem to infer that it is difficult infant temperament that leads to maternal fatigue rather than a fatigued maternal state imposing effects on perception.

A smattering of research has directly and indirectly addressed the association of maternal fatigue and perception of infant temperament. Milligan et al. (1990) identified that at six and twelve weeks postpartum, higher levels of fatigue were found in mothers who rated their infants as more difficult. Further, in a large cohort of postpartum women ( $n = 505$ ), Dennis and Ross (2005) studied the relationship among maternal fatigue, depression and mother rated infant sleep patterns. The authors surmised that difficult infant temperament may be predictive of disrupted sleep and fatigue in postpartum mothers.

Wambach (1998) conducted a pilot study of forty-one, breastfeeding, first-time mothers, using a prospective longitudinal design. The study explored the effects of maternal fatigue in breastfeeding women. Using the theory of unpleasant symptoms as a theoretical framework, the investigation employed self-report measures to examine the relationship between physiologic (labor/ delivery and breastfeeding), psychologic (depression), situational (stress, sleep, and infant temperament) and performance

(activities of daily living) factors. Consistent with the findings of Pugh and Milligan (1993), one of several associations that the study identified was a significant relationship between difficult infant temperament and higher levels of maternal fatigue. Infant difficulty was shown to have a mild, positive relationship with fatigue at six ( $r = .32, p < .05$ ) and nine ( $r = .43, p < .05$ ) weeks postpartum. However, the direction of association was not identified.

### ***Social Support***

Social support is the knowledge of being cared for, valued, and belonging (Cobb, 1976). There are four sub-types of support that have been identified which fall under the larger umbrella of social support. They are: emotional (love and concern), appraisal (positive feedback), informational (counsel and direction) and instrumental (assistance such as in time, goods, or service) support (Kruse, Low, & Seng, 2013). In general, it is presumed that social support provides a positive benefit.

In times past, when extended family lived together in the same home, new mothers were undergirded with the assistance of female family members; mothers, grandmothers, aunts and sisters. Women in the family, generally those with childbearing experience, provided teaching, respite and tended to household cares. However, with modern day dispersion of families, new mothers often find themselves alone in dealing with the many facets of managing a home and adjusting to motherhood. It should be noted that some cultures continue to practice ritual family and community closeness surrounding the event of childbirth, such as Chinese (Ngai & Chan, 2012), Arabic

Muslim (Yehia, Callister, & Hamdan-Mansour, 2013), and Hispanic (Mann, Mannan, Quinones, Palmer & Torres, 2010) cultures; even in this modern era.

In perinatal research, spouses or partners are often thought of as being the primary source of support for new mothers (Kruse et al., 2013). The support provided by partners has been found to be associated with greater maternal emotional well-being and increased duration of breastfeeding (Hildingsson, Tingvall & Rubertsson, 2008). However, for those who are not partnered or are in abusive or uncaring relationships, support must be found elsewhere.

Forms of community support for postpartum women have been identified in the literature. Shaw et al. (2006) defined this external support as “interpersonal interaction(s) between a postpartum woman and trained individuals or health care professionals” (p. 211), which could be in the form of telephone conversations, home visits, and/or individual or group clinic visits. For example, Dennis et al. (2009) utilized telephone based peer support as a preventive intervention in the development of postnatal depression. In validating the benefit of the intervention, the study concluded that those who received peer support were significantly less likely to develop postnatal depression at twelve weeks postpartum as compared to the control group ( $OR = 2.1$ , 95%  $CI = 1.38 - 3.20$ ).

Low social support and poor quality partner relationships have been identified as the most consistent risk factors associated with depression following childbirth (Buist & Bilszta, 2005). Therefore, a substantial amount of research involving postpartum women and social support has been directed toward understanding the relationship between

postpartum depression, various types of social support and other co-related variables. The literature is replete with studies (multi-cultural, domestic and international) that correlate postpartum depression with unsatisfactory social support (Ege, Timur, Zincir, Geckil, & Sunar-Reeder, 2008; Heh, Coombes, & Bartlett, 2004; Leahy-Warren, McCarthy & Corcoran, 2011b; Ngai & Chan, 2012; Sheng, Le & Perry, 2010; Yehia et al., 2013; and others).

Social support provided to mothers in the early postpartum period also has implications for breastfeeding duration (Pugh et al., 2010) and severity of maternal anxiety (Aktan, 2012). In general, women who have poor support in the postnatal period tend to exhibit higher levels of anxiety and discontinue breastfeeding sooner than women who perceive their support as adequate or better.

### ***Social Support and Perception of Infant Temperament***

A paucity of literature exists that speaks to the relationship between social support and maternal perception of infant temperament. Noteworthy, however, is the contradiction in outcomes that have been identified in what does exist. McGrath et al. (2008) found that perceived differences in infant temperament appear to be related to the presence of depression and are not altered by the presence of family support or childcare stress. Other researchers including Kronstadt, Oberklaid, Ferb and Swartz (1979) inferred that maternal temperament, self-perception of parenting ability and the availability of support from family and friends affect a mother's perception of her infant.

In the most recent analysis, Mantymaa et al. (2006) concluded that "alleviating parenting stress would be one of the most important issues to be considered when

intervention strategies to reduce mother's negative perceptions of her infant are applied. Supporting and strengthening the social network of the families and offering concrete help in household duties and child-care would be beneficial for families with young children" (p.385).

### ***Summary***

In summary, previous research has demonstrated that the study variables have identifiable connections to one another within the general population of postnatal women. Physiologic, psychologic and situational components of childbirth and the adaptation process of the early postnatal period is often one of challenge and less congruent with preconceived elation. The processes that occur within the mother and within the infant as each adapts to postnatal life may not lead to a smooth blending of reciprocal bliss. Whether maternal characteristics have a more profound effect on the infant or vice versa is still open for exploration and perhaps it is inconsequential as to what comes first. Likely, it is an ongoing recursive process as illustrated by the theory of unpleasant symptoms (Lenz et al., 1997). However, the insight that we can glean from identifying predictors of maternal perception of infant difficulty, specifically in relation to fatigue, anxiety, and depression in conjunction with any moderating effects of social support making those the focus of nursing intervention, can only serve to assist in how we care for this population in the early postpartum period.

## **CHAPTER 3**

### **METHODOLOGY**

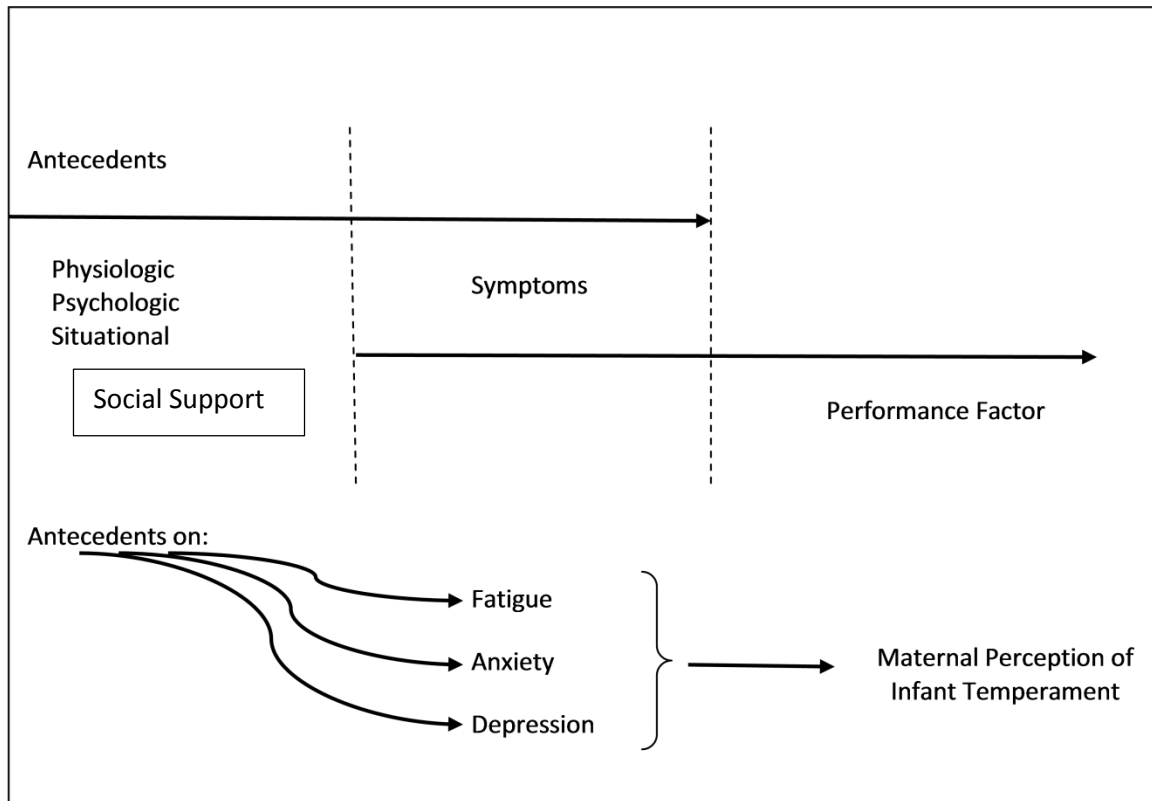
#### **Research Design**

This study is an exploratory, secondary analysis of data derived from a National Institute of Nursing Research (NINR) funded randomized controlled trial (RCT) that investigated the effects of a twenty-four week breastfeeding support team (BST) intervention created in accordance with one Healthy People 2010 goal; to have 50% of low-income women who initiate breastfeeding continue for at least six months. Specifically, the intervention was designed to assist postpartum low-income, urban, minority women to breastfeed their infant's for a longer period of time (Pugh et al., 2010). This specific data set was chosen for secondary analysis for several reasons: First, the original authors and designers of the parent study had the ability to gather data based on their pilot work (Pugh & Milligan, 1998; Pugh, Milligan, & Brown, 2001; Pugh, Milligan, Frick, Spatz, & Bronner, 2002). Only portions of the data have been analyzed to date and largely speak to the effectiveness of the intervention (BST) and how well the intervention affected duration of breastfeeding as a performance or outcome factor. A cost analysis was also undertaken to quantify costs associated with the intervention (Frick, Pugh, & Milligan, 2011). Secondly, the psychosocial and physiologic variables contained within the original data set and selected for secondary analysis have been only

minimally assessed. Third, the variables that are available for analysis (fatigue, anxiety, depression, social support satisfaction and maternal perception of difficult infant temperament) are a good match for this study to serve as a pilot for future research on maternal negative thoughts in the postpartum period.

While the parent study was longitudinal with the intervention lasting twenty-four weeks and data collection continuing for fifty-two weeks, a quantitative, cross sectional approach will be employed for a secondary analysis utilizing data collected at the twelve week time-point. Twelve weeks was chosen for two reasons: First, one conclusion derived from the primary analysis of the original study was an indication that there was no significant difference beyond twelve weeks between the intervention and control groups with regard to breastfeeding rates (efficacy of the intervention) (Pugh et al., 2010) potentially making the groups more similar than different. It would be beneficial to analyze the entire twelve week sample collectively versus by group for the sake of benefitting from a larger sample size. In addition, should statistical analyses fail to identify significant differences between the groups, that would eliminate the need to control for group assignment in regression analyses. Second, twelve weeks was the first time point that maternal perception of infant difficultness was assessed and therefore, the variable had not previously been explored lending originality to this research.

The major study variables to be included in this analysis are physiologic and psychosocial in nature. They are displayed in Figure 3 as a linear representation of the conceptualization of this study's flow of analysis.



*Figure 3.* Linear conceptualization of the study's flow of analysis.

### **Population and Sample**

Low-income, urban, minority women who had just given birth were recruited for the parent study. Two urban hospitals in Baltimore, Maryland were used as recruitment sites (Pugh et al., 2010). The original sample of three hundred twenty-eight, breastfeeding, WIC eligible, women who had delivered full term infants were randomized “in blocks of 10” within each hospital. This yielded 168 mother-baby dyads for the intervention group and 160 for the care as usual group. The sample of the parent study was largely African American (“Black”) in ethnicity (87%), followed by a much smaller percentage of mothers who identified themselves as “White” (5%) or “Hispanic”

(4%). These women were identifiably young, 74%  $\leq$  25 years of age with a range of 13 – 43 years, and fairly well educated with 74% having the equivalent of a high school diploma or greater. In addition, participants were mostly single (80%), more than half of the sample unemployed (63%), and all WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children) eligible. (See Table 2). WIC eligibility was a stipulation of the inclusion criteria for participation in the study. Participants were recruited to the parent study following childbirth while still in the hospital; within 24 hours of vaginal delivery and 48 hours following cesarean birth. The researchers used an experimental design to randomly assign consented, postpartum mothers to one of two groups; intervention or usual care. Assignments were made by sealed envelope technique. Reports generated from the parent study suggested that the peer support intervention (BST) significantly improved breastfeeding rates at six weeks for those receiving the intervention. However, no significant difference was found between the usual care and intervention groups at twelve and twenty-four weeks postpartum.

Table 2

*Demographics of original sample at recruitment*

| Characteristics              | Total (N = 328) | Intervention Group<br>(n = 168) | Usual Care Group<br>(n = 160) |
|------------------------------|-----------------|---------------------------------|-------------------------------|
| Age in years                 |                 |                                 |                               |
| • 13-17                      | 33 (10.1)       | 20 (11.9)                       | 13 (8.1)                      |
| • 18-19                      | 56 (17.1)       | 26 (15.5)                       | 30 (18.8)                     |
| • 20-24                      | 137 (41.8)      | 70 (41.7)                       | 67 (41.9)                     |
| • 25-34                      | 91 (27.7)       | 48 (28.6)                       | 43 (26.9)                     |
| • 35-43                      | 11 (3.4)        | 4 (2.4)                         | 7 (4.4)                       |
| • Mean +/- SD                | 23.1+/- 5.3     | 23.1+/- 5.3                     | 23.2+/-5.3                    |
| Type of Delivery             |                 |                                 |                               |
| • Spontaneous Vaginal        | 241 (73.5)      | 122 (72.6)                      | 119 (74.4)                    |
| • Cesarean                   | 87 (26.5)       | 46 (27.4)                       | 41 (25.6)                     |
| Highest level of Education   |                 |                                 |                               |
| • < 12 years                 | 87 (26.5)       | 49 (29.2)                       | 38 (23.8)                     |
| • High School/GED            | 121 (36.9)      | 59 (35.1)                       | 62 (38.8)                     |
| • Some college               | 83 (25.3)       | 47 (28.0)                       | 36 (22.5)                     |
| • College graduate           | 37 (11.3)       | 13 (7.7)                        | 24 (15.0)                     |
| Marital Status               |                 |                                 |                               |
| • Single                     | 261 (79.6)      | 129 (76.8)                      | 132 (82.5)                    |
| • Married                    | 56 (17.1)       | 33 (19.6)                       | 23 (14.4)                     |
| • Separated/Divorced/Widowed | 11 (3.4)        | 6 (3.6)                         | 5 (3.1)                       |
| Gestation at Delivery        |                 |                                 |                               |
| • 36-37 weeks                | 50 (15.2)       | 32 (19.1)                       | 18 (11.3)                     |
| • 38-40 weeks (term)         | 250 (76.2)      | 124 (73.8)                      | 126 (78.8)                    |
| • 41 weeks                   | 28 (8.5)        | 12 (7.1)                        | 16 (10.0)                     |

|                    |            |            |            |
|--------------------|------------|------------|------------|
| Race/Ethnicity     |            |            |            |
| • African American | 286 (87.2) | 150 (89.3) | 136 (85.0) |
| • White            | 15 (4.6)   | 7 (4.2)    | 8 (5.0)    |
| • Latina           | 13 (4.0)   | 5 (3.0)    | 8 (5.0)    |
| • Other            | 14 (4.3)   | 6 (3.6)    | 8 (5.0)    |

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*Note.* Adapted from “A Randomized Controlled Community-Based Trial to Improve Breastfeeding Rates Among Urban Low-Income Mothers,” by L. Pugh, J. Serwint, K. Frick, J. Nanda, P. Sharps, D. Spatz, and R. Milligan, 2010, *Academic Pediatrics*, 10, p. 17. Copyright 2010 by the Academic Pediatric Association.

## Sample Size

While the original sample was comprised of 328 participants, by week twelve data collection, the sample had decreased in number to 174 available participants. However, it was learned anecdotally that some of the subjects had varying availability over the fifty-two week data collection period. That is to say that some of the individuals who did not participate at twelve weeks may have been present for the twenty-four week or beyond assessments. For the twelve week period concerned, an attrition rate of forty-seven percent can be noted. By week twelve, data could be gathered from less than half of the original participants. However, because attrition rate does not specifically affect cross-sectional analysis, this sample can be regarded as similar to an independent sample standing alone. This study does not make any comparison of data between any previous time point and twelve weeks. All analyses are specific to what occurred at twelve weeks only with the data collected from the available participants. Nevertheless, based on the following power analysis, this sample has adequate strength.

To determine if there was an adequate number of participants at the twelve week data collection time point as needed for this secondary analysis, a power analysis was undertaken utilizing the formula identified in Munro (2005, p. 261). This formula has been determined as specific for use in sample size calculations for studies using multiple regression and correlation analysis such as in this study. Munro credits Cohen's 1987 work for the following power analysis equation:

$$N = \frac{L(1-R^2)}{R^2} + u + 1$$

Where:  $N$  = total sample size, Lambda ( $L$ ) = effect size index (which is a function of power, number of independent variables, and alpha level, Cohen, 1988),  $R^2$  = the effect size (small = 0.02, moderate = 0.13, and large = 0.30), and  $u$  = the number of independent variables in the study (Munro, p. 261). The identified independent variables used in this research were: fatigue, anxiety, depression and two separate measures of social support (“partner” and “other”).

To determine if the week twelve sample had sufficient participants to carry out the investigation and in an attempt to decrease the possibility of having a type II error, the following sample size power analysis was done. The difference in number of participants needed for the proposed study to have a power of 0.80 and 0.90 is illustrated below.

Power = **0.80**

Significance level,  $\alpha = 0.05$

Effect size index,  $L = 12.8$  (tabled value from Cohen, 1988, p. 452).

Moderate effect size,  $R^2 = 0.13$

Number of independent variables  $u = 5$

$$N = \frac{12.8 (1 - 0.13)}{0.13} + 5 + 1$$

$$N = 132$$

Power = **0.90**

Significance level,  $\alpha = 0.05$

Effect size index,  $L = 16.5$  (tabled value from Cohen, 1988, p. 452).

Moderate effect size,  $R^2 = 0.13$

Number of independent variables  $u = 5$

$$N = \frac{16.5 (1 - 0.13)}{0.13} + 5 + 1$$

$$N = 157$$

This power analysis indicates that a minimum of 132 participants are necessary for the study to achieve an acceptable power of 0.80 and 157 for a power of 0.90. The numbers indicate how large the sample should be to decrease the risk of a type two error. In other words, the probability of correctly rejecting the null hypothesis when it is not true (Polit, 2010).

### **Instrumentation: Variables and their measurement**

The following is a description of the self-report instruments that were used to measure the variables of interest in the parent study.

### ***Social Support***

The **Support Behaviors Inventory** (SBI) shortened version (Brown, 1986) is also a subscale of the Prenatal Psychosocial Profile (PPP) (Curry, Campbell, & Christian, 1994). This inventory is an eleven item satisfaction appraisal scale. Items are descriptions of behaviors that would likely be interpreted as supportive, helpful, or caring. A sample of statements includes: “Shows interest in my daily activities and problems”, “Takes me seriously when I have concerns”, and “Lets me know that he/she will be around if I need assistance”. In its original version, each item is rated on a scale of 1-6 with 1 being very dissatisfied and 6 being very satisfied (Brown, 1986). Likert scaling assumes that distances on each item are equal. This measurement tool is unique in that it has the ability to provide three scores; “partner”, “other”, and total support satisfaction. The form used in the parent RCT was nearly identical in structure with the exception of minor wording modifications and the numbering of the Likert responses. Item responses were scored on a numeric scale ranging from 0-4; 0 being very dissatisfied and 4 being very satisfied. Respondents specified their level of satisfaction for the series of statements. By virtue of the instrument’s intent and in accordance with the guidelines established by the instrument’s author (personal communication, Dr. Marie Annette Brown, January, 2013), summated scores for “partner” and “other” support of the Support Behaviors Inventory were used for analysis as separate variables. It would be unlikely that every participants had a “partner” and that all participants had an identified “other” to be supportive. Therefore, in summing scores for “partner” support, any mother who could not rate a partner received a zero score for that scale. Likewise, in

summing scores for “other” support any mother who could not rate an “other” received a zero score as their response. Each respondent could receive a summed score for each of two support domains as described above. In this data set, at week twelve, Cronbach’s Alpha for “Other” support had a number of items equal to 11 with an  $n$  of 141 and an alpha of 0.87. The “Partner” support scale had a number of items equal to 11 with an  $n$  of 133 and an alpha of 0.92. A total sum score was not used in this analysis. Because of the variation observed in support among the participants, some recoding of the variables was necessary to account for all 174 individuals available at the twelve week assessment.

### ***Fatigue***

The **Modified Fatigue Symptom Checklist** (MFSC). Originally created to assess fatigue in Japanese industry workers (Yoshitake, 1978), the instrument was modified by Pugh (1993) using ordinal responses for the assessment of fatigue in the intrapartum population. It was further modified by Milligan, Parks, Kitzman and Lenz (1997) for use in assessing postpartum fatigue. Idiomatic language changes were made for clarity in English speaking subjects. The later modification became the version that was subsequently used in the parent study of this secondary analysis. The MFSC is a multidimensional scale that contains a “set of conceptually clear, discrete symptoms, formulated on the premise that fatigue is manifested in a variety of subjective qualities that occur together” (Milligan et al., 1997, p. 4). The checklist consists of thirty experiential statements related to how an individual may feel physically or mentally if they were fatigued. Participants either affirm or deny experiencing the symptom described within the past week. Sample statements include: “My body feels tired”, I get

weary talking”, and “I can’t concentrate”. The measurement tool is dichotomously scored in which individuals are asked to respond to each statement in a yes or no fashion. For computational purposes “no” responses were assigned a value of 0 and “yes” responses were given a value of 1. Scores could therefore range from 0-30 with higher scores indicating greater levels of fatigue. In this sample, for internal consistency and reliability at week 12 Cronbach’s Alpha was 0.84, number of items was 30,  $n = 174$ .

### ***Anxiety***

The **State-Trait Anxiety Inventory** (STAI) (Spielberger, Gorsuch, & Lushene, 1970). This inventory consists of two separate 20- item self-report questionnaires; one measuring state anxiety (temporary) “right now at this moment” and the other trait anxiety (characteristic). A modified version of the State Anxiety (with wording modifications) was utilized. Each item is rated on a four point Likert scale; “not at all” (1) to “very much” (4). Scores range from 20-80 with higher scores indicating greater anxiety. Sample statements for response include: “I feel nervous”, “I am worried”, “I feel indecisive”. Ten of the twenty statements are positively worded and required reverse coding. For example:” I feel calm”, I feel content”. Participants were instructed to rate how they felt at the present moment. The Trait Anxiety portion of this inventory was not included. In this sample, Cronbach’s Alpha was the measure for internal consistency at week twelve (0.89), number of items was 20,  $n = 170$ .

### ***Depression***

The **Center for Epidemiologic Studies Depression Scale** (CES-D) (Radloff, 1977). This measurement tool is a widely used measure of depressive symptoms. The

CES-D consists of 20 statements that are rated on how often in number of days during the past week the respondent felt or behaved as each statement described. For example: “I had crying spells”, I felt sad”. Each item was rated by the participant by selecting one of four categories and responses were subsequently assigned a numeric code (0-3) for computational purposes. Scoring was as follows: <1 day = 0, 1-2 days = 1, 3-4 days = 2, and 5-7 days = 3. An individual score could range from 0-60. Higher scores indicate a greater number of depressive symptoms. A score of 16 or greater has been established as the cut-off for defining an individual as depressed (Radloff, 1977) and will be adhered to for this study. The responses to items 4, 8, 12, and 16 have been reverse coded for scoring purposes. Within the parent study, depression was measured at five separate time points (baseline and weeks 12, 24, 36, & 52). The CES-D has a high internal consistency with  $\alpha$  coefficients ranging from 0.85-0.90; test-retest reliability  $r = 0.45 - 0.70$  (Radloff, 1977). For this cross-sectional analysis at week twelve, the Cronbach’s Alpha was 0.89, number of items = 20,  $n = 174$ .

### ***Maternal Perception of Infant Temperament***

**Bates Infant Characteristics Questionnaire (ICQ)** (Bates, Freeland, & Lounsbury, 1979), fussy-difficult subscale. The ICQ is comprised of four subscales: fussy-difficult, unadaptable, dull, and unpredictable. The tool in its entirety consists of twenty-nine items that are participant rated on a seven point Likert scale. Only the fussy-difficult characteristic was measured in the parent RCT. In its original form, the fussy-difficult subscale has an identified test-retest reliability of  $r = 0.70$  and an internal consistency of  $\alpha = 0.79$  (Hubert, Wachs, Peters-Martin, & Gandour, 1982). It is

comprised of nine items that measure infant mood. Five of the nine items were chosen for measurement of infant temperament and were further modified in wording by the authors of the parent study. The five-item version has a reported Cronbach's Alpha of 0.82 (Milligan et al., 1997). In the parent study, the first measurement occurred at twelve weeks postpartum. In this secondary analysis, at week twelve the reliability coefficient, Cronbach's alpha, was found to be 0.77, number of items = 5,  $n = 174$ . The fussy/difficult rating is the sum of scores for five items with each item rated on a 1-7 point Likert scale. Scores can range from a total of 5-35 with higher scores indicating a greater degree of difficult temperament. A sample question includes: "Babies differ in how much they fuss and cry. If a rating of one is a baby who fusses very little and a rating of seven is a baby who fusses a lot (with a rating of four being in the middle as a baby who fusses the average amount), how would you rate your infant?" Cut-off scores to categorize infants as non-difficult or difficult are based on the works of Campbell (1979) and Mantymaa (2006). Sum scores above the 85<sup>th</sup> percentile of the distribution of the fussy/difficult scores, which is equal to approximately +1 standard deviation from the mean, denotes a temperamentally difficult infant.

Table 3 summarizes the measurement instruments and week twelve reliability coefficients.

Table 3

*Reliability of Instruments – Alpha Coefficients Week 12*

| Scale of Measurement                       | # of Items | Cronbach's Alpha |
|--|------------|------------------|
| Modified Fatigue Symptom Checklist         | 30         | .843             |
| State-Trait Anxiety Inventory              | 20         | .889             |
| CES-D (Depression Scale)                   | 20         | .888             |
| Support Behaviors Inventory                |            |                  |
| • Partner                                  | 11         | .919             |
| • Other                                    | 11         | .874             |
| Bates Infant characteristics Questionnaire | 5          | .773             |

**The Pilot Study**

A pilot study conducted on this twelve week data set in 2011 by this author (unpublished) evaluated depression (as an outcome variable) and the correlation of fatigue, anxiety and social support (“partner” and “other”). The results of that analysis revealed correlational relationships among these psychosocial variables within this population.

**Background:** The concept of ‘symptom clusters’ has emerged as a way to conceptualize mediating factors of disease states. Fatigue and anxiety have been identified as a symptom cluster related to postpartum depression (PPD). Data from the NINR funded randomized controlled trial conducted by Pugh et al. (2010) were analyzed

with regard to social support's interaction in buffering fatigue and anxiety on postpartum depression.

**Purpose:** The purpose of the secondary data analysis was to assess for the correlation of life factors including anxiety, fatigue, and social support with PPD and to test the predictive value of these variables within the study subsample ( $n = 174$ ) of urban, low-income women that were primarily young (58% age 20-29), black (88%), and first-time mothers (50%). A second purpose was to test whether or not social support buffered the effects of the predictive variables.

**Methodological Approaches:** A secondary analysis of data from a randomized controlled clinical trial with mother infant dyads recruited from two urban hospitals. Dyads were randomly placed in either an intervention group who received visits, telephone and pager support from a breastfeeding support team or usual-care ( $n = 328$ ).

**Findings:** A regression analysis revealed that sixty-one percent of the variance in depression scores at 12 weeks postpartum could be attributed to anxiety, fatigue and social support in this subsample of low-income mothers. When fatigue and anxiety were interacted with “other” support, “other” support had a significant interaction with anxiety ( $p = 0.46$ ), but not fatigue ( $p = .081$ ) as a predictor of postpartum depression at twelve weeks postpartum. The results indicated that the structured intervention of continuous access to breastfeeding support may have contributed to a decrease in anxiety but not fatigue, which are common unpleasant symptoms encountered by breastfeeding mothers. Table 4 shows a summary of the pilot study correlations.

Table 4

*Pilot study correlations*

| <b>Variable</b>                           | <b>Pearson<br/>Correlation</b> | <b>Sig. (1-<br/>tailed)</b> |
|---|--------------------------------|-----------------------------|
| Week 12 Anxiety Score                     | .762                           | .000                        |
| Week 12 Fatigue Score                     | .534                           | .000                        |
| Week 12 ‘Other’ Support Satisfaction      | -.298                          | .000                        |
| Int. Wk 12 Anxiety /Wk 12 ‘Other’ Support | .572                           | .000                        |
| Int. Wk 12 Fatigue/ Wk 12 ‘Other’ Support | .455                           | .000                        |

*Notes.* Dependent Variable- Week 12 Depression Scores

### **Data collection procedures**

Permission to conduct this study was granted by the George Mason University Institutional Review Board. This study is an exploratory, secondary analysis stemming from a larger randomized controlled trial. For the parent study, data were collected at various predetermined time points over a 52 week period either during a home visit or by telephone interview. The time period of interest for this secondary analysis of data is twelve weeks postpartum. At twelve weeks, data were collected via telephone interview by trained peer counselors.

### **Data Analysis**

Data were analyzed using SPSS (Statistical Package for the Social Sciences) Version 21.0 (IBM Corp., 2011). In an effort to control Type I errors, statistical

inferences were based on the results of analyses with a significance level of  $p < 0.05$ .

This standard level of significance is widely accepted and corresponds to a 95% confidence interval. This means that there is a 95% probability that the true null will be accepted and 5% probability that the true null will be rejected (Polit, 2010).

Research question 1 is a prediction analysis and as such was answered using a multiple regression. The significantly correlated study variables were placed in a regression analysis to identify those that significantly predicted maternal perception of infant difficultness. The variables were added to the regression analysis collectively in one block. The  $R^2$  change was observed for each variable, and its associated significance value. This was done to identify the most influential and significant predictors amongst the independent variables in predicting maternal perception of infant difficultness. The method of analysis included testing of the assumptions necessary for the regression analysis to be valid. The assumptions of multiple regression include: 1) independence of observation errors, 2) a linear relationship between predictor and dependent variable, 3) homoscedasticity of residuals, 4) absence of multicollinearity, 5) no significant outliers or influential points, and 6) a normal distribution of residuals (Cohen, Cohen, West, & Aiken, 2003). Scatterplots, figures, and tables were used to identify satisfaction of the assumptions and are presented in Chapter 4 and Appendix A. The benefit of a regression analysis is being able to predict the value of the dependent variable if we know the actual value of the independent variable. This can be modeled using a regression equation:

$$\hat{Y} = B_0 + B_1X_1 + B_2X_2 + \dots + B_kX_k \text{ (Mertler \& Vannatta, 2005).}$$

Research question 2 is an inquiry of the possible buffering effect of the social support variables. The moderating influences of social support were assessed through sequential (Hierarchical) regression analysis. The significant predictor variables of the multiple regression described above for research question 1 were again regressed using an interaction product with “partner” and “other” support. An evaluation of the interaction term and its significance was used to determine the presence of any moderating effects of the support variables. Using Andrew Hayes’s PROCESS tool (Hayes, 2013) a simple slopes analysis was conducted to further explain any moderating effects of the support variables. Results of these analyses are reported in Chapter 4 and Appendix A.

### **Summary**

The purpose of this study was to undertake a secondary analysis of twelve week data to explore the psycho-physiologic variables, fatigue, anxiety, depression and social support in an effort to develop a greater understanding of their relationship to maternal perception of difficult infant temperament in low-income, urban, minority mothers. The chosen variables relate to measurement tools that were used to collect data during the implementation and evaluation of a breastfeeding support team intervention. A pilot study identified strong intercorrelations among the variables of interest. The data will be used in regression and moderator analyses to identify any significant predictors of maternal perception of infant difficulty and moderating effects of social support satisfaction. Additional insight to how we might best assist postpartum women,

especially those without adequate resources, can only serve to better the mother/infant bond and alleviate maternal distress in the early period following childbirth.

## **CHAPTER 4**

### **ANALYSIS OF DATA**

#### **Introduction**

From October 2003 through December 2005, an interventional study was undertaken to evaluate the effects of a breastfeeding support team on assisting low-income, urban, postnatal women to sustain exclusive breastfeeding for at least six months in accordance with one Healthy People 2010 goal (Pugh et al., 2010). The data set that was analyzed for this twelve week cross-sectional analysis was comprised of sub-portions of the above referenced study. Psycho-physiologic variables were evaluated using several well validated tools that were described at length in Chapter 3. Fatigue, anxiety, depression, social support and maternal perception of infant difficultness were the primary focus of this secondary analysis of data.

The purpose of this chapter is to present the analytical findings that provide answers to the main research questions. The questions that this chapter will answer are:

At twelve weeks postpartum, within a cohort of low-income, urban, minority mothers who initiated breastfeeding and were assigned to a group receiving a breastfeeding intervention or care as usual:

1. Among fatigue, anxiety, depression, social support satisfaction, and significant demographic variables, what predicts maternal perception of fussy/difficult infant

temperament? How much of the variation in perceived infant difficultness can be explained by any of the predictor variables?

2. Does satisfaction with social support have any influence on fatigue, anxiety and/or depression in prediction of maternal perception of infant difficultness?

It is hypothesized that fatigue, anxiety and depression play a predictive role in the way a mother perceives her infant as temperamentally difficult. Further, satisfaction with social support provided by a “partner” or “other” may moderate the effects of any predictor variables on maternal perception of infant difficultness.

The general organization of chapter four is as follows:

- A description of the characteristics of the twelve week sample stratified by group assignment.
- Establishment of similarity of groups; chi-square and t-test.
- Correlation analysis of the major study variables.
- Regression of dichotomous demographic variables for observance of significant predictors of MPID.
- Testing the assumptions of multiple regression.
- Description of significant results of the multiple regression.
- Identification of the significant predictors of maternal perception of infant difficultness.
- Hierarchical regression of significant predictors and social support variables with interaction term.

- Identification of significant interactions among the predictor variables and the social support variables.
- Identification of any moderating effects of social support satisfaction and simple slopes analysis.

### **Description of the sample**

The sample used for this twelve week time point secondary analysis was comprised of the maximum number of cases available. Univariate statistics were run on the five major study variables and select demographic variables. SPSS statistical software program 21.0 (IBM, Inc., 2012) was used to conduct all statistical analyses. Upon crosstab evaluation of the major study variables, all displayed valid cases equal to 174. According to the power analysis conducted in chapter three, to achieve a power of 0.90 the minimum sample required is 157. With an  $n = 174$ , this study's sample size is adequate enough to achieve a power of 0.90.

### **Sample Demographics**

The available sample at twelve weeks had a near equal amount of participants in each group; intervention (85, 49%) and control (89, 51%). The overall sample was predominantly Black (87%), single (83%), twenty-one to thirty years of age (50%), and experiencing their first pregnancy (46%). They were fairly well educated with about one-third reporting High School/GED (37%) or one to four years of college (35%) as their highest level of education.

Four demographic variables were recoded into dichotomous “dummy” variables for use in chi square and subsequent regression analyses. Highest level of education was

grouped by “college or not”. If participants indicated any college through graduate degree, they received a score of “1”. All others indicating less education (high school diploma or equivalent, or less) received a score of “0”. The marital status variable was recoded as “married or not”; yes = “1”, all other descriptors (single, separated, divorced, and widowed) = “0”. Gravidity was grouped by “first pregnancy or not”. The word gravidity means the number of times that a woman has been pregnant, regardless of the outcome. First time pregnant participants received a score of “1”. Those who identified themselves as having had more than one pregnancy (2 or greater) received a score of “0”. The type of delivery variable was recoded “C-section or not”. If the participant delivered her baby via abdominal incision, she received a score of “1”. A vaginal delivery (spontaneous or assisted) received a score of “0”.

As Table 5 illustrates, the demographic characteristics of the twelve week sample were relatively similar in composition.

Table 5

*Demographics – Week 12 Sample, N = 174*

| Characteristic   |                     | Intervention<br><i>n</i> = 85 (49%) | Control<br><i>n</i> = 89 (51%) |
|------------------|---------------------|-------------------------------------|--------------------------------|
| Age (years)      |                     |                                     |                                |
|                  | 13-20               | 32 (18)                             | 36 (20)                        |
|                  | 21-30               | 43 (25)                             | 43 (25)                        |
|                  | 31-43               | 10 (6)                              | 10 (6)                         |
|                  | Mean (years)        | 23.27                               | 22.91                          |
|                  | Median (years)      | 22.00                               | 22.00                          |
|                  | Mode (years)        | 20                                  | 18                             |
| Race/Ethnicity   |                     |                                     |                                |
|                  | Black/Afr. American | 76 (44)                             | 74 (43)                        |
|                  | American Indian     | 1 (0.5)                             | 2 (1.1)                        |
|                  | White               | 4 (2.3)                             | 8 (4.6)                        |
|                  | Latina/Hispanic     | 4 (2.3)                             | 5 (2.8)                        |
| Marital Status   |                     |                                     |                                |
|                  | Married             | 19 (11)                             | 11 (6)                         |
|                  | Not-married         | 66 (38)                             | 78 (45)                        |
| Education        |                     |                                     |                                |
|                  | College             | 35 (20)                             | 32 (18)                        |
|                  | No college          | 50 (29)                             | 57 (33)                        |
| Gravidity        |                     |                                     |                                |
|                  | First Pregnancy     | 42 (24)                             | 38 (22)                        |
|                  | Not first pregnancy | 43 (25)                             | 51 (29)                        |
| Type of Delivery |                     |                                     |                                |
|                  | Cesarean Section    | 22 (13)                             | 20 (11)                        |
|                  | Not C-section       | 63 (36)                             | 69 (40)                        |

*Notes.*

Based on a priori assumptions about childbearing women three months following birth, five demographic variables were selected for exploration in an effort to identify any

co-predictors of MPID. They were: maternal age, education, marital status, gravidity, and type of delivery. Maternal age, being a continuous variable was entered into a correlation analysis with the other interval level variables. The other demographic variables, being categorical, were not appropriate for Pearson correlation analysis and so were made dichotomous and analyzed in a separate exploratory regression analysis.

Related to the striking similarities between the intervention and control groups at twelve weeks, several statistical tests were performed to observe for any significant differences among the variables by group assignment. A Chi-square test for association was performed between the dichotomous demographic variables and group assignment (control /intervention). The assumptions of the Chi-square test were met by each listed variable. All variables were categorical coming from a randomized sample. Values for the variables were dichotomized to make them mutually exclusive. Each variable had a minimum of five occurrences in each category. The analysis did not reveal any significant difference between groups (control or intervention) in relation to education, marital status, gravidity, or type of delivery. Chi-square values and their significance are displayed in Table 6.

Table 6

*Chi-square analysis of demographic variables based on group assignment*

| Variable                     | $X^2$ value | $p$ value |
|------------------------------|-------------|-----------|
| Education (college or not)   | 0.501       | .479      |
| Marital status (married/not) | 3.043       | .081      |
| Gravidity (1st regnancy/no)  | 0.789       | .374      |
| Delivery (C-Section or not)  | 0.276       | .599      |

*Notes.*  $df = 1$ ; significance  $p < .05$

The major study variables were then evaluated by group assignment. The ordinal level, Likert scale variables (anxiety, depression, infant temperament, and social support scales) were made interval level by using summated (total) scores. Fatigue, which was a yes/no response, was coded 0/1; 0 for a “no” response and 1 for a “yes” response and then summated.

An independent t-test was conducted to compare the means of the major study variable sum scores by group assignment. In observing Table 7, it is noteworthy to acknowledge the striking similarity of mean scores between groups throughout. Interestingly, the intervention group was slightly more fatigued, anxious and depressed at twelve weeks as compared to the control group. They also had a slightly higher mean score for perceived infant difficultness. The control group tended to be a little more satisfied with their partner’s support, while the intervention group was narrowly more

satisfied with the “other” support that they received. Overall, both groups tended to rate the support that they received from an identified “other” as more satisfying than the support that they received from a “partner”. However, the mean sum scores for each variable were not significantly different between the intervention and control groups.

Table 7

*Comparison of major study variable mean sum scores – Independent T-test, Week 12 Sample, n = 174*

| Variable<br>(Possible<br>Score) | Group<br>Assignment | Mean  | SD    | <i>t-value</i> | <i>Sig. p &lt; .05</i> |
|---------------------------------|---------------------|-------|-------|----------------|------------------------|
| Fatigue<br>(0-30)               | Intervention        | 6.02  | 4.53  | 1.130          | .260                   |
|                                 | Control             | 5.24  | 4.66  |                |                        |
| Anxiety<br>(20-80)              | Intervention        | 30.19 | 10.07 | 0.724          | .470                   |
|                                 | Control             | 29.17 | 8.48  |                |                        |
| Depression<br>(0-60)            | Intervention        | 10.92 | 10.27 | 0.353          | .725                   |
|                                 | Control             | 10.40 | 8.90  |                |                        |
| MPID<br>(5-35)                  | Intervention        | 12.71 | 5.56  | 0.573          | .567                   |
|                                 | Control             | 12.19 | 6.25  |                |                        |
| “Partner”<br>(0-44)             | Intervention        | 27.06 | 17.14 | -0.227         | .820                   |
|                                 | Control             | 27.64 | 16.59 |                |                        |
| “Other”<br>(0-44)               | Intervention        | 31.78 | 16.03 | 0.087          | .931                   |
|                                 | Control             | 31.56 | 16.40 |                |                        |

*Note.* SD = standard deviation

In summary, because the parent data set was from a randomized controlled trial utilizing intervention and control groups, it was necessary to first establish any significant differences between the two groups to serve as a guide for analysis. In relation to the major study variable mean scores, sample demographics, and Chi-square analysis, the groups appear more similar than different. In addition, based on the breastfeeding variable (the major dependent variable of the parent study), while a significantly greater number of mothers in the intervention group were still exclusively breastfeeding their infants at six weeks, by week twelve, there was no significant difference between the groups. As reported by Pugh et al. (2010), no effect of the intervention (breastfeeding support) was observed as far as significant difference in breastfeeding continuation (breastfeeding or not) between the control and intervention groups at week twelve. Therefore, based on the logic of the above discussion, it was surmised that the entire twelve week sample could be analyzed collectively versus by group assignment.

### **Identification of significant relationships**

In building the prediction model, it was first necessary to explore for significant relationships among the major study variables. Pearson correlation coefficients were calculated for the relationships between participants' sum scores of perceived level of fatigue, anxiety, depression, social support satisfaction ("partner" and "other"), and infant difficulty (MPID).

The maternal age demographic variable was analyzed with the predictor and criterion variables as a continuous variable. Group assignment was included for

demonstrative purposes. Degrees of freedom were equal to  $n-2$ . Table 8 illustrates the results.

Table 8

*Bivariate correlations between predictor and criterion variables*

|                   | 1     | 2       | 3       | 4       | 5       | 6     | 7     |
|-------------------|-------|---------|---------|---------|---------|-------|-------|
| 1. Group          | --    |         |         |         |         |       |       |
| 2. Fatigue        | -.086 |         |         |         |         |       |       |
| 3. Anxiety        | -.055 | .537*** |         |         |         |       |       |
| 4. Depression     | -.027 | .528*** | .775*** |         |         |       |       |
| 5. MPID           | -.044 | .234**  | .238**  | .250*** |         |       |       |
| 6. "Partner" Sat. | .017  | -.168*  | -.134   | -.164*  | -.010   |       |       |
| 7. "Other" Sat.   | -.007 | -.063   | -.146*  | -.202** | -.119   | .120  |       |
| 8. Maternal Age   | -.032 | .142    | -.051   | -.082   | -.234** | -.117 | -.096 |

*Notes.* \* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$

Among the five major study variables, strong intercorrelations were displayed between fatigue and anxiety ( $r(172) = .537, p < .001$ ), fatigue and depression ( $r(172) = .528, p < .001$ ), and depression and anxiety ( $r(172) = .775, p < .001$ ) indicating significant linear relationships among the three variables. Fatigued participants tended to be more anxious and depressed. Depression and anxiety displayed the strongest

correlation indicating that those participants who were depressed had a high likelihood of also being anxious. The coefficient of determination revealed that 29% of the variance in anxiety and 28% of the variance in depression could be explained by maternal fatigue ( $r^2 = .288, .279$  respectively). Sixty percent of the variance in depression scores could be attributed to maternal anxiety ( $r^2 = .601$ ).

A significant weak positive relationship was found between maternal perception of infant difficultness and fatigue, anxiety, and depression ( $r(172) = .234, p < .01$ ;  $r(172) = .238, p < .01$ ;  $r(172) = .250, p < .01$ ) respectively. The more anxious, fatigued and/or depressed the mother, the greater likelihood of her perceiving her infant as more temperamentally difficult. The coefficient of determination ( $r^2$ ) for these variables revealed that fatigue ( $r^2 = .055$ ), anxiety ( $r^2 = .057$ ) and depression ( $r^2 = .06$ ) each explained about six percent of the variance in maternal perception of infant difficultness scores.

Participants who could identify a supportive “other” were less likely to be depressed. A significant weak negative relationship ( $r(172) = -.202, p < .01$ ) was found between depression and “other” support satisfaction. The association between “other” and anxiety ( $r(172) = -.146, p = .054$ ) was negligible. Four percent of the variance in depression ( $r^2 = .041$ ) and two percent of the variance in anxiety ( $r^2 = .021$ ) could be attributed to satisfaction with support of an identified “other”.

“Partner” support satisfaction displayed an inverse relationship with fatigue ( $r(172) = -.168, p < .05$ ) and depression ( $r(172) = -.164, p < .05$ ) at twelve weeks postpartum. Participants who were fatigued and depressed were likely also less satisfied

with the support that they received from their “partner”. A very small, but significant relationship was found. Three percent of the variance in both fatigue ( $r^2 = .028$ ) and depression ( $r^2 = .027$ ) could be explained by “partner” support satisfaction. Participants were not, however, likely to be less anxious ( $r(172) = -.134, p = .077$ ) if they were satisfied with the support they received from their “partner”. Interestingly, the social support variables did not display any significant correlations with maternal perception of infant difficultness. Group assignment had no significant relationship with any of the variables.

Subsequently, dichotomized demographic variables were entered into a regression analysis to observe for any that may be significant predictors of MPID. The overall regression was not statistically significant;  $F(4, 169) = 1.473, p = .212$ . Further only 1% of the variance in MPID could be explained by this group of variables (adjusted  $R^2$ ). None of the variables were found to be significant predictors. Beta coefficients and significance are reported in Table 9.

Table 9

*Summary multiple regression of dichotomous demographic variables*

| Variable                      | <i>B</i> | <i>SE<sub>B</sub></i> | $\beta$ | <i>Sig.</i> |
|-------------------------------|----------|-----------------------|---------|-------------|
| College or not                | -1.096   | 0.943                 | -.091   | .247        |
| Married or not                | -0.778   | 1.218                 | -.050   | .524        |
| C-Section or not              | -0.627   | 1.046                 | -.046   | .550        |
| 1 <sup>st</sup> pregnancy/not | 1.542    | 0.902                 | .130    | .089        |

*Notes.* Dependent variable – MPID; significance -  $p < .05$

Based on the previous analyses, significantly correlated variables were used in regression analyses to answer the research questions posed by this study.

## **Results**

The findings of each research question are presented in the following section.

### ***Research Question 1***

Among fatigue, anxiety, depression, social support satisfaction, and significant demographic correlates what predicts maternal perception of fussy/difficult infant temperament? How much of the variation in perceived infant difficultness can be explained by any of the predictor variables?

This research question was answered using a multiple regression analysis.

### **Multiple Regression Analysis**

A single block multiple regression was run to identify significant predictors of MPID among the previously established significantly correlated variables. The five

independent variables and one significantly correlated demographic variable were entered simultaneously into a multiple regression analysis. The summated scores for fatigue, anxiety, depression, “partner” and “other” support satisfaction and MPID were used. The maternal age variable was used as continuous.

While the design of the parent study was a randomized controlled trial, it is acknowledged that it was not necessary to control for group assignment in this twelve week secondary analysis. This is true related to the relative similarity demonstrated between the intervention and control groups at the twelve week time point as discussed previously within this chapter.

### **Testing the Assumptions of Multiple regression**

The data were analyzed for independence of cases, detection of unusual points and normality of residuals. The results are reported and displayed in the following section.

#### ***Independence of cases***

Independence of observations was assessed by observing the Durbin-Watson statistic which is a “measure of autocorrelation of errors over the sequence of cases” (Tabachnick & Fidell, 2007, p. 128). A value of approximately two (2.0) indicates no correlation between residuals. As evidenced by a Durbin-Watson statistic of 1.966 it can be stated that there was independence of residuals.

#### **Linearity**

Multiple linear regression assumes that there is a linear relationship between the predictor variables and the dependent variable. In evaluating the distribution of values in

scatter plot Figure A1 (Appendix A), the relationship between Studentized residual values and unstandardized predicted values relatively form a horizontal band. The same is true for independent variable partial regression plots (Figures A2-7). The partial regression plots for fatigue, anxiety, depression, “partner” and “other” support variable sum scores and maternal age displayed approximate linear relationships with maternal perception of infant difficulty as noted in each partial regression plot. This indicated that the relationship between the independent and dependent variables was likely to be linear. As a rule, scatterplots should also be free of any extreme bivariate outliers (Warner, 2013). Several outliers can be observed and were acknowledged in other assumption tests.

#### Homoscedasticity

The assumption of homoscedasticity of variance states that “the variance of  $Y$  scores should be the same at each level of  $X$ ” (Warner, 2013, p. 164). The residuals should be spread equally over the predicted values of the dependent variables, otherwise the assumption of homogeneity of variance is violated. If the residuals are evenly spread, it can be stated that homoscedasticity is present. Observe Figures A2-7 in Appendix A which are scatterplots of the predictor variables.

#### Multicollinearity

Multicollinearity refers to the degree to which predictor variables are intercorrelated (Warner, 2013). Independent variables should not have correlations greater than 0.7. Depression sum and anxiety sum scores correlation was slightly above the recommended limit with an observed correlation of 0.775 as shown in the correlation

Table 8. All other significant correlations were less than 0.7. In addition, collinearity statistics, tolerance and variable inflation factor (VIF) were evaluated. “Tolerance is the proportion of variance in X that is not predictable from other predictor variables already in the equation...A tolerance of 1.0 indicates that a variable is completely uncorrelated with other predictors” (Warner, 2013, p. 1121). All tolerance values were observed to be greater than 0.1 (the lowest is .364). The variable inflation factor (VIF) is the reciprocal of tolerance, i.e. if tolerance is high then VIF should be low (Munro, 2005). VIF’s less than ten (10) indicate the absence of multicollinearity amongst the data. The highest VIF observation was 2.745. Therefore, the assumption was satisfied. It can therefore be stated that multicollinearity was not present.

### ***Unusual points***

#### **Outliers**

SPSS identified two potential outliers that were greater than + 3 standard deviations (a commonly used cut-off criteria) indicating that a residual may represent an outlier. In returning to the data and examining the Studentized deleted residuals for values + or – 3 standard deviations, accordingly, the two cases were found to be slightly greater than three standard deviations above (with the highest being +3.71); no cases were observed to be less than -1.69. Rather than excluding the potential outliers at that point, it was decided to retain the cases and observe their behavior as far as leverage value and/or influence and consider all of the measures together.

### Leverage points

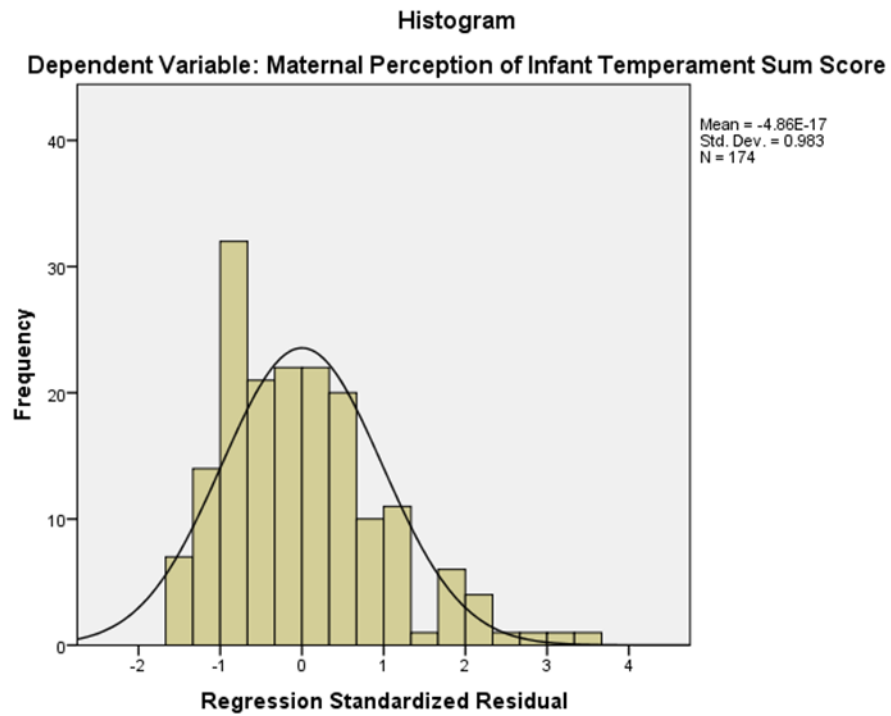
Returning to the data the variable “leverage value” (LEV\_1) was sorted in descending order. Leverage values less than 0.2 can be considered safe. The highest leverage value within the data set was found to be 0.12. No cases were identified as having a larger than desired leverage value of  $< 0.2$ . Leverage values of  $> 0.2$  indicate highly influential cases that potentially may change the slope of the regression by a large amount if dropped from the analysis (Warner, 2013). In this data set, there were no leverage values above the “safe” value of 0.2.

### Influential points

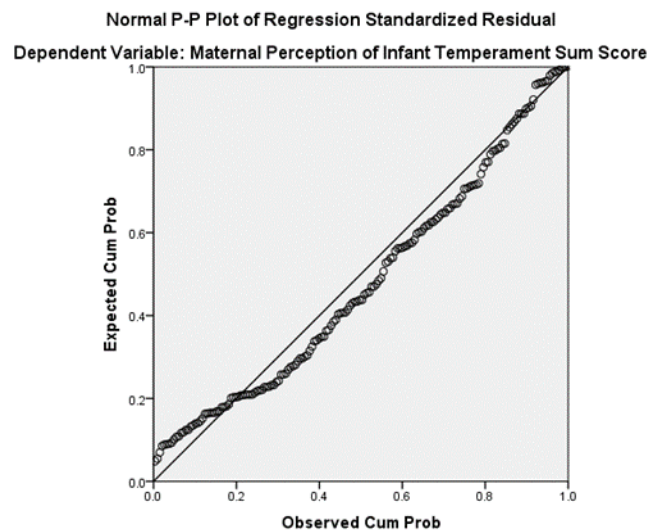
The data were inspected for Cook’s Distances above one (1.0) to determine if any cases were influential. None were found in this data set. All were found to be 0.126 or less. It was then determined that there are no highly influential points among the assessed variables.

### ***Normality of Residuals***

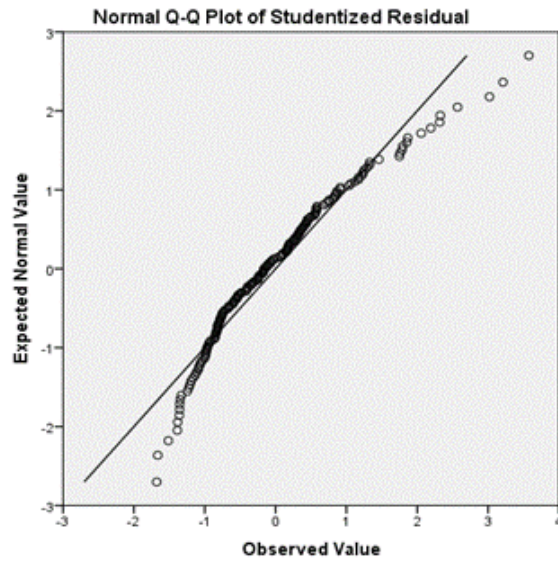
The errors in a prediction analysis, called the residuals, must be normally distributed to be able to specify statistical significance from inferential statistics. The assumption of normality was verified using two separate methods: observation of a histogram with superimposed normal curve and plots of regression residuals. It is apparent from the histogram below that the standardized residuals appear to be approximately normally distributed (Figure 4). As a way of confirming the findings, P-P and Q-Q Plots were created and can be observed in Figures 5 & 6.



*Figure 4.* Histogram of standardized regression residuals.



*Figure 5.* P-P plot of regression residuals.



*Figure 6.* Q-Q plot of regression residuals.

Normally distributed residuals will have associated points that align along the diagonal line. The regression analysis is relatively robust to deviations from normality, and only requires that the distribution of residuals be approximately normal. In observing the P-P and Q-Q Plots, the points are not in exact alignment with the diagonal line. The residuals, however, follow the line closely enough to indicate that they are relatively normal and the regression analysis may proceed. There is no evidence of violation of the assumption of normality and, therefore, no data transformations needed to take place.

The assumptions of regression analysis were met as per above. The multiple regression output was subsequently evaluated for overall significance and significant predictors of maternal perception of infant difficulty.

## Regression Analysis

A multiple regression was calculated to predict participants' perception of infant difficultness based on their ratings of fatigue, anxiety, depression, social support satisfaction ("other" and "partner") and maternal age. The assumptions of linearity, independence of errors, homoscedasticity, unusual points and normality of residuals were met. A significant regression equation was found,  $F(6, 167) = 4.969$ ,  $p = .000$ , adjusted  $R^2 = .121$ , representing a small effect size (Cohen's 1988 classification). This tells us that 12.1% of the variance in maternal perception of infant difficultness could be explained by this regression model. Fatigue and maternal age were the best predictors of maternal perception of infant difficultness and added statistically significantly to the prediction ( $p \leq .05$ ) of maternal perception of difficult infant temperament. Regression coefficients and standard errors can be found in Table 10.

The general form of the equation to predict maternal perception of infant temperament from the independent variables is:

$$\begin{aligned} \text{Predicted maternal perception of infant difficultness} = & 17.023 + (0.269 * \text{fatigue}) \\ & + (0.035 * \text{anxiety}) + (0.034 * \text{depression}) - (0.042 * \text{other}) + (0.009 * \text{partner}) - (0.277 \\ & * \text{maternal age}) \end{aligned}$$

Table 10

*Summary of Multiple Regression Analysis*

| Variable            | <i>B</i> | <i>SE<sub>B</sub></i> | $\beta$  |
|---------------------|----------|-----------------------|----------|
| Intercept           | 17.023   | 2.866                 | --       |
| Maternal Age (yrs.) | - 0.277  | 0.078                 | -0.265** |
| Fatigue             | 0.269    | 0.115                 | 0.210*   |
| Anxiety             | 0.035    | 0.074                 | 0.055    |
| Depression          | 0.034    | 0.073                 | 0.055    |
| “Partner” Support   | 0.009    | 0.026                 | 0.024    |
| “Other” Support     | -0.042   | 0.027                 | - 0.115  |

*Notes.* \*  $p < .05$ ; \*\* $p < .001$ ; *B* = unstandardized regression coefficient; *SE<sub>B</sub>* = standard error of the coefficient;  $\beta$  = standardized coefficient

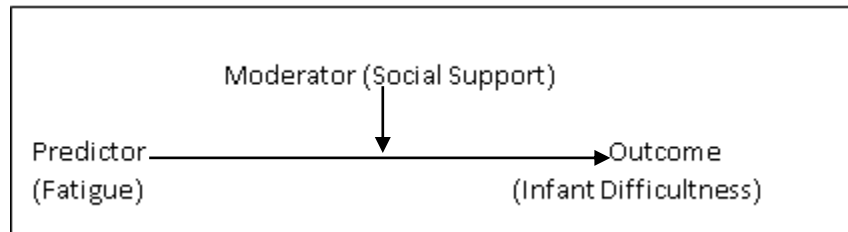
***Research Question 2***

Does satisfaction with social support have any influence on fatigue, anxiety, and/or depression in prediction of maternal perception of difficult infant temperament?

Once it was determined that fatigue and maternal age were the best predictors of maternal perception of infant difficultness among the research variables (see regression analysis for research question 1), they were then used in a hierarchical regression for moderator analysis.

“A moderator is a variable that specifies conditions under which a given predictor is related to an outcome. The moderator explains *when* a dependent and independent variable are related. Moderation implies an interaction effect, where introducing a

moderating variable changes the direction or magnitude of the relationship between two variables” (Moderation, n.d.).



*Figure 7.* Moderation model

To determine whether a certain variable influences or is related to the size of one variable’s effect on another, a moderation analysis (also known as interaction) is the proper analytical strategy (Hayes, 2013). To test the hypothesis that maternal perception of infant difficultness is a function of multiple risk factors, and more specifically whether being satisfied with the support provided by an identified “partner” or “other” moderates the relationship between maternal fatigue and maternal perception of infant difficultness, a hierarchical multiple regression analysis was conducted.

### **Moderation Analysis**

In creating the moderation regression analysis, after first entering maternal age, into the second block two variables were added: fatigue and “partner” support satisfaction sum scores. These variables significantly accounted for a portion of the variance in maternal perception of infant difficultness,  $R^2 = .128$ ,  $\Delta F(2, 170) = 7.115$ ,  $p = .001$ . Subsequently, an interaction term between fatigue and the “partner” support variable was

created. This interaction term was added to the regression model (block 3), which also significantly added to the variance explained in maternal perception of infant difficulty,  $\Delta R^2 = .036$ ,  $R^2 = .163$ ;  $\Delta F(1, 169) = 7.199$ ,  $p = .008$ . The interaction term, Fatigue x Partner, displayed a  $B$  coefficient = 0.014,  $t(169) = 2.68$ ,  $p < .01$ . Thus the null hypothesis that the slope ( $B$  coefficient) is equal to zero was rejected. The research hypothesis that a relationship exists between the interaction term (fatigue x “partner” support satisfaction) and maternal perception of infant difficulty was supported.

The overall relationship between the independent and dependent variables was observed in the ANOVA table. Model 2 without the interaction term was significant  $F(3, 170) = 8.298$ ,  $p < .001$ . Model 3 with the interaction term was also significant  $F(4, 169) = 8.250$ ,  $p < .001$  supporting the research hypothesis that there is a statistically significant relationship between the set of independent variables and the dependent variable.

In analyzing the Model Summary table, Model 3 with the interaction between fatigue and “partner” support satisfaction accounted for significantly more variance than just fatigue and “partner” support alone,  $R^2$  change = .036,  $p = .008$ , indicating that there existed potentially significant moderation between fatigue and partner support satisfaction on maternal perception of infant difficulty. In the overall model, 14.4% (adjusted  $R^2$ ) of the variance in maternal perception of infant difficulty could be attributed to the predictor variables.

Since there was a potentially significant moderation effect, a regression was run on the centered terms to examine the effect. Andrew Hayes’ PROCESS command (Hayes, 2013) was used to analyze for moderating effects attributed to the social support

variables. Analysis of the PROCESS model revealed the following: In this sample, at twelve weeks postpartum, fatigue was a highly significant predictor of maternal perception of infant difficulty ( $p = .0001$ ). Maternal age was also a highly significant predictor of maternal perception of infant difficulty ( $p = .0000$ ). Partner support was not identified as a significant predictor of maternal perception of infant difficulty ( $p = .985$ ). The interaction of fatigue x partner support satisfaction significantly moderated the relationship between fatigue and MPID ( $p = .010$ ). A  $p$  value of  $< .05$  indicated that significant moderation had occurred (See Table A1 in Appendix A).

Simple slopes analysis revealed that at low levels of “partner” support satisfaction there is no moderation between fatigue and MPID ( $p = .1044$ ). However, progressing through the continuum of “partner” support satisfaction, the relationship between fatigue and MPID goes from negative and non-significant to positive and highly significant ( $p = .0001$ ) as observed in the conditional effects table (Table A1, Appendix A). This indicates that moderation between fatigue and MPID occurs at higher levels of satisfaction with “partner” support.

The interaction plot (Figure 8) displays a visual representation of “partner” support satisfaction and the moderating effects between fatigue and maternal perception of infant difficulty. “Partner” support was observed to buffer the effects of maternal fatigue on perception of infant difficulty at moderate to high levels of satisfaction.

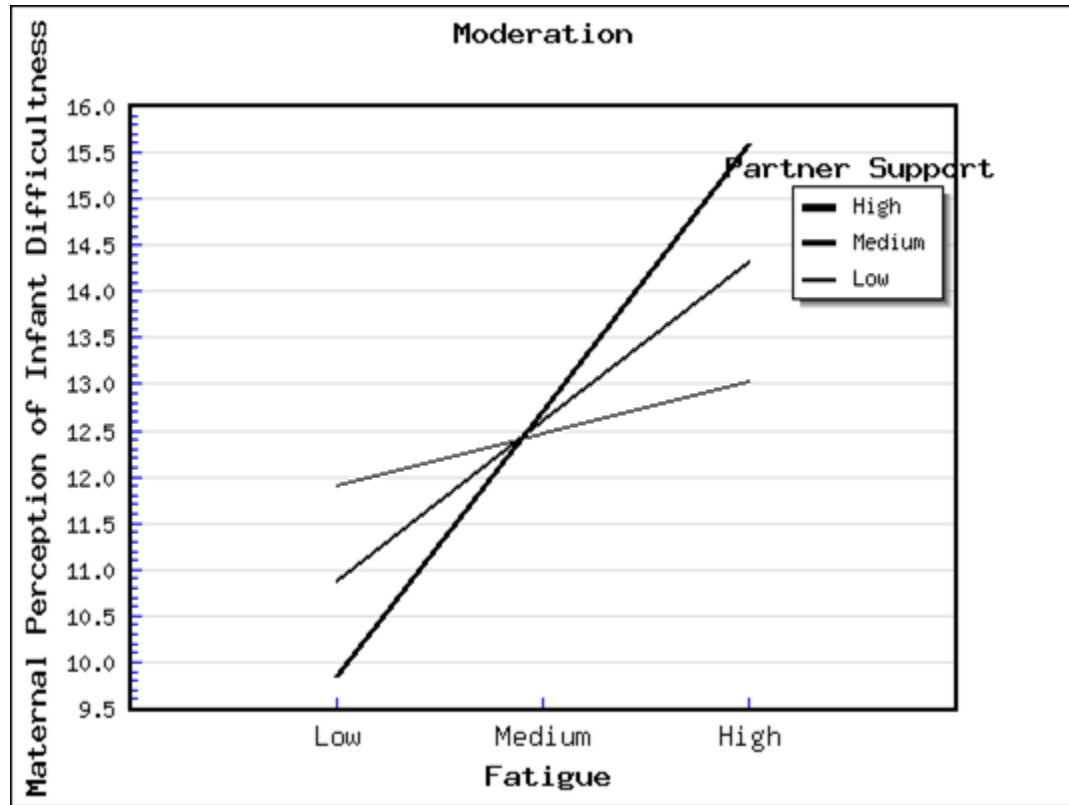


Figure 8. Moderating effects of “partner” support satisfaction.

The same process was repeated replacing “partner” support satisfaction sum score with “other” support satisfaction sum score in the regression model. With maternal age entered into block one, in the second block, two variables were included: fatigue and “other” support satisfaction. These variables accounted for a significant amount of variance in maternal perception of infant difficulties,  $R^2 = .144$ ,  $\Delta F(2, 170) = 8.910$ ,  $p = .000$ . An interaction term between fatigue and the “other” support variable was created. This interaction term was added to the regression model (block 3), which also accounted for a significant proportion of the variance in maternal perception of infant difficulties,  $\Delta R^2 = .019$ ,  $\Delta F(1, 169) = 3.834$ ,  $p = .052$ . The  $B$  coefficient was  $-0.012$ ,  $t(169) = -1.96$ ,

$p = .05$ . Therefore, the research hypothesis that a relationship exists between the interaction term (fatigue x “other” support satisfaction) and maternal perception of infant difficulty is supported.

The overall relationship between the dependent and independent variables was again found to be significant. Analysis of variance revealed that both models with and without the interaction term were highly significant; Model 2 without the interaction term  $F(3, 170) = 9.56, p < .001$ . Model 3 with the interaction term  $F(4, 169) = 8.25, p < .001$ .

In analyzing the Model Summary, Model 3 with the interaction between fatigue and “other” support accounted for significantly more variance than just fatigue and “other” support alone,  $R^2$  change = .019,  $p = .052$ , indicating that there is potentially significant moderation between fatigue and “other” support satisfaction on maternal perception of infant difficulty. In this model, 14.4% of the variance in maternal perception of infant difficulty can be attributed to the predictor variables using the conservative adjusted R square value.

In examining the PROCESS model (Appendix A, Table A2), fatigue is a highly significant predictor of maternal perception of infant difficulty ( $p = .0003$ ). Maternal age is a highly significant predictor of maternal perception of infant difficulty ( $p = .0000$ ). “Other” support is a significant predictor of maternal perception of infant difficulty ( $p = .05$ ). In the model, “other” support satisfaction significantly moderates the relationship between fatigue and maternal perception of infant difficulty ( $p = .0452$ );  $p < .05$  indicating that there has been significant moderation.

Simple slopes analysis revealed that at low levels of “other” support satisfaction there is significant moderation between fatigue and MPID ( $p = .0001$ ). However, progressing through the continuum of “other” support satisfaction, the relationship between fatigue and MPID goes from negative and highly significant to positive and non-significant ( $p = .0835$ ) as observed in the conditional effects table (Appendix A, Table A2). This indicates that moderation between fatigue and MPID occurs at low to moderate levels of satisfaction with “other” support.

The interaction plot (Figure 9) displays a visual representation of “other” support satisfaction and the moderating effects between fatigue and maternal perception of infant difficulty. “Other” support was observed to buffer the effects of maternal fatigue on perception of infant difficulty at low to moderate levels of satisfaction.

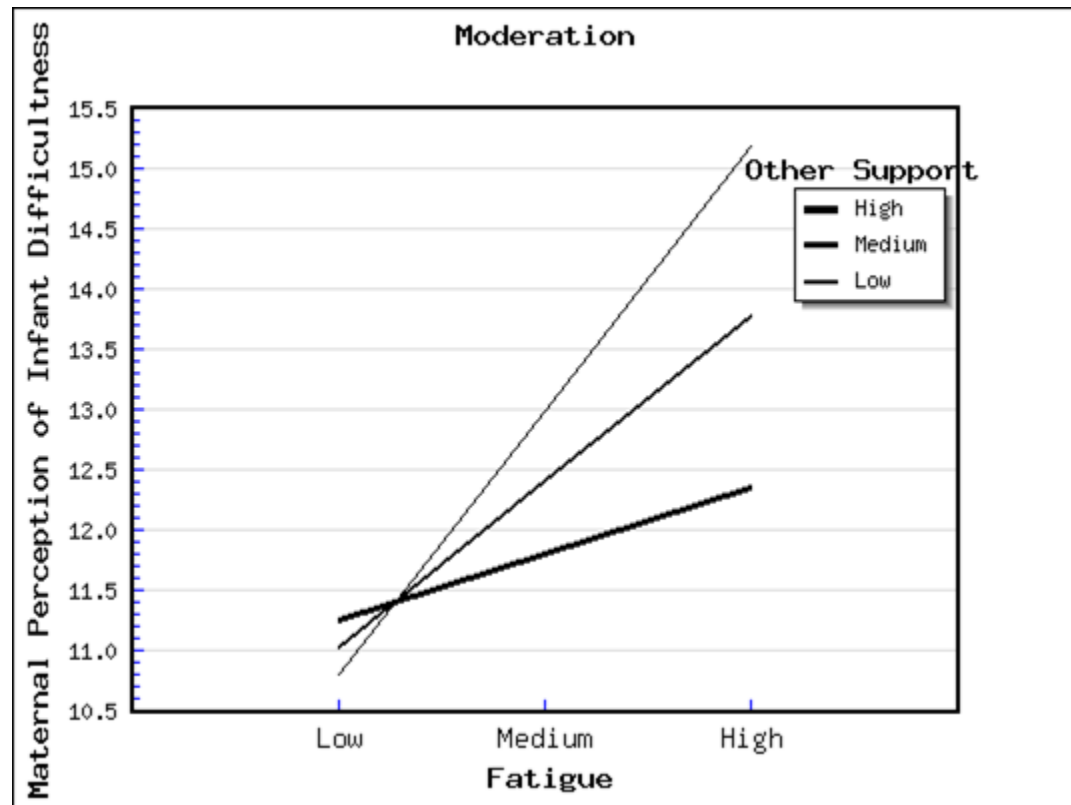


Figure 9. Moderating effects of “other” support satisfaction.

## Summary

In this chapter, a secondary analysis of data was conducted to explore predictors of maternal perception of infant difficultness in low-income, urban, minority mothers at twelve weeks postpartum. The variables fatigue, anxiety, depression, social support satisfaction (both “partner” and “other”) and maternal age were entered into a multiple regression analysis. The results indicated that the overall model significantly predicted maternal perception of infant difficultness and accounted for 12% of the variance in the criterion variable. However, fatigue and maternal age were the two predictors that significantly contributed to the model. In a subsequent hierarchical regression analysis

for moderation, the social support variables, both “partner” and “other” satisfaction subscales, were found to moderate the relationship between maternal fatigue and maternal perception of infant difficulty. Through a simple slopes analysis, the social support variables were observed to moderate at different levels. Low to moderate levels of “other” support satisfaction buffered the relationship between maternal fatigue and maternal perception of infant difficulty while moderate to high levels of “partner” support satisfaction buffered the same relationship. While they were significantly correlated with the criterion variable, anxiety and depression within this regression model were not predictors of maternal perception of infant difficulty.

## **CHAPTER 5**

### **FINDINGS, CONCLUSIONS AND IMPLICATIONS**

#### **Introduction**

An exploratory investigation, as a secondary analysis of data, was undertaken to better understand the relationship among the psycho-physiologic correlates fatigue, anxiety, depression and social support and their relationship to maternal perception of infant difficultness in low-income, urban, minority postpartum mothers. The data were part of a larger randomized controlled trial investigating the use of a breastfeeding support team as an intervention to promote increased duration of breastfeeding (Pugh et al., 2010). A data set was created by selecting relevant week twelve variables from the original data set. A multiple regression was performed to identify which independent variables significantly predicted maternal perception of infant difficultness. An interaction term was introduced to identify any moderating effects of the social support variables. Group assignment (intervention or care as usual) had no significant correlation with any study variable. Further, through Chi-square analysis of demographic factors by group, it was determined that the two groups were not statistically significantly different from each other and so were analyzed collectively as one combined sample.

The theory of unpleasant symptoms (Lenz et al., 1997) was the theoretical framework upon which this study was based. The theory originated as a framework for

the study of childbearing fatigue (Pugh & Milligan, 1993). The TOUS was an excellent model for this study as the results substantiated the basic precepts of the framework. An identified situational factor (maternal age) influencing the intensity, quality, timing of fatigue, anxiety and depression (the symptoms) were shown to influence (be predictive of) maternal perception of infant difficultness (performance factor) in a regression model. Social support (in the form of “partner” and “other” satisfaction) was shown to be a moderating factor along the line of influence between one symptom—fatigue—and maternal perception of infant difficultness (See Figure 2).

An extensive review of literature was conducted for the purpose of clarification of the major study independent variables (fatigue, anxiety, depression, and social support) and to gain a better understanding of what is currently known about their relationship to the dependent variable (maternal perception of difficult infant temperament) and each other. For each study variable, literature was examined specifically in relation to childbearing women in the postpartum period. Because these variables tend to occur in combination they are often studied together. The most notable gap in the literature was the lack of research related to social support and its relationship to maternal perception of infant temperament. Further, no studies were found that specifically explored the concept of social support as a buffer between the predictor variables and maternal perception of difficult infant temperament, bringing novelty to this study’s design. Fatigue, anxiety and depression have been studied as both outcomes and predictors of fussy/difficult infant temperament. The flow of this inquiry was the later. Fatigue literature examined causes, correlates, relief interventions and the role of social support. Anxiety literature

focused on predisposing factors and the comorbid relationship it shares with depression. There was a voluminous amount of depression literature specific to postnatal women as its study spans decades. The primary focus was on occurrence following childbirth, incidence, risk factors, causes, effects and disclosure challenges. Social support literature identified classification, who can provide, forms of community support, and its relationship to depression. Perceived infant temperament literature clarified its definition, challenges associated with the fussy/difficult infant, and challenges and controversy in measurement techniques.

### **Descriptives**

The twelve week sample consisted of postpartum women who were 87% Black, 83% single, 45% having their first child and 50% between ages twenty-one and thirty years with a near equal distribution of the participants between the intervention and control groups. Although significantly smaller than the original recruitment number (174/328), *Chi-square* analysis comparing the intervention and control groups on several demographic factors (education, marital status, gravidity, and type of delivery) did not display any significant differences between the groups and therefore, the sample was analyzed using the full complement of available week twelve participants.

### **Discussion and Conclusions**

#### ***Research Question 1***

Among fatigue, anxiety, depression, social support satisfaction, and significant demographic correlates, what predicts maternal perception of fussy/difficult infant

temperament? How much of the variation in perceived infant difficulty can be explained by any of the predictor variables?

The outcome variable of this study was maternal perception of infant temperament, specifically the fussy/difficult characteristic. In an effort to gain a deeper understanding of this construct, based on relevant research, four independent variables were chosen from the selected data set to be explored: fatigue, anxiety, depression, and social support. In accordance with the existing literature and preliminary investigation, the independent variables fatigue, anxiety and depression were found to have strong positive significant correlations amongst themselves and moderate positive significant correlations with maternal perception of infant temperament. “Other” support satisfaction had a small significant negative correlation with anxiety ( $-0.146, p = .05$ ) and depression ( $-0.202, p = .008$ ), but not fatigue ( $-0.063, p = .407$ ). As satisfaction with the support of an “other” increased, anxiety and depression decreased. Similarly, “partner” support satisfaction displayed a small significant negative correlation with fatigue ( $-0.168, p = .026$ ) and depression ( $-0.164, p = .031$ ), but not anxiety ( $-0.134, p = .077$ ). As satisfaction with the support of a “partner” increased, fatigue and depression decreased. These variables have been studied in a multitude of combinations and their significant associations are well documented throughout several decades of dedicated research. Neither “partner” nor “other” support were significantly correlated with maternal perception of infant difficulty.

In citing the most recent literature, Giallo et al. (in press) reported that younger mothers are more likely to report higher levels of fatigue than older mothers at three

months postpartum. Further, another recent study using a longitudinal design, and the theory of unpleasant symptoms as a theoretical framework (Loutzenhiser, McAuslan, & Sharpe, 2015), investigated fatigue in 108 Caucasian mother-father couples. The variables maternal fatigue, maternal age and infant temperament behaved similarly in a more privileged population indicating that the postpartum experience may be more similar than different among mothers of varying socioeconomic status and ethnicity. There were three significant findings that are in support of this study. 1) High levels of fatigue are prevalent following the birth of a first child with younger mothers reporting higher levels of fatigue at three months postpartum. 2) Mothers with poorer psychological functioning (such as when experiencing depression) have an association with fatigue in the early postpartum period. 3) Infant characteristics, such as negativity, are strongly associated with maternal fatigue during the first three months postpartum.

A multiple regression analysis was conducted to determine the best model fit among the variables in the prediction of maternal perception of infant difficulty. When all of the independent variables were placed collectively into the regression, fatigue and maternal age were found to significantly predict maternal perception of infant difficulty.

Mother's age (in years) was the most significant predictor of maternal perception of infant difficulty ( $B = -0.278, p = .000$ ), followed by maternal fatigue ( $B = 0.266, p = .022$ ). Anxiety ( $B = .034$ ), depression ( $B = .035$ ), "partner" ( $B = .009$ ) and "other" ( $B = -.042$ ) support exhibited very low  $B$  coefficients and were statistically non-significant. This regression model explains 12% of the variance in maternal perception of difficult

infant temperament. These study findings suggest that the younger the mother and the greater her fatigue the more likely she is to perceive her infant as temperamentally difficult.

This secondary analysis makes a significant contribution to what is already known about maternal perception of infant difficultness in that it validates previous research. It has been identified, but not the common thought, that fatigue precedes perception of infant difficultness. While there may be truth to both, this study adds to the concept of a maternal factor preceding perceptions of difficult infant behavior. More often than not, it is fussy infant temperament that is reported to precede reports of maternal fatigue. The findings are consistent with Milligan et al. (1990) who found that after controlling for depression, a significant relationship exists between difficult infant temperament rating and higher levels of maternal fatigue. Infant difficulty was shown to have a mild, positive relationship with fatigue at six and twelve weeks postpartum. However, in that particular study, no direction of association was identified.

Current research continues to support the relationship between maternal fatigue and a mother's perception of infant difficultness. Loutzenhiser, McAuslan, and Sharpe (2015) studied one hundred-eight mother-father couples to assess fatigue and its correlates in each parent over the course of pre-delivery through six months postpartum. A moderate relationship was found between maternal fatigue and infant difficultness (negativity) at three months postpartum  $r = 0.25$ , which is remarkably similar to the results of this study,  $r = 0.23$  at the same time point.

As part of a separate analysis not previously explained, the non-significant predictors (anxiety and depression) were regressed in a similar fashion to the method used for fatigue (maternal age, social support variable and social support interaction term). The overall models were significant when regressed independent of the other predictors: Anxiety with partner satisfaction ( $F(4,169) = 5.037, p = .001$ ), anxiety with other satisfaction ( $F(4,169) = 5.650, p = .000$ ); depression with partner satisfaction ( $F(4,169) = 5.138, p = .001$ ), depression with other satisfaction ( $F(4,169) = 5.738, p = .000$ ). The variables anxiety and depression are significant in separate regressions, but not in combination and there is no significant interaction with either social support variable. Further, there is no significant  $R^2$  change when added to the model indicating that there may be some overlap of construct. For anxiety x “partner” and depression x “partner”, based on the statistical test of the  $b$  coefficient, ( $t = .344, p = .732$ ;  $t = .147, p = .883$ , respectively) for the interaction variables, the null hypothesis that the slope is equal to zero is accepted and the research hypothesis that there is a relationship between the interaction variables and maternal perception of infant difficultness is not supported for anxiety or depression in any combination with the social support variables (anxiety x “other”,  $t = -0.128, p = .898$ ; depression x other,  $t = 0.631, p = .529$ ). Because anxiety and depression were non-significant predictors of maternal perception of infant difficultness in the combined model utilizing all study variables, they were not reported or used in any moderation analysis.

### ***Research Question 2***

Does satisfaction with social support have any influence on fatigue, anxiety, and/or depression in prediction of maternal perception of difficult infant temperament?

A separate hierarchical multiple regression analysis was conducted using the significant predictors from the regression model, maternal age and fatigue with the addition of an interaction term (social support satisfaction –both “partner” and “other”) to test the hypothesis that social support buffers fatigue in maternal perception of difficult infant temperament. Both “partner” support satisfaction and “other” support satisfaction were found to significantly moderate the effects of maternal fatigue on maternal perception of difficult infant temperament, but at varying levels. “Other” support buffered the effects of maternal fatigue on perception of infant difficultness at low to moderate levels of satisfaction, while “partner” support buffered at moderate to high levels of satisfaction.

There is a very interesting implication to the results of the moderation analysis. Among this group of low-income, urban, minority women at twelve weeks postpartum they needed to be moderately to highly satisfied with the support they received from their partner for the “partner” support to buffer the relationship between maternal fatigue and MPID. Perhaps the better news is that they did not have to be highly satisfied with the support of an “other” for other support to moderate the same relationship. Low to moderate levels of other support satisfaction were found to buffer the relationship between maternal fatigue and MPID.

Two studies were identified that speak to the importance of social support and maternal perception of difficult infant temperament. Kronstadt et al. (1979) surmised that support from family and friends (did not mention partner) in conjunction with maternal self-evaluative characteristics (temperament and parenting ability) affects how a mother perceives her infant's temperament. In a more recent study, Mantymaa et al. (2006) expressed that providing assistance to new mothers as an intervention to reduce parenting stress would be the most beneficial intervention in reducing a mother's negative perception of her infant. This study provides some suggestive support in favor of these previous findings and uniquely adds the various levels at which moderation occurs between fatigue and maternal perception of infant difficulty relative to "partner" and "other" support satisfaction.

### **Limitations**

The limitations of this study can be placed into three categories: Challenges related to 1) subjects, 2) data, and 3) measurement tools.

#### ***Subjects***

##### **Demographics and generalization**

The subjects of the study are limited to low-income, urban, minority (Black/Hispanic) women; a highly non-diverse sample, albeit by design. There is a lack of racial/ethnic and socioeconomic diversity in the study sample which will limit the generalizability of this study's findings. Therefore, the findings of this study are applicable to the specific population of low-income, urban, minority postpartum mothers. Further research is needed in more diverse populations.

## ***Data***

Problems with third party, secondary analysis.

The study was limited by the available data and the quality of the data.

Unfortunately, one of the frustrations of a secondary data analysis is the lack of history available to the researcher. For this particular data set, there were no available field notes or data coding/label dictionary for the major study variables. Information about the data set and its procurement was largely pieced together from what was either published in the primary analysis and pilot work of the original RCT or by recall from memory of members of the original research team. When the researcher is not involved in the data collection phase, there is some disadvantage. Any factors that may influence the study's outcome are hidden. In general, the secondary data researcher abdicates all control as to generation and recording of the original data set which can lead to difficulty understanding variable specifics in analysis and interpretation.

## ***Measurement***

In the study of perinatal women, it has been observed that standardized, self-report instruments are often used to measure maternal/child variables in the postnatal period. However, Rothbart & Goldsmith (1985) argued that there exists possible biases that may be inherent in parent report questionnaires; most notably, in maternal evaluation/report of infant temperament. In an extrapolation of the concept, the same biases have been argued to exist when mothers self-report their own psychosocial and physiologic status. It has therefore, been suggested that a more rigorous approach to measuring maternal characteristics of fatigue, anxiety, depression and an alternative to

self-report instruments is to use DSM-IV criteria which require interpretation by trained medical personnel. While this is an area of contention, the majority of studies similar to this one continue to use self-report measures related to their ease of implementation. As is the case with this data set, temperament assessment was captured by maternal report; although observational ratings are considered to be more reliable.

The Support Behaviors Inventory was a challenging scale to analyze. The ability to have three separate scores for analysis “partner”, “other”, and “total” make it a complex variable. For example, should it be considered one variable or two or three? Each total could ostensibly act as a separate subscale. In deciding how to best utilize it within an analysis, requires the researcher to make some very calculated decisions based on the design of the study and required analyses. Significant challenges exist especially in a secondary analysis where first-hand knowledge of any problems encountered in data collection or preparing the collected data for analysis are unknown.

It is perhaps also worth acknowledging the 47% attrition rate that occurred in the original study over the twelve week period of time. While quite large, it was not a limitation of this particular secondary analysis related to the cross-sectional design of the study. However, it would likely affect any time series analyses related to the parent RCT. In longitudinal studies, attrition rates are of concern to researchers because very large rates can bias the results of the study (Polit & Beck, 2012). The demographics of the sample may have been a contributing factor to the high attrition rate. In an investigation by Fernandez, Butler, and Eyberg (2011) it was identified that the socioeconomic status

of the participants (low-income, African American) predicted treatment dropout. This illustrates the difficulty of longitudinal studies in socially deprived populations.

### **Implications**

The study findings offer some interesting implications for the nursing of low-income, urban, minority postpartum mothers. The nursing community should be especially concerned about younger, first time mothers, of which the majority of the sample was comprised. As the results of the analysis indicated, those mothers who were younger and with higher fatigue, were more likely to rate their infant as temperamentally difficult. However, if they were satisfied with the support they received from a “partner” or “other,” the effects of the fatigue on perception of infant difficultness were buffered. The greatest concern, however, is that significant maternal fatigue may be detrimental to the health and development of the infant. There is literature to suggest that maternal fatigue coupled with perceived infant difficultness can lead to parenting difficulties and sometimes infant abuse (Giallo et al., 2013).

While this study was specific to postpartum women twelve weeks following delivery, it may be important to understand where fatigue begins because it likely affects fatigue later. As Loutzenhiser et al. (2015) pointed out, fatigue begins in the prenatal period, rapidly increases following birth and stays at consistently high levels throughout the postpartum period up to six months and sometimes beyond. One study identified fatigue as “lingering” up to eighteen months following childbirth (Parks, Lenz, Milligan, & Han, 1998). Given that fatigue has been identified as a common and significant problem for postpartum mothers, that is starts before birth, increases following, and

remains at significantly distressing levels for potentially a great length of time, it would be important to consider nursing interventions from birth through the postpartum continuum that would serve to alleviate fatigue and its sequelae. As such, postpartum nursing care in the hospital, following birth, may be contributing to the progression of fatigue and setting the stage for a strained mother/infant relationship following discharge and beyond, including the twelve week postpartum period.

One example of how nursing factors may perpetuate fatigue rather than alleviate it, is in a description of “baby-friendly” practices. Those who have recent experience in the nursing of postnatal women in the direct patient care setting, undoubtedly have been introduced to the concept of “baby-friendly” as a model of healthcare delivery. The *Baby-Friendly Hospital Initiative* exists to “promote, protect, and support breastfeeding” by following ten steps outlined by the United Nations Children’s Fund (UNICEF) and the World Health Organization (WHO) (Baby-Friendly USA, Inc.). The “Baby Friendly” initiative is a driving factor in many hospitals across the nation and all over the world. It is not uncommon for hospitals to be striving toward this designation. The premise of “baby-friendly” practices is largely related to the initiation and continuation of breastfeeding. This is supported by keeping the infant in close proximity to its mother; continually as indicated by step #7, “practice ‘rooming-in’—allow mothers and infants to remain together 24 hours a day” (Baby-Friendly USA, Inc.). As such, mothers are encouraged to keep their infant’s with them, in their hospital room, at all times. As compared to days gone by, hospital nurseries are utilized less frequently, and the option is not offered. Anecdotally and empirically, it has been observed that new mothers are

tired. Is the baby friendly practice a denial of a form of social support by an “other”?-- in keeping with the terms of this study. As McGrath et al. (2008) pointed out, there are supportive interventions that nurses can implement to assist with the promotion of synchrony between mother and infant. One such intervention suggested is to facilitate the increase of maternal sleep time. By facilitating rest for the mother, nurses could be the “other” support in this equation.

Through the present study, it was identified that specifically low to moderate levels of satisfaction with support by an “other” moderate fatigue in a mother perceiving her infant as temperamentally difficult. Perhaps the message here is that within this population, some help is better than no help. By not assisting these mothers fully, the fatigue-temperament strain may already be beginning to form. Subsequently, these women are discharged to a non-supportive home environment, already fatigued, to a community where support is hard to find (Landy, Sword & Valaitis, 2009). Is it any wonder that these mothers struggle and infants are being abused and neglected? Giallo et al. (2013) described the pathway leading from maternal fatigue to infant abuse in socioeconomically disadvantaged women with identified contributing factors of fatigue, being a first time mother, and infant crying.

### **Recommendations for Further Study**

Commensurate with the many studies preceding this one, the need for viable community support is apparent. Unfortunately, it has yet to be discovered a type of support that benefits postnatal women, is easy to access and implement, and is sustainable. Future research needs to focus on such community interventions. Whether it

is home visits, parent-to-parent support, telephone intervention, peer counseling, pre- and post-natal educational offerings, which have all been shown to be beneficial in their own ways, perhaps it is a combination of them that will work best. This is where future research should be focused. As healthcare providers, we are not there yet, as evidenced by the fact that postpartum mothers are still “in survival mode” (Giallo, Rose, Cooklin, & McCormack, 2013).

In light of the above, a recommendation for further study would be to investigate whether the strict adherence to the ten steps of the *Baby-Friendly Hospital Initiative* could be associated with factors contributing to maternal fatigue and subsequent maternal-infant relationship strain, vis-à-vis maternal perception of difficult infant temperament. Understanding issues that contribute to maternal fatigue in the early postpartum period as they exist within the practices of the Baby-Friendly designated hospitals, could make a meaningful improvement in the care we provide to mothers and their newborns in this practice setting.

Further, the results of this study underscore the dimension of fatigue and cognition in postnatal fatigue research. Previous studies have looked at fatigue and breastfeeding (Wambach, 1998), and fatigue and postpartum depression (Corwin et al., 2005). Research efforts should possibly be turned toward exploring fatigue and cognition; the implications of fatigue and how a mother perceives and thinks about her baby. An interesting, but possible link along the lines of maternal fatigue and cognition is adding to the exploration of negative thoughts in the postpartum period (Hall &

Holden, 2008; Hall & Papageorgiou, 2005). An identifiable possibility for future research.

Lastly, nursing implications for low-income, urban, minority mothers include focusing on specifically younger mothers and the prevention or assistance with minimizing fatigue. The support of an “other” person or “spouse” both appear to be beneficial, however, the efficacy is limited by perceived satisfaction. Because women do not have to be highly satisfied with “other” support for it to buffer the effects of fatigue in how a mother perceives her infant, any assistance would be beneficial. Perhaps the use of community volunteers, such as older experienced women assisting with household chores and providing times of rest for the new mothers by caring for the infant, thereby allowing the mother respite, may serve to bolster maternal reserve.

## **Conclusion**

This study adds to the body of knowledge associated with perinatal research. More specifically psycho-physiologic challenges facing postnatal women and their effect on the maternal/infant dyad. Through the analysis of two research questions and the exploration of secondary data, several interesting findings emerged from this study; 1) Social support is not significantly correlated with maternal perception of infant difficultness, yet it does significantly moderate the relationship between fatigue and maternal perception of infant temperament. 2) Maternal age significantly predicts maternal perception of infant difficultness. It is interesting that younger mothers are more likely to perceive their infant's as temperamentally difficult especially when fatigued. Maturity and/or life experience may play a part in how women cognate about

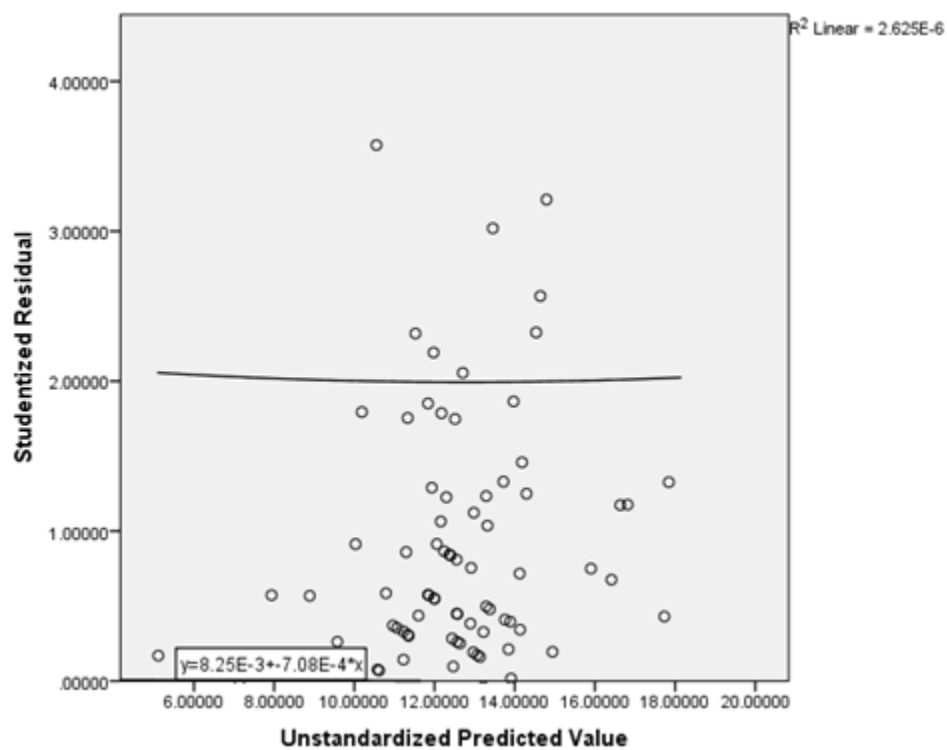
their infants. This highlights the need for education and mentoring by older and more experienced mothers or lay individuals. Further research should evaluate maturity and life experience as predictors of maternal perception of infant difficultness and if the effects of social support change as women mature.

Previous research has outlined interventions to decrease fatigue. Given the success of the intervention from the parent study, the outcome of this investigation determined that this is yet another reason to have lay individuals, nurse practitioners and home health nurses provide assistance to mothers in the postpartum period. Understanding that support acts as a buffer in how a mother perceives her infant's temperament when she is fatigued, it seem imperative that postnatal women have the support that they need.

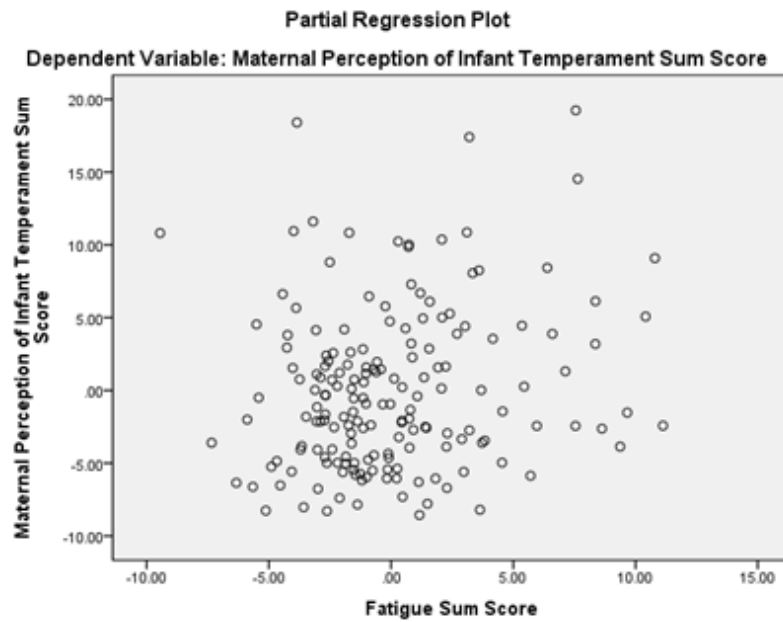
## APPENDIX A

### FIGURES AND TABLES

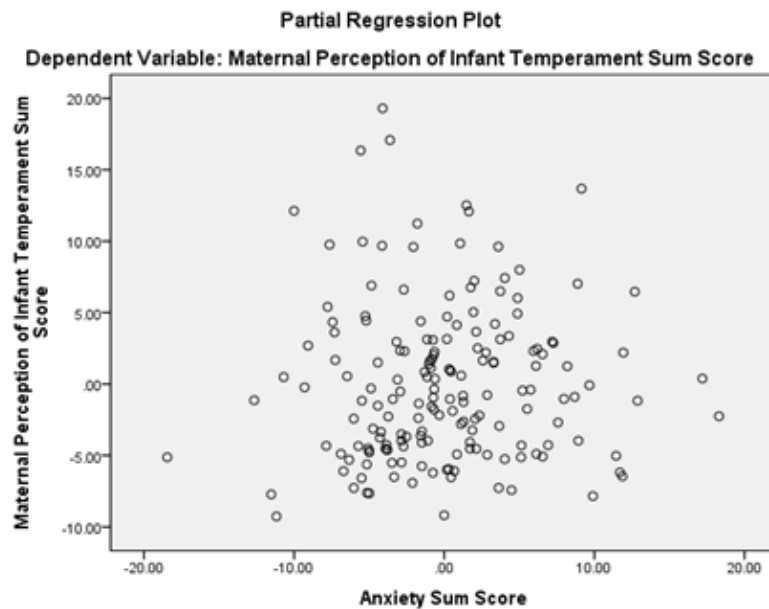
Testing the Assumption of Linear Relationships – Figures A1-A7



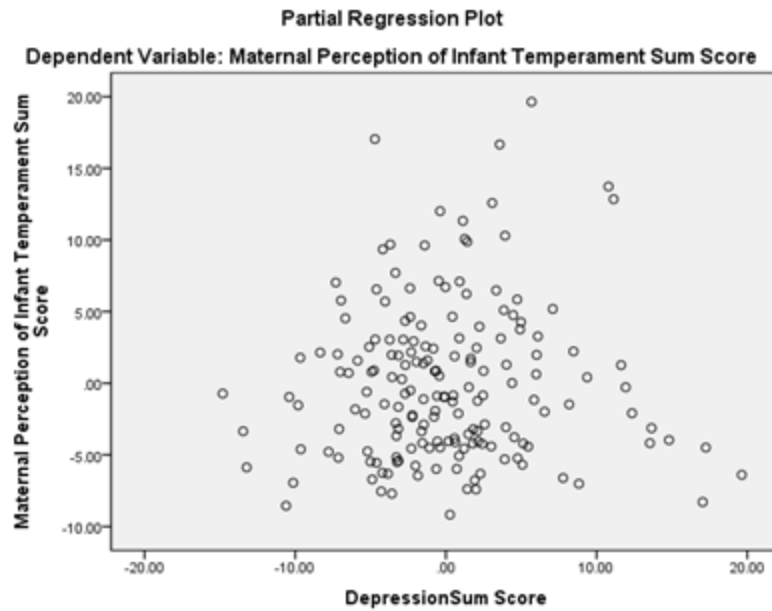
*Figure A1.* Scatter plot. Observing for a linear relationship between predictor variables and dependent variable. Superimposed 95% confidence interval.



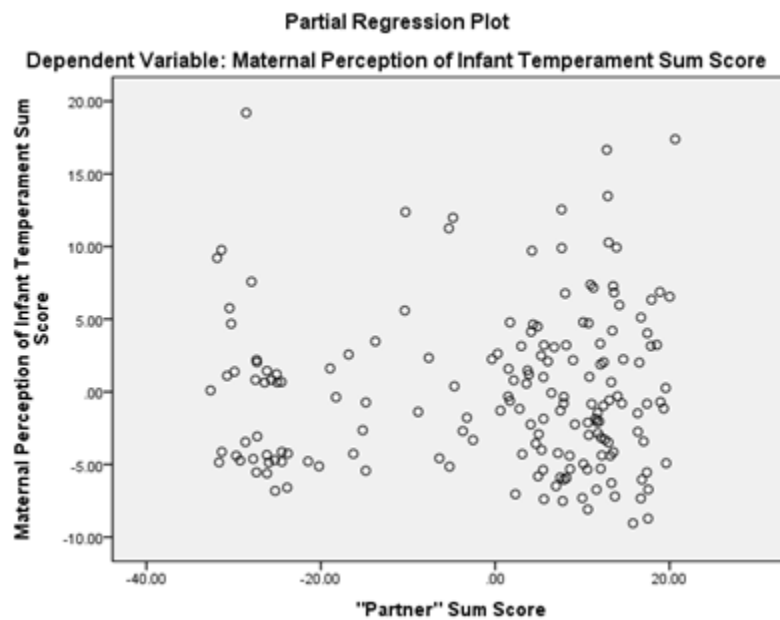
*Figure A2.* Partial regression plot observing for a linear relationship between fatigue and MPID.



*Figure A3.* Partial regression plot observing for a linear relationship between anxiety and MPID.



*Figure A4.* Partial regression plot observing for a linear relationship between depression and MPID.



*Figure A5.* Partial regression plot observing for a linear relationship between “partner” support and MPID.

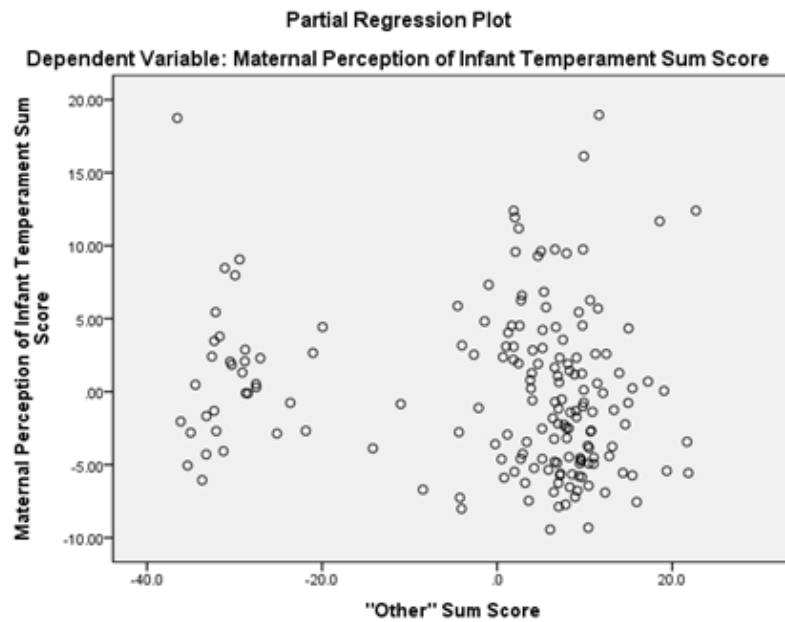


Figure A6. Partial regression plot observing for a linear relationship between “other” support and MPID.

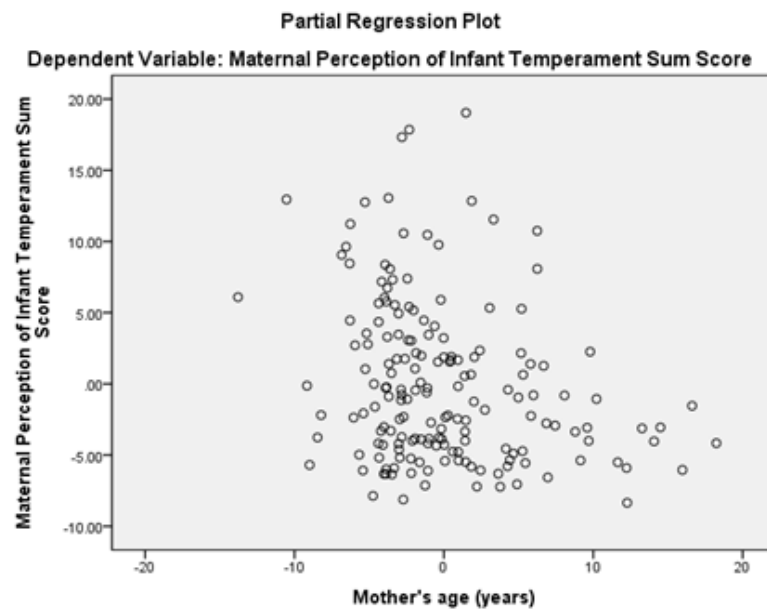


Figure A7. Partial regression plot observing for a linear relationship between maternal age and MPID.

Table A1

*Moderation Analysis Fatigue x Partner Support*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
 Documentation available in Hayes (2013). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model = 1  
 Y = w12InfantDifficultnessSum  
 X = w12FatigueSum  
 M = w12PartnerSum

Statistical Controls:  
 CONTROL= MaternalAge

Sample size  
 174

\*\*\*\*\*

Outcome: w12IDSum

Model Summary

| R     | R-sq  | MSE     | F      | df1    | df2      | p     |
|-------|-------|---------|--------|--------|----------|-------|
| .4042 | .1634 | 29.9056 | 9.7666 | 4.0000 | 169.0000 | .0000 |

Model

|          | coeff   | se     | t       | p     | LLCI    | ULCI    |
|----------|---------|--------|---------|-------|---------|---------|
| constant | 18.8720 | 1.6374 | 11.5255 | .0000 | 15.6396 | 22.1045 |
| w12PSum  | .0005   | .0270  | .0189   | .9849 | -.0528  | .0539   |
| w12FaSum | .4159   | .1043  | 3.9885  | .0001 | .2100   | .6217   |
| int_1    | .0139   | .0054  | 2.5940  | .0103 | .0033   | .0245   |
| mage     | -.2707  | .0629  | -4.3034 | .0000 | -.3949  | -.1465  |

Interactions:

int\_1 w12FaSum X w12PSum

\*\*\*\*\*

Simple Slopes Analysis

Conditional effect of X on Y at values of the moderator(s):

| w12PSum  | Effect | se    | t      | p     | LLCI   | ULCI  |
|----------|--------|-------|--------|-------|--------|-------|
| -16.8128 | .1819  | .1114 | 1.6325 | .1044 | -.0381 | .4019 |
| .0000    | .4159  | .1043 | 3.9885 | .0001 | .2100  | .6217 |
| 16.6437  | .6474  | .1592 | 4.0657 | .0001 | .3331  | .9618 |

Table A2

*Moderation Analysis Fatigue x Other Support*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)  
 Documentation available in Hayes (2013). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model = 1  
 Y = w12InfantDifficulttnessSum  
 X = w12FatigueSum  
 M = w12OtherSum

Statistical Controls:  
 CONTROL= MaternalAge

Sample size  
 174

\*\*\*\*\*

Outcome: w12IDSum

Model Summary

| R     | R-sq  | MSE     | F       | df1    | df2      | p     |
|-------|-------|---------|---------|--------|----------|-------|
| .4042 | .1634 | 29.9052 | 10.5619 | 4.0000 | 169.0000 | .0000 |

Model

|          | coeff   | se     | t       | p     | LLCI    | ULCI    |
|----------|---------|--------|---------|-------|---------|---------|
| constant | 19.3610 | 1.6346 | 11.8443 | .0000 | 16.1341 | 22.5879 |
| w12OSum  | -.0461  | .0236  | -1.9551 | .0522 | -.0926  | .0004   |
| w12FaSum | .3501   | .0937  | 3.7370  | .0003 | .1651   | .5350   |
| int_1    | -.0117  | .0058  | -2.0176 | .0452 | -.0231  | -.0003  |
| mage     | -.3020  | .0629  | -4.8034 | .0000 | -.4262  | -.1779  |

Interactions:

int\_1 w12FaSum X w12OSum

\*\*\*\*\*

Simple Slopes Analysis

Conditional effect of X on Y at values of the moderator(s):

| w12OSum  | Effect | se    | t      | p     | LLCI   | ULCI  |
|----------|--------|-------|--------|-------|--------|-------|
| -16.1719 | .5386  | .1314 | 4.0993 | .0001 | .2792  | .7979 |
| .0000    | .3501  | .0937 | 3.7370 | .0003 | .1651  | .5350 |
| 12.3333  | .2063  | .1185 | 1.7412 | .0835 | -.0276 | .4402 |

**APPENDIX B**

**INSTRUMENTS FOR VARIABLE MEASUREMENT**

Modified Fatigue Symptom Checklist (MFSC). Milligan, R., Parks, P., Kitzman, H., & Lenz, E. (1997). Measuring women's fatigue during the postpartum period. *Journal of Nursing Measurement*, 5, 3-16.



14731

**WEEK 12 DATA COLLECTION:  
DURATION AND COSTS**



**Fatigue**

Directions: "I'm going to read a list of things you may have generally experienced in the past week. For each one, please say 'yes' if you have experienced it." (If asked to clarify "generally" say "most of the time.")

|   | yes                   | no                    |                                    | yes                   | no                    |
|---|-----------------------|-----------------------|------------------------------------|-----------------------|-----------------------|
| 58. My head feels heavy.                      | <input type="radio"/> | <input type="radio"/> | 73. I am apt to forget things.     | <input type="radio"/> | <input type="radio"/> |
| 59. My body feels tired.                      | <input type="radio"/> | <input type="radio"/> | 74. I lack self-confidence.        | <input type="radio"/> | <input type="radio"/> |
| 60. My legs feel tired.                       | <input type="radio"/> | <input type="radio"/> | 75. I'm anxious about things.      | <input type="radio"/> | <input type="radio"/> |
| 61. I yawn a lot.                             | <input type="radio"/> | <input type="radio"/> | 76. I can't straighten my posture. | <input type="radio"/> | <input type="radio"/> |
| 62. My brain feels hot and muddled (spinning) | <input type="radio"/> | <input type="radio"/> | 77. I lack patience.               | <input type="radio"/> | <input type="radio"/> |
| 63. I am drowsy.                              | <input type="radio"/> | <input type="radio"/> | 78. I have a headache.             | <input type="radio"/> | <input type="radio"/> |
| 64. My eyes feel strained. (tired)            | <input type="radio"/> | <input type="radio"/> | 79. My shoulders feel stiff.       | <input type="radio"/> | <input type="radio"/> |
| 65. My movements are rigid or clumsy.         | <input type="radio"/> | <input type="radio"/> | 80. My back hurts.                 | <input type="radio"/> | <input type="radio"/> |
| 66. I am unsteady when standing. (wobbly)     | <input type="radio"/> | <input type="radio"/> | 81. It's hard to breathe.          | <input type="radio"/> | <input type="radio"/> |
| 67. I want to lie down.                       | <input type="radio"/> | <input type="radio"/> | 82. I'm thirsty.                   | <input type="radio"/> | <input type="radio"/> |
| 68. It's difficult to think.                  | <input type="radio"/> | <input type="radio"/> | 83. My voice is husky.             | <input type="radio"/> | <input type="radio"/> |
| 69. I get weary talking.                      | <input type="radio"/> | <input type="radio"/> | 84. I feel dizzy.                  | <input type="radio"/> | <input type="radio"/> |
| 70. I am nervous.                             | <input type="radio"/> | <input type="radio"/> | 85. My eyelids twitch.             | <input type="radio"/> | <input type="radio"/> |
| 71. I can't concentrate.                      | <input type="radio"/> | <input type="radio"/> | 86. My legs or arms tremble.       | <input type="radio"/> | <input type="radio"/> |
| 72. I am unable to get interested in things.  | <input type="radio"/> | <input type="radio"/> | 87. I feel ill.                    | <input type="radio"/> | <input type="radio"/> |



06/29/2004



State-Trait Anxiety Inventory (STAI). Spielberger, C., Gorsuch, R., & Lushene, R. (1970). *STAI manual for the state-trait anxiety inventory*. Palo Alto, CA: Consulting Psychologists Press.



**WEEK 12 DATA COLLECTION:  
DURATION AND COSTS**



Directions: "I am going to read a number of statements that people have used to describe themselves. Please tell me how you feel RIGHT now; that is, AT THIS MOMENT." There are no right or wrong answers. Give the answer that seems to best describe how you generally feel." Please refer to card one.

|   | Not at all            | Somewhat              | Moderately            | Very Much             |
|---|-----------------------|-----------------------|-----------------------|-----------------------|
| 91. I feel calm.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 92. I feel secure.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 93. I am tense.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 94. I feel strained. (pushed and pulled in every direction) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 95. I feel at ease.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 96. I feel upset.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 97. I am presently worrying over possible misfortunes.      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 98. I feel satisfied.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 99. I feel frightened.                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 100. I feel comfortable.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 101. I feel self-confident.                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 102. I feel nervous.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 103. I feel jittery.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 104. I feel indecisive. (unable to make a decision)         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 105. I feel relaxed.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 106. I feel content.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 107. I am worried   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 108. I feel confused  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 109. I feel steady. (balanced)                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 110. I feel pleasant.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Center for Epidemiologic Studies Depression Scale (CES-D). Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.



**WEEK 12 DATA COLLECTION:  
DURATION AND COSTS**



Directions: "I am going to read a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week."  
Please refer to card two.

|  | # of days: <1         | 1-2                   | 3-4                   | 5-7                   |
|--|-----------------------|-----------------------|-----------------------|-----------------------|
| 111. I was bothered by things that don't usually bother me.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 112. I did not feel like eating; my appetite was poor.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 113. I felt that I could not shake off the blues even with the help of my family or friends. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 114. I felt that I was just as good as other people.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 115. I had trouble keeping my mind on what I was doing.                                      | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 116. I felt depressed.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 117. I felt that everything I did was an effort.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 118. I felt hopeful about the future.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 119. I thought my life had been a failure.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 120. I felt fearful.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 121. My sleep was restless.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 122. I was happy.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 123. I talked less than usual.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 124. I felt lonely.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 125. People were unfriendly.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 126. I enjoyed life.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 127. I had crying spells.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 128. I felt sad.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 129. I felt that people dislike me.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 130. I could not get going.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |



06/29/2004



Infant Characteristics Questionnaire (ICQ) (fussy-difficult subscale). Bates, J., Freeland, C., & Lounsbury, M. (1979). Measurement of infant difficultness. *Child Development*, 50, 794-803.



**WEEK 12 DATA COLLECTION:  
DURATION AND COSTS**



**Infant Characteristics (M3, M6, M9, M12)**

Now I'd like to ask you some questions about your infant:

- |  |   |
|--|---|
| 131. Babies differ in how much they fuss and cry.<br>If a rating of one is a baby who fusses very little and a rating of seven is a baby who fusses a lot (with a rating of four being in the middle as a baby who fusses the average amount), how would you rate your infant ?  | <div>1 2 3 4 5 6 7</div> <div>○ ○ ○ ○ ○ ○ ○</div> |
| 132. Babies differ in how difficult they are for the average mother.<br>If a rating of one is a baby who is super easy and a rating of seven is a baby who is highly difficult (with a rating of four being in the middle as a baby who is ordinary with some problems), how would you rate your infant?   | <div>1 2 3 4 5 6 7</div> <div>○ ○ ○ ○ ○ ○ ○</div> |
| 133. Babies differ in how often and quickly their moods change.<br>If a rating of one is a baby whose mood changes seldom and a rating of seven is a baby whose mood changes often and rapidly (with a rating of four being in the middle as a baby whose mood changes about as often as average), how would you rate your infant?                         | <div>1 2 3 4 5 6 7</div> <div>○ ○ ○ ○ ○ ○ ○</div> |
| 134. Babies differ in how difficult or easy they are to soothe when they are upset.<br>If a rating of one is a baby who is easy to soothe and a rating of seven is a baby who is difficult to soothe (with a rating of four being in the middle as a baby who is about average difficulty to soothe), how would you rate your infant?                      | <div>1 2 3 4 5 6 7</div> <div>○ ○ ○ ○ ○ ○ ○</div> |
| 135. Babies differ in how vigorously or loudly they cry when they are upset. If a rating of one is a baby whose cry is very mild in intensity or loudness and a rating of seven is a baby whose cry is very loud or intense (with a rating of four being in the middle as a baby whose cry is moderately loud or intense), how would you rate your infant? | <div>1 2 3 4 5 6 7</div> <div>○ ○ ○ ○ ○ ○ ○</div> |

Support Behaviors Inventory (SBI) (shortened version). Brown, M.A. (1986). Social support during pregnancy: A unidimensional or multidimensional construct? *Nursing Research*, 35, 4-9.



WEEK 12 DATA COLLECTION:  
DURATION AND COSTS



This next set of questions asks how satisfied you are with the amount of support you receive from your partner and/or other people.

136. Do you have a partner?

yes no  
☐ ☐

(Note to interviewer: if no, ask only about support from others)

**Directions:** I will read you a list of statements describing types of support.  
(If the person has a partner) What is the name of your partner?

Who is the most important individual who gives you help or support with breastfeeding?  
What is their name? \_\_\_\_\_

Please rate this individual and your partner on the following scale. On a scale from 0 to 4, with 0 being very dissatisfied and 4 being very satisfied, I want you to tell me how satisfied you are with the support you currently receive from your partner.

Please refer to card three. Now I will ask you to answer the same questions about \_\_\_\_\_  
(most important individual)

|  | <u>Partner</u>        |                       |                       |                       |                       | <u>Most Important Individual</u> |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | Name _____            |                       |                       |                       |                       | Name _____                       |                       |                       |                       |                       |
|  | 0                     | 1                     | 2                     | 3                     | 4                     | 0                                | 1                     | 2                     | 3                     | 4                     |
| 137. Shares similar experiences with me                                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 138. Helps keep up my morale   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 139. Helps me out when I'm in a pinch                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 140. Shows interest in my daily activities and problems                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 141. Goes out of his/ her way to do special things for me              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 142. Allows me to talk about things that are very private and personal | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 143. Lets me know I am appreciated for the things I do for him/ her    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 144. Tolerates my ups and downs  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 145. Takes me seriously when I have concerns/ problems                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 146. Says things that make my situation clearer                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 147. Lets me know that he/she will be around if I need help            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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## **BIOGRAPHY**

Karen Kozlowski Smith is a native Californian, but now calls Virginia home. She is a registered nurse and graduate of Mt. San Jacinto College (ADN, 1994), Loma Linda University (BSN, 1996), and George Mason University (MSN, 2008). Originally a medical/surgical nurse, Karen completed a post baccalaureate program at the Johns Hopkins Hospital School of Perfusion Science and received certification as a Clinical Perfusionist in 1998. Her Obstetric nursing career began in 2001, and she continues to practice in the perinatal setting. Karen is certified in Inpatient Obstetric and Maternal-Newborn Nursing, as well as, Childbirth Education. She is a member of Sigma Theta Tau International, the Association of Women's Health, Obstetric and Neonatal Nurses, and the National Alliance of Certified Legal Nurse Consultants. Her interests include perinatal research and education.