Understanding Postpartum Depression from a Structural Family Theory Perspective: Examining Risk and Protective Factors

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Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
In
Human Development

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August 24, 2010
Blacksburg, Virginia

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ABSTRACT

This study examined pregnancy risk and protective factors for developing postpartum depression from a structural family theory lens. The purpose of this study was to (1) examine previously identified pregnancy stressors to learn which stressors put women more at risk for postpartum depression and (2) to identify possible buffers for women who are at risk for developing postpartum depression. In this paper, two analyses were proposed. Analysis I, uses a hierarchal regression analysis to examine the impact of couple related stress on postpartum depression. Analysis II uses moderated multiple regression to test factors during pregnancy which may protect at-risk women from postpartum depression symptoms. Three post-hoc exploratory analyses were conducted following the originally proposed analyses. Secondary data was used in this study. The data was collected in four large urban hospitals in Utah from 2005-2007 and included 1568 women. The results of these analyses illustrate the importance of conceptualizing postpartum depression from a family systems perceptive. Specifically, this study shows that a couple's relationship, depending on the stress level experienced in the relationship, can be both a risk and protective factor for pregnant women.

Table of Contents

LIST OF TABLES

.

LIST OF FIGURES

.

CHAPTER 1. Introduction

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While having a baby is often referred to as the happiest time in a woman's life (Barnes, 2006), many women find pregnancy, as well as the postpartum period, a stage of major physical and emotional changes. For 20% of women, pregnancy initiates the onset of postpartum depression (Wisner, Parry, & Piontek, 2002). Postpartum depression is a mood disorder affecting women after childbirth and involves symptoms that range from mild to severe. It is the most frequent complication following childbirth and often goes undiagnosed and untreated (Munk-Olsen, Laursen, Pedersen, Mors, & Mortensen, 2006). In fact, approximately 40-50% of all postpartum depression episodes are unreported. While our knowledge about postpartum depression has greatly advanced in recent years, many aspects of the pregnancy and postpartum depression process are not understood and could be contributing to the high prevalence and low treatment rates. Three areas need to be addressed to better understand postpartum depression. They are risk factors, protective factors and the relational conceptualization of postpartum depression.

Thus far, research on postpartum depression has followed a specific path. The path began by only looking at the biological aspects of postpartum depression. Early research on postpartum depression focused only on etiology (Bloch, Daly, & Rubinow, 2003; Blum, 2007; Forty et al., 2006; Hendrick, Altshuler, & Suri, 1998; Klier et al., 2007; Whiffen & Johnson, 1998; Zonana & Gorman, 2005). These studies looked at the biological aspects of the women affected, such as the role of female hormones and various biological changes which occur during pregnancy and childbirth (Barnes, 2006). Establishing biomedical risk factors for postpartum depression (Kendall-Tackett & Kantor, 1993; Nierop, Bratsikas, Zimmermann, & Ehlert, 2006; Pedersen et al., 2007) was pivotal for understanding physical and chemical changes which can affect a woman's mood during this time (Barnes, 2006). While these studies were important they were limited because they did not consider the context of a woman's life.

Then the path turned to researchers' focus on psychosocial issues related to postpartum depression. It was not until the most recent decade that researchers drew their attention toward the psychological as well as social aspects of postpartum depression (Barnes, 2006; Chandra,

Bhargavaraman, Raghunandan, & Shaligram, 2006; Green, Broome, & Mirabella., 2006; Halligan, Murray, Martins, & Cooper, 2006; Haslam, Pakenham, & Smith, 2006; Roberts, Bushnell, Collings, & Purdie, 2006; Shaw, Levitt, Wong, & Kaczorowski, 2006; Whiffen & Johnson, 1998). Researchers began acknowledging the important role life stressors could play in women's mental health (Blum, 2007; Cutrona & Troutman, 1986; Forty et al., 2006; Haslam et al., 2006; Klier, 2006; O'Hara, 1986; Whiffen & Johnson, 1998). From this body of research, the current literature became rich with studies examining sources of stress for women with postpartum depression (Barnes, 2006; Bernazzani, Saucier, David, & Borgeat, 1997; Brown, 1986; Dulude, Ba, Wright, & Sabourn, 2002; Glazier, Elgar, Goel, & Holzapfel, 2004; Grote & Bledsoe, 2007; Robertson, Grace, Wallington, & Stewart, 2004; Seguin, Potvin, St-Denis, & LoiseUe, 1999). While these studies worked to identify psychosocial risk factors, the studies did not discern the relative importance of one risk factor over another or the circumstances in which that risk factor existed. This book of research furnished medical and mental health providers with long lists of risk factors for pregnant women, but did not offer ways to utilize the long lists. While researchers have been good at identifying this taxonomy of individual risk factors, they have not been as good at understanding the prepotency of particular factors.

From here the research path changed again and researchers began looking at possible protective factors. In the midst of studying the psychosocial aspects, they found that social support inversely affects postpartum depression symptoms (Barnes, 2006; Blum, 2007; Dennis & Chung-Lee, 2006; Klier et al., 2007; Pearlstein et al., 2006). While noting that some form of social support is important as a protective factor, researchers have not thoroughly examined the effects of social support related to postpartum depression. For example, there is little information regarding different types of social support, when social support is most helpful or how often social support is needed. Some of the information about postpartum depression social support is inconclusive and contradictory. Similar to the long lists of risk factors, the current information regarding social support and postpartum depression is not specific enough to lend itself to practical application. For example, providers do not know if certain risk factors put women more at risk than other factors. If providers had information about the relative importance of these risk factors, they could then screen women accordingly during prenatal visits.

The focus on social support then led researchers to examine a woman's relationships during her postpartum period. Originally, studies on etiology, postpartum depression symptoms

and the effects of postpartum depression were focused only on the woman, rather than including other family members. While the woman's experience is arguably the most critical component, the female is not the only person affected by postpartum depression. Researchers became particularly interested in the relationship between a mother and her infant (Chandra et al., 2006; Green et al., 2006; Halligan et al., 2006; Klier, 2006; Moehler, Brunner, Wiebel, Reck, & Resch, 2006). They have found that postpartum depression affects the mother-infant bond, in addition to a child's overall mental health (Barnes, 2006; Chandra et al., 2006; Green et al., 2006; Halligan et al., 2006; Haslam et al., 2006; Roberts et al., 2006; Shaw et al., 2006; Whiffen & Johnson, 1998). Some researchers began studying the marital relationship (Dulude et al., 2002; Glazier et al., 2004; Koeske & Koeske, 1991; Lutz & Hock, 2002). Studies show that a woman feeling appreciated by her partner is actually a protective factor for postpartum depression. This is evidenced even with women who have a predisposition for depression (Barnes, 2006; Whiffen & Johnson, 1998). The strength of the marital dyad can be very advantageous or detrimental for people with postpartum depression.

Some research suggests that men experience postpartum symptoms and there might be both maternal postpartum depression, as well as paternal postpartum depression (Munk-Olsen et al., 2006; Whiffen & Johnson, 1998). The research in this area is not conclusive, but regardless of whether or not fathers can be clinically diagnosed with postpartum depression, it is a fact that fathers are under more stress and have more responsibility when their partners have postpartum depression. While scholars have noted these extended effects of postpartum depression on certain family members (Halligan et al., 2006; Haslam et al.2006; Moehler et al., 2006; Moran & O'Hara, 2006; Munk-Olsen et al., 2006; Whiffen & Johnson, 1998; Wisner, Chambers, & Sit, 2006), postpartum depression has not been conceptualized as a family issue.

At present, research focuses on the biological, psychological and social topics while separating each family member from the whole. Approaching postpartum depression from a relational or family perspective broadens this current disjointed understanding by conceptualizing the family members in relations to each other as well as connects the family unit to the other elements of postpartum depression. This expanded conceptualization offers explanation for what a woman is experiencing during pregnancy and postpartum. Using a family framework can also provide clarification and a basis for certain risk factors or protective factors being more influential than others.

The primary goal of this project is to examine factors which put women at-risk and factors that protect women from the onset of postpartum depression symptoms. This project offers a unique perspective. A family systems theory has not been used previously in the postpartum depression literature. In this study it is employed to inform the conceptualization of postpartum depression and guide this project. A family system perspective not only helps connect the family unit to the various aspects of the risk and protection postpartum depression literature, but also has the potential to offer practical implications for the future. Along with learning more about the risk factors, this analysis aims to identify possible relationship protective factors for women who are already at-risk for developing postpartum depression symptoms. To meet this goal, two empirical analyses are proposed.

Analysis I examines which risk factors put women more at risk for postpartum depression. Researchers have already identified many pregnancy stressors which increase the chance of postpartum depression symptoms. This analysis will examine those stressors to prioritize the significance each stressor exerts. Learning more about these previously identified risk factors can help inform the development of future postpartum depression screening tools and treatment.

Analysis II tests if women who (1) report non-stressed couple relationships, (2) perceive help with childcare from their partner and/or (3) have provider support during pregnancy buffers the effects of a history of depression. A history of depression is a factor known to put pregnant women at risk for developing postpartum depression. As one of the main biological risk factors for postpartum depression (Beck, 2001; Blum, 2007; Forty et al., 2006; Leigh & Milgrom, 2008), a history of depression will be used in this analysis as a way to examine possible buffers.

CHAPTER 2. Background and Theoretical Framework

Postpartum Depression

Women are admitted into psychiatric care during the child-bearing years more often than at any other time in their lives (Cox, Murray, & Chapman, 1993). Approximately 14.5 percent of women experience a new episode of minor or major depression during the first three months postpartum and 6.5 percent of these women's depression is categorized as Major Depression (Gaynes et al., 2005; Wisner et al., 2006). Postpartum depression is prevalent in many countries in addition to the United States. Approximately 10 to 28 percent of females experience postpartum depression internationally (Beck, 2001; Green et al., 2006). In fact, some studies show that rates of postpartum depression in developing countries are almost double the rates in developed countries (Husain et al., 2006). It is important to consider that many prevalence rates are based on self report, hence many cases of postpartum depression go undiagnosed and the numbers themselves are underestimated (Haslam et al., 2006). One study asserts that up to 85 percent of females experience postpartum depression after giving birth (Henshaw, 2003).

Defining postpartum depression. Women who are experiencing postpartum depression can exhibit a range of symptoms and severity from postpartum baby blues to postpartum psychosis. The baby blues begin a few days after birth and are characterized by crying, sadness and agitation (Blum, 2007). While the baby blues symptoms are seen as less severe than other postpartum depression symptoms, they can still impact a woman's ability to function as a new mother, as well as the way the family functions and deals with the transition of adding a new family member. According to the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR, 2000), postpartum depression is defined as Major Depression with the onset within the first four weeks after childbirth. During this time, a woman may experience sleeplessness, irritability, anxiety, disorientation, feeling overwhelmed, feeling emotionally detached and overall feeling unable to cope with her role as a mother (Barnes, 2006). All of these symptoms are distressing not only for the mother, but also for her family. Postpartum psychosis involves the most severe symptoms and can result in suicide and infanticide. Since postpartum psychosis involves a mental state in which there is a loss of reality testing and a presence of delusions and/or hallucinations, it is important for women to be treated immediately (Blum, 2007; Chandra et al**.,** 2006). Mothers with postpartum psychosis may feel

aggressive impulses, hostility, rejection, and pathological ideas. Postpartum psychosis prevalence rates are much lower than postpartum depression, but require immediate medical interventions including antipsychotic medication and possible hospitalization (Blum, 2007). These symptoms can be extremely dangerous to the woman, as well as to her family.

Postpartum depression differs from non-postpartum depression. Whiffen (1991) states that when researchers use the words "postpartum depression" to describe their research area, they are suggesting a conceptual distinction between postpartum depression and non-postpartum depression. The biological question of how postpartum depression differs from non-postpartum depression is unanswered. Some medical professionals state that postpartum depression is specific to the postpartum time period (four months after birth) and is different from non-postpartum depression (Kendall-Tackett & Kantor, 1993; Silverman et al., 2007; Whiffen, 1991), because postpartum depression is caused by the drop in the hormone, progesterone (Dalton, 1971). Postpartum blues occur any time between one day and seven days following childbirth, and are believed to be directly related this hormonal change (Whiffen, 1991).

Not all postpartum depression researchers agree however that postpartum dperession is a distinct diagnosis (Bloch et al., 2003; Ugarriza, 2002). O'Hara and colleagues (1991) report an association between postpartum depression and low levels of serotonin, similar to major depression. Likewise, women who are most at risk for developing postpartum depression are those who have a history of depression (Blum, 2007; Forty et al., 2006; Whiffen, 1991), which is also true for recurrent episodes of major depression. One study found that 80 percent of women with postpartum depression had another episode of depression within the next 5 years (Bloch et al., 2003). These findings have led some researcher to believe that major depression and postpartum depression should not be considered separate diagnoses. Postpartum depression is not listed as a distinct diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV-TR, 2000). In fact, postpartum depression is classified as an onset specifier for major depression, bipolar, or brief psychotic disorder. As long as questions about the etiology of postpartum depression remain unanswered, distinctions between depression and postpartum depression will also be inconclusive.

Even without conclusive evidence, there are palpable differences between postpartum depression and major depression, which many researchers believe are important enough to stand

alone as a diagnosis (Kendall-Tackett & Kantor, 1993; Whiffen, 1991). Postpartum depression naturally occurs during a major life transition (Ugarriza, 2002, Whiffen, 1991). In fact, the diagnostic timeframe for the onset of postpartum depression symptoms is more similar to an adjustment disorder than major depression. According to the American Psychiatric Association's DSM-IV-TR (2000), adjustment disorders develop within three months of an identifiable stressor, while postpartum depression develops within four months following childbirth. While major depression can develop during transition times of peoples' lives, it is not a requirement for diagnosis as it is for postpartum depression. Additionally, the hormonal changes that occur during and following pregnancy are remarkable (Hendrick et al., 1998). The hormone theory of postpartum depression focuses on the drastic decline in hormone levels that occur during the postpartum period only. Research shows that the abrupt hormonal changes have a direct influence on mood (Bloch et al., 2003).

While many of the postpartum depression symptoms are similar to major depression, a few are not. According to the DSM (DSM-IV-TR, 2000), tearfulness, irritability, labile mood, feelings of helplessness and hopelessness, and suicidal ideation are symptoms of postpartum depression and non-postpartum depression. Lethargy, somatic complaints and appetite changes are symptoms of major depression, but are common occurrences for a postpartum mother and are not valid diagnostic criteria for postpartum depression. Also, a woman with postpartum depression may have symptoms specific to postpartum depression, but not common in major depression, such as negative feelings towards her baby, feeling inadequate to care for her baby, guilt about her role as a mother or a woman and excessive thoughts about protecting or harming her baby. These distinctions separate depression occurring anytime in life from depression occurring postpartum.

Family Systems Theory

The way in which postpartum depression is conceptualized is critical to the understanding of and the examination of postpartum depression symptoms. At present, postpartum depression research focuses on just the woman, but does not combine these efforts to understand the whole family unit. According to family system theory, the woman is only one part of the family system and focusing on her or the other family members separately is acknowledging only one part of the system effecting or being affected by the disorder (Nichols & Schwartz, 2001). Allowing a

family systems theory to inform the conceptualization of postpartum depression can provide an expanded and more comprehensive understanding than the current disjointed ones. Structural family theory is one of the most widely used theories in the field of family therapy. It provides a framework that explains family dysfunction and how to treat families for these dysfunctions (Nichols & Schwartz, 2001). Salvador Minuchin, one of the founders of family systems theory and also the creator of structural family therapy, (Nichols & Schwartz, 2001) theorizes that problems in families are due to the family's inability to adjust to change and transition. Since structural family theory focuses on times of transitions, the theory is a natural fit when talking about the transitions of pregnancy or the birth of a new child (Minuchin, 1974; Nichols & Schwartz, 2001).

It is important to consider the whole family in relation to postpartum depression because structural family theory states anything which happens in one part of the family affects the other parts. Although Minuchin (1974) states that pathology could be in the individual, in the individual's social context, or in the interaction between people, he asserts that the family structure is what creates, amplifies, or corrects pathology. The symptoms of one family member, therefore, are not seen as individual problems, but as a reflection of problems within the family structure (Nichols & Schwartz, 2001). This notion is missing in the current understanding of postpartum depression. The current understanding looks at each family member as a separate part and does understand postpartum depression in relation to the whole family unit.

The focus of structural family theory is how families organize and reorganize the family structure, parallel to what is happening with families during pregnancy and adjusting to a newborn. Transitions are usually a source of stress for people (Cowan, Cowan, Shultz, & Heming, 1994; Minuchin, 1974) and pregnancy is just that, a time of change. In fact, this time period is a critical developmental phase that requires individual, marital, and familial reorganization (Belsky & Pensky, 1988; Kreppner, 1988; Mercer, Ferketich, & DeJoseph, 1993; Ruble et al., 1990). In structural family theory, a family's capacity to handle this reorganization is based on an individual family structure and its ability to support one another (Minuchin, 1974; Nichols & Schwartz, 2001). Minuchin defines family structure as the organization of patterns in which a family interacts. For example, which family members make the decisions in the family or how families offer emotional support to each other are patterns that create a family structure. In structural family theory, family members serve two different functions for the family. One is

8

the internal function that protects the psychosocial aspects (i.e. feelings of safety, feeling appreciated, feeling worthy) of each member. For example, Minuchin states it is important that family members know how to support each other emotionally. The second is the external function, which helps members acclimate to culture and the social context (i.e. knowing how to build friendships outside the home, being able to find employment, or filtering societal messages) in which they live (Nichols & Schwartz, 2001). New circumstances, such as pregnancy or childbirth, require families to change and often require them to adjust their family structure while still honoring these two functions (Barnes, 2006; Cowan et al., 1994; Tammentie, Tarkka, Astedt-Kurki, Paavilainen, & Laippala, 2004). See Table 1 for the main theoretical concepts of structural family theory.

Table 1

Definition of Structural Family Theory Concepts

Main Concept	Definitions
Family Structure	The organization of how family members interact
Boundaries	The overt and covert rules which regulate behavior
Hierarchy	The organization of individual or subsystem power in the family structure
Subsystems	Individuals or dyads in the family system which together create the family structure
Roles	The position of a family member in relation to other family members which is governed by predictable behavior
Stuck	The state in which a family structure is inflexible and resistant to change

Structural Family Theory, Pregnancy and Postpartum Depression

From a structural family theory lens, all families are competent and have the ability to change. However, from this perspective, families get trapped in maladaptive patterns or structure and then have difficulty handling change (Minuchin, 1974). For example, families may have a hard time adjusting to a newborn in the home (Barnes, 2006). However, families with a stable, but flexible, family structure successfully deal with transitions and life struggles (Belsky, Spanier, & Rovine, 1983; Lutz & Hock, 2002; Mercer et al., 1993). While this study will not

specifically test family structure, it is important to understand Minuchin's (1974) definition of family structure to understand how families effect and are affected by the pregnancy timeframe and ultimately postpartum depression. In Minuchin's theory, one way to build a flexible but stable family structure is through a clearly outlined family hierarchy. The hierarchy is built through family subsystems, which are created by family members joining together. One of the most important subsystems during pregnancy is the couple unit (Barnes, 2006; Dennis & Chung-Lee, 2006). For proper family functioning, the boundaries of the subsystems need to be clearly defined in the hierarchy to support the family structure. For example, during pregnancy or postpartum the couple's boundaries need to be ones where each partner is comfortable asking the other for help. The boundaries around the couple's relationship need to be strong enough so the couple has a pattern of relying on each other when they need support rather than seeking support outside the couple subsystem (Barnes, 2006; Belsky et al., 1983; Dennis & Chung-Lee, 2006). When the couple subsystem is not able to support itself, and thus the family structure, family dysfunction occurs and pathology can develop.

Couples often report having to support each other in new ways during the transition to parenthood, and in this time of change during the pregnancy and postpartum period, many couples experience a decline in marital quality (Belsky et al., 1983; Mercer et al., 1993). Some of the couple's distress is temporary and is resolved in a short amount of time (Campbell, Kub, & Rose, 1996; Dulude et al., 2002; Tessier, Piché, Tarabulsy, & Muckle, 1992). In structural family theory, these families have a structure that can accommodate change. For other families, members' individual well-being decreases and family distress increases during the transition to parenthood (Campbell et al., 1996; Cutrona, 1986; Dulude et al., 2002; Ferketich & Mercer, 1989; Gottman & Osofsky, 1985). Within structural family theory, a lasting increase in distress and decrease in personal well-being illustrates a stuck, or potentially pathological, family structure which is not able to support its members appropriately. During the life transition of having a baby, pathology commonly manifests itself as postpartum depression (Barnes, 2006; Beck, 2001; Green et al., 2006). While whole families must adjust when a new baby is brought into the family system, according to structural family theory a well-functioning couple subsystem increases the likelihood of positive adjustment. Family structures which are not able to accommodate change may be more vulnerable to postpartum depression.

The way a couple functions is critical to how well the whole family structure functions (Minuchin & Fishman, 1981). Therefore, it is hypothesized that stress in the couple's relationship during pregnancy would put a woman more at risk for postpartum depression than other risk factors. Likewise, it is hypothesized that couples without a stressed relationship, or a well functioning couple subsystem could buffer women from experiencing postpartum depression symptoms. For many couples, the end of pregnancy and the first few weeks a new baby is home is chaotic and physically and emotionally overwhelming (Barnes, 2006). Partners may feel an increased need for support due to their wives' attention now being focused on the baby (Lutz & Hock, 2002), whereas wives may feel a need for more support due to their new physical and emotional responsibilities (Barnes, 2006; Dennis & Chung-Lee, 2006). Couples with clear boundaries (i.e., rules, patterns and norms within their relationship in which they both agree protects and supports their subsystem, or relationship) will find ways to realign their family structure during this time and support one another (Minuchin & Fishman, 1981). Current research indicates that poor relationships are a significant predictor of postpartum depression, with or without the presence of other stressors (Barnes, 2006; Burke, 2003; Coyne & Benazon, 2001; Jacob & Johnson, 1997). Research indicating tension in the marital dyad is a risk factor for the onset of postpartum depression (Barnes, 2006; Beck, 2001; Blum, 2007; Haslam et al., 2006; Whiffen & Johnson, 1998) supports the hypothesis that the couple's relationship is the primary way in which depression develops or worsens. When a partner and wife are experiencing the transition of pregnancy and do not have boundaries that support each other during this time, they may report relationship problems or dissatisfaction with their relationship. A poorly structured couple subsystem, as indicated by marital conflict, feelings of isolation, or physical separation may be a predictor of postpartum depression and may affect how other psychosocial stressors are linked to postpartum depression. The inability to communicate about this life transition and their marital distress are cited as common complaints for couples experiencing postpartum depression (Thorp, Krause, Cukrowicz, & Lynch, 2004). Also, women who report feelings of isolation and lack of support during their pregnancy are more likely to develop postpartum depression (Brugha et al., 2000; Cutrona, 1986; Paykel, Emms, Fletcher, & Rassaby, 1980; Robertson et al., 2004). Many couples report a major increase in conflict during pregnancy and during the postpartum period (Dulude et al., 2002; Glazier et al., 2004; Koeske & Koeske, 1991; Lutz & Hock, 2002).

Although conflict is normal, it can manifest pathologically depending on the family structure (Minuchin, 1974).

Conversely, Minuchin (1974) would suggest the family structure and a lack of stress in the couple's relationship could also serve as the protective factor for women during pregnancy and postpartum. Functional boundaries around the family members are critical for protection. In structural family theory, appropriate boundaries around the couple relationship would be a protective factor for families during this transition. In fact, the couple's relationship could protect women and thus, their family from outside stressors and experiencing postpartum depression.

Analysis I: The Impact of Couple Related Stress on Postpartum Depression

Risk Factors

When families are exposed to extra challenges or stresses during this transition to parenthood, pathology is more evident. Many researchers have acknowledged that stress provokes illness (Brown, 1986; Dulude et al., 2002; Glazier et al., 2004; Minuchin, 1974). Research shows that stress during pregnancy increases the risk of a woman experiencing postpartum depression symptoms (Blum, 2007; Forty et al., 2006; Haslam et al., 2006; Klier, 2006; Whiffen & Johnson, 1998). Thus, extra challenges and stress are considered postpartum depression risk factors for pregnant women. Structural family theory suggests that additional stress can be difficult for family structures to cope with and, therefore, pathology cultivates (Minuchin & Fishman, 1981). Low levels of social support, highly stressful life events during pregnancy, unwanted pregnancy, marital problems, and poor family relationships are some of the stresses which can burden the family structure. These have been previously identified as risk factors for postpartum depression (Blum, 2007; Forty et al., 2006; Haslam et al., 2006; Klier, 2006; Whiffen & Johnson, 1998).

Preserving a well functioning family structure becomes even more vital when the family is being bombarded with other psychosocial stressors in addition to the stress of this life transition. Researchers have been diligent about studying psychosocial stressors which may put women at risk for postpartum depression (Barnes, 2006; Bernazzani et al., 1997; Brown, 1986; Dulude et al., 2002; Glazier et al., 2004; Grote & Bledsoe, 2007; Robertson et al., 2004; Seguin et al., 1999). While research has identified many psychosocial risk factors during pregnancy associated with the development of postpartum depression (stressful negative life events

12

(Bernazzani et al, 1997; Brown, 1986; Cutrona & Troutman, 1986; Grote & Bledsoe, 2007; Norbeck & Tilden, 1983; O'Hara, 1986; Robertson et al., 2004); financial problems (Seguin et al., 1999), occupational problems (Grote & Bledsoe, 2007), emotional stress, physical violence, and couples conflict), such research has not determined which factors put more women at risk or how these risk factors comparatively precipitate the same outcome. While the risk factors have been identified to help anticipate who may be vulnerable to postpartum depression, the long lists do not help women or their healthcare providers assess or determine treatment (Munk-Olsen et al., 2006). Narrowing down which risks factors put families at greater risk for postpartum depression could give families and medical practitioners tangible ways to screen, treat and increase understanding of postpartum depression.

According to Minuchin (1974), stress and conflict usually increases in the family during transitions. If the family members are able to serve their two functions (internal and external protection) then they can help protect the family unit from these extra psychosocial stressors which put them at risk. If the family is not able to support each other during this transition time then these extra stressors are going to create more distress and more potential pathology for the family. In structural family theory, a stable family hierarchy with a supportive couple subsystem can help protect the family from these outside stressors. The psychosocial stressors that are often referenced in the postpartum depression literature under the topic of couple's stress include but are not limited to marital conflict, unwanted pregnancy and divorce or separation (Barnes, 2006; Chandra et al., 2006; Green et al., 2006; Halligan et al., 2006; Haslam et al., 2006; Roberts et al., 2006; Shaw et al., 2006; Whiffen & Johnson, 1998). It also includes financial stress (i.e. not being able to pay the bills, losing a job, and not being able to find work) (Glazier et al., 2004). Emotional stress is often sited and includes but is not limited to illness, death and loss and pregnancy complications. When traumatic stress is addressed it is often referring to going to jail, physical fights, and substance use problems. Looking at the literature specific to these psychosocial stressors is necessary to prioritize which common psychosocial risk factors put women and their families more at risk for postpartum depression.

Couple's stress. Women who experience relationship stress during pregnancy are vulnerable to both psychological and physical problems (Barnes, 2006; Chandra et al., 2006; Haslam et al., 2006). Many couples have unrealistic expectations of pregnancy and parenthood, which have a negative effect on their relationship. Such relationship strains become a risk factor

for postpartum depression (Barnes, 2006; Whiffen & Johnson, 1998). These unrealistic expectations frequently include the belief that the baby's birth will not change the family's daily life, that each partner will have an equal responsibility of caring for the baby or that babies fix problems in marriages (Barnes, 2006; Beck 2001; Whiffen & Johnson, 1998). The need to create a new family structure to accommodate their baby is not immediately obvious to these couples, (Barnes, 2006; Tammentie et al., 2004) and, when their roles are not renegotiated after a child's birth, they report some of the highest rates of marital dissatisfaction (Belsky et al., 1983). Couples in well functioning stable marriages have different ways of handling conflict than couples in unstable marriages (Gottman, 1999). Since research indicates that tension in the marital dyad is a risk factor for the onset of postpartum depression (Barnes, 2006; Beck, 2001; Blum, 2007; Haslam et al., 2006; Whiffen & Johnson, 1998), it is especially important to understand the quality of a woman's marital relationships. Minuchin (1974) would say that women who are not married will not have the same protection from the couple subsystem and family hierarchy. Indicators of relationship stress that will be used in this analysis are; separation and/or divorce during pregnancy, arguing more during pregnancy, and the father of the baby not wanting the pregnancy.

Financial stress. Poverty, low socioeconomic status (SES) and financial stresses during pregnancy have all been associated with postpartum depression symptoms (Curry, Durham, Bullock, Bloom, & Davis, 2006; Patel, Araya, de Lima, Ludermir, & Todd, 1999). Seguin and colleagues (1999) suggest that a large proportion of economically disadvantaged women suffer from depression during pregnancy. Financial strains during pregnancy and a mother not being employed outside the home have been shown to increase a woman's risk of postpartum depression symptoms (Beck, 2001; Patel, Rodrigues, & DeSouza, 2002). In fact, many studies have shown that financial strain and lower social status not only relate to postpartum depression but can, in fact, predict postpartum depression (Beck, 2001; Patel et al., 1999; Warner, Appleby, Whitton, & Faragher, 1996). Employed women report better overall health whereas low employment rates are associated with depressive symptoms (Repetti, Matthews, & Waldron, 1989). Low SES families, in which the mother is unemployed, are more at risk for depression than low SES women with jobs. Research has shown that being employed can provide social support and connections with people outside the home. Co-workers and work environments can offer a way for women to build individual self-esteem and self-efficacy (Repetti et al., 1989).

14

While research has identified financial stress as a risk factor for postpartum depression, it is not clear what aspects of the stress makes women vulnerable to postpartum depression. For example, low SES women are at risk for postpartum depression, but unemployed women with financial strains may be more at risk. The indicators for financial stress which will be used in this analysis are families moving to a new address, partners losing jobs, women losing jobs when they wanted to continue working, and families not being able to pay their bills.

Emotional stress. Women and their families who experience emotional distress during pregnancy have an increased risk of adverse health outcomes (Glazier et al., 2004). According to Dulude and colleagues (2002), the transition to parenthood is a stressful event that involves emotional distress for all families. Furthermore, pregnancy seems to be the most demanding time of the transition process. Women in their study report high scores of overall psychological distress. While Dulude et. al.(2002) reports that emotional stress is predictable during this time, studies also report that intense emotional stress is related to postpartum depression (Brown, 1994; Glazier et al., 2004; Moehler et al., 2006; Norbeck & Tilden, 1983). Some research has shown that depressive episodes are triggered when women and families experience the emotional stress of the death of a loved one, family illness, or legal problems, during this transition to parenthood (Robertson et al., 2004). Because these are common indicators of emotional stress, this analysis will focus on women with family members who go to the hospital during pregnancy, a family member dying while the woman is pregnant or the women experiencing pregnancy complications as indicators of emotional stress.

Traumatic stress. Women who experience physical violence or another type of emotional or traumatic stress are at greater risk of mental health problems (Varma, Chandra, Thomas, & Carey, 2007). The rates of physical abuse during pregnancy range between four to eight percent (Altarac & Strobino, 2002; Bohn, Tebben, & Campbell, 2004). However, these statistics are based on self-report and so are likely underestimated because some women never report their abusive situation for fear of their safety or because of shame (Curry et al., 2006). Women between 16 and 20 years of age are commonly exposed to violence. For some women, this age range is right before or during pregnancy. Also, violence often increases when stress increases. Women are more at risk for being involved in violent situations during pregnancy because of the increase of stress in families during pregnancy.

Women who reported partner violence were more likely to report poorer health symptoms than women who were not in violent situations (Varma et al., 2007). Women who are in abusive relationships or who experience abuse during pregnancy are also at risk for experiencing Posttraumatic Stress Disorder (PTSD). Since PTSD is also associated with high rates of co-morbid psychiatric disorders (Keane & Kaloupek, 1997), women who have experienced trauma are more likely to develop postpartum depression symptoms. While violence is one of the best studied forms of trauma, other life events can also be traumatic. In this analysis trauma indicators include, being in a physical fight during pregnancy, being homeless during pregnancy, the woman or her partner going to jail while she is pregnant, or someone close to the woman having a drug or alcohol problem while she is pregnant.

Sociocultural disadvantages. Researchers have also acknowledged the stress from social stratification and cultural disadvantages on families during pregnancy (Britton, 2008; Kim et al., 2006; McKee, Cunningham, Jankowski, & Zayas, 2001). Structural family theory highlights the influence of the larger cultural system in a person's life (Minuchin, 1974). As it was stated above, in structural family theory the second function of each family is to protect itself from external stresses specific to the culture and the social context in which they live (Nichols & Schwartz, 2001). If the couple subsystem is not able to support itself, it may not be able to protect the family from societal stressors.

Sociocultural disadvantages are defined as the stresses which come from being stratified by various social categories and cultural values. Some of the stratification seen in the larger system is represented by race, insurance status, age, level of education and marital status. These are also demographic variables. SES will not be considered in the sociocultural disadvantages because it is captured in the financial stress variable. In structural family theory, the individual's symptoms are seen not only as an expression of the entire family's dysfunction, but also broadens the scope to see the social context in which the problem exists, rather than interpreting the problem as an isolated entity (Minuchin, 1974). Minuchin would say a couple subsystem that is not able to supports its members will be more vulnerable to outside stresses. Postpartum depression is a common complication following childbirth, but is even more common for women in racial minority groups (Kurki, Hiilesmaa, Raitasalo, Mattila, Ylikorkala, 2000; McKee et al., 2001). Socially oppressed populations, such as uninsured and minority mothers, are less likely to seek services when they are depressed (Munk-Olsen et al., 2006). Cost-saving methods may

ultimately lead to unrecognized needs of vulnerable populations because those women will not be seen for health care needs at all. For these reasons, it is important to consider insurance status and race when understanding postpartum depression.

Other demographic factors of age, level of education and marital status are also examples of how women can be socially stratified in society, and have also been shown to be related to depression symptoms (Britton, 2008; Hung, 2005; Mayberry, Horowitz, & Declercq, 2007). Young (23 years old and younger) women tend to enter prenatal care later or not at all (Curry, 1990; Friedman, Heneghan, & Rosenthal, 2009a). Absent prenatal care or receiving prenatal care late can prevent women from being offered the supports and resources they need. It also puts them at higher risk of postpartum depression (Britton, 2008; Cook, Selig, Wedge, & Gohn-Baube, 1999; Kim et al. 2006).

According to research done by Mayberry, Horowitz and Declercq (2007), a woman's level of education was significantly related to her depression. Women with low levels of education (high school degree or less) had higher rates of depression when compared to women with more education. Also, women with less education are less likely to seek prenatal care (Curry, 1990; Joyce, Green, & Sorokin, 1983), which is also associated with postpartum depression (Cook et al., 1999).

Marital status is another demographic factor that has been associated with postpartum depression outcomes. Single women are more likely to report less social support than married women (Beck, 2001; Webster et al., 2000). Women who identify as single tend to have poorer prenatal and postnatal outcomes (Kim et al., 2006), whereas married women are more likely to receive prenatal care and have lower rates of postpartum complications (Curry, 1990). While some researchers have found that marital status is inherently a source of support, a few researchers have found that martial status had no impact of postpartum depression symptoms (Beck, 2001; Appolonio, & Fingerhut, 2008). Munichin's (1974) theory would suggest that marital status would impact the overall health of a family. Women without support from a partner may have a harder time protecting her boundaries and maintaining a well functioning family system. A woman's marital status, age, level of education, race, and insurance status are all considered indicators of sociocultural advantages or disadvantages during pregnancy.

Goals and Hypothesis of Analysis I: The Impact of Couple Related Stress on Postpartum Depression

       The overall goal of Analysis I is to examine factors that put women at risk for the onset of postpartum depression symptoms. Previous researchers already identified many pregnancy stressors which increase the chance of postpartum depression symptoms (couple's stress, financial stress, traumatic stress, emotional stress and sociocultural disadvantages). This analysis will examine those stressors to empirically determine the most accurate predictors for postpartum depression. It is hypothesized that stress in the couple's relationship during pregnancy (divorce, argue, partner not want baby) will be related to higher postpartum depression scores even after other demographic and stress-related risk factors are accounted for because, according to structural family theory, if the couple subsystem is stressed then pathology in the mother could be created. Learning more about these risk factors will not only fill a gap of postpartum depression knowledge not previously addressed from this perspective, but also provide practical information to inform future education, screening and treatment for woman and their families.

Analysis II: Protective Factors During Pregnancy Against Postpartum Depression

       Along with learning more about postpartum depression risk factors, it is important for researchers, medical providers and families to understand what can protect women from postpartum depression symptoms. One way to examine protective factors is to study women who are at risk for postpartum depression and do not develop postpartum depression symptoms.

       As mentioned in Analysis I, there is a long list of psychosocial risk factors which put women more at risk for developing postpartum depression symptoms, but there is one biological factor in particular that is the most widely researched, a history of depression.

At-risk Women

       History of depression. A woman's experience of depression is a major life event that subsequently puts her at risk for developing postpartum depression. One of the main biological risk factors for postpartum depression is a prior diagnosis of Major Depression, especially prior postpartum depression (Beck, 2001; Blum, 2007; Forty et al., 2006; Leigh & Milgrom, 2008). Six and one half percent of women experience Major Depression in the United States (Coyne & Benazon, 2001). Women experience Major Depression about twice as often as men and the lifetime risk of Major Depression in women is 20% to 26%. Depression rates have been

consistently rising over the past decade (Compton, Conway, Stinson, & Grant, 2006), increasing across all socioeconomic and demographic groups. Because a women's history of depression, postpartum depression, and her family history of psychiatric disorders are all biological risk factors for postpartum depression (Beck, 2001; Blum, 2007; Forty et al., 2006; Leigh & Milgrom, 2008), they will all be used as biological markers for postpartum depression in this analysis.

In this analysis, protective factors will be examined in relation to women who have a history of depression. As stated above, the literature shows that women with a personal history or family history of depression are at high risk for developing postpartum depression. Therefore, this analysis will assess possible protective factors for these high-risk women.

Protective Factors

While protective factors are equally important to note as risk factors, the current literature is sparse with articles addressing protective factors for women at risk for postpartum depression. In fact, researchers have commented that future research needs to study factors that protect women from postpartum depression (Grote & Bledsoe, 2007). When protective factors are addressed in the literature, social support is the main factor presented (Dennis & Chung-Lee, 2006; Green et al., 2006; Haslam et al., 2006; Shaw et al., 2006). Social support research specific to postpartum depression is often too broad for application because social support has been discussed without specifications on types of support (Seguin et al., 1999; Webster et al., 2000). It is not clear if researchers are referring to emotional support, instrumental support or specific behaviors or actions which were perceived as supportive. Even though social support is the most researched protective factor relating to postpartum depression, there are only three known clinical trials that have included social support in an intervention to address depression during pregnancy (Hayes, Muller, & Bradley, 2001; Spinelli & Endicott, 2003; Zlotnick, Miller Pearlstein, Howard, & Sweeney, 2006). Therefore, more specific information needs to be gathered to offer practical suggestions regarding protective factors.

Structural family theory offers a framework for understanding which factors protect pregnant women from postpartum depression symptoms and why. In Analysis I, couple stress is examined to determine the relative risk it bears on women and their families. Munichin's (1974) theory offers a unique conceptualization regarding the existence or absence of these couples'

stressors. From within this theoretical framework, it is the family's responsibility to protect the family members from outside stress (Munichin, 1974). A well functioning couple subsystem would offer the most protection from postpartum depression symptoms. The patterns a couple uses to deal with life transitions, such as having a baby, illustrates how their family system functions and can either help or hinder the onset of postpartum depression. When a couple subsystem reports couple's stress it could indicate a subsystem that is not able to support this transition. When a couple reports the absence of these couple stressors, it could signify a couple who is functioning well and handling this life transition. If other psychosocial stressors are also present during this transition time, the couple subsystem has to work very hard to support one another and maintain the family hierarchy. Also, the couple's relationship can have a profound effect on how psychosocial stressors affect the individual and the family system.

Postpartum depression literature cites family dynamics as playing an important role in the risk or protective factors for postpartum depression (Hakulinen, Paunonen, White, & Wilson, 1997; Mercer et al., 1993; Tomlinson, White, & Wilson, 1990). In structural family theory, a couple who is able to handle the transition of pregnancy without stressing their relationship and still support each other is critical to helping the mother through this postpartum period and crucial for the protection of the couple and the children (Minuchin, 1974). In structural family theory, one part of the family system affects all parts of the system. Family structures which support the family members, and thus decrease maternal pathology, in turn, help their children, because when the family structure is functioning well, the family is better able to support itself. One study demonstrated that remission of maternal depression lowered the rates of children's psychiatric diagnosis (Weissman et al., 2006). In fact, often times when a mother has Major Depression, her child also has a mental health diagnosis, and when mothers are treated successfully, their children also get better (Weissman et al., 2006). When the hierarchy is functioning well then pathology is less likely to develop elsewhere in the family structure. Family structures that are stable enough to support the subsystems and flexible enough to adapt during transitions will help the overall health of the whole family (Minuchin, 1974). Therefore, it is hypothesized that women who report a non-stressed couple relationship and help with childcare from their partner are protected against pathology and, in this case, postpartum depression. When women are protected, entire families are protected.

While Minuchin (1974) would agree that family dynamics and structure are an important aspect to protecting women, what is meant by family dynamics in the literature is not clearly defined. While Minuchin (1974) would say that the family structure affects how families protect women from pathology, specifying the types of family support which are helpful will aid in the development of educating, screening and especially treatment recommendations in the future. Therefore, learning more about the absence of couples stress can also catapult research regarding protective factors for at-risk women.

The literature also states that support can act as a buffer against depression (Haslam et al., 2006; Shaw et al., 2006). The support women receive during pregnancy and postpartum can act as a buffer against stress in their lives (Seguin et al., 1999). Both couple support and extended network support have been shown to be helpful to pregnant and postpartum women. High rates of social support are associated with lower levels of depression (Haslam et al., 2006; Shaw et al., 2006). From a structural family theory perspective, not just any support is helpful. Support from within the couple relationship would be the most effective buffer against individual and family pathology. Partner support has been shown to decrease a woman's chance of postpartum depression symptoms (Belsky et al., 1983; Lutz & Hock, 2002; Mercer et al., 1993). While most of the literature matches Minuchin's (1974) theory about the couple subsystem, a few studies suggest the opposite. Hueston and Kasik-Miller (1998) and McKee and colleagues (2001) both found that the presence of a partner or support from a partner only slightly influenced women's prenatal and postnatal experiences. Further research regarding support that protects at-risk women can advance current knowledge about risk factors, but also clarify current contradictions in the literature

While literature on protective factors is limited, there is some literature to suggest that health care can offer women postpartum depression support (Braveman, Marchi, Egerter, Pearl, & Neuhaus, 2000; Friedman, Heneghan, & Rosenthal, 2009b; Hanson, VandeVusse, Roberts, & Forristal, 2009; Novick, 2009). Health care support is received when women acquire prenatal care or prenatal providers offer a supportive relationship. Prenatal care is most commonly associated with protecting against low birth weights and infant mortality (McKee et al., 2001; Pagnini & Reichman, 2000), but there is also research to indicate that women who do not receive prenatal care are at higher risk for developing postpartum complications (Cook et al., 1999). Conversely, women who seek prenatal care early in their pregnancy are at lower risk for

developing postpartum depression (Kim et al., 2006). Similar to family support, the literature on healthcare provider support needs more specificity about what types of healthcare provider support as well as further investigation to clarify contradictions. Much of the literature on healthcare provider support has looked at prenatal education, but the current literature has mixed results regarding the efficacy of pregnancy and postpartum education (Hanson et al., 2009). Some literature indicates that women who are educated about postpartum depression during pregnancy are at lower risk for developing symptoms (Petersen, Connelly, Martin, & Kupper, 2001). Britton (2008) reports one stress that resulted in postpartum complications, such as depression, was women who do not attend prenatal educational classes. However, Hayes and colleagues (2001) found that an educational intervention during pregnancy made no difference in regards to postpartum depression scores.

Not only does more research need to be conducted to learn about protective factors, but specifically more research needs to be done to clarify the broad and sometimes contradictory results of social support for pregnant women. This analysis will look at women with a history of postpartum depression and examine three types of protective factors, women reporting non-stressed couple's relationships, partners helping with childcare and medical provider support. These three types of social support will be examined as a way to learn more about what protects women from experiencing postpartum depression symptoms.

Non-stressed couple's relationships. Structural family theory highlights the importance of a well functioning couple subsystem. This concept is new to the postpartum depression literature and offers a possible way to understand what can protect women and their families from postpartum depression symptoms. Since the couple subsystem is at the top of the hierarchy, how the couple functions is critical to how well the whole family structure functions (Minuchin & Fishman, 1981). Couples with clear boundaries that protect and support their subsystem will find ways to realign their family structure during this time and support one another (Minuchin & Fishman, 1981).

While conflict is normal, it can range from daily struggles to severe pathology (Minuchin, 1974). How conflict manifests can depend on the family structure. If the boundaries around the couple are too rigid, then the couple may experience emotional isolation. Women who report feelings of isolation and a lack of support are more likely to develop postpartum depression (Robertson et al., 2004). If the couple's boundaries are too loose, then the subgroups

22

can infringe on the couple's relationship and negatively affect the family functioning. Munichin's (1974) theory suggests that couples who report experiencing relationship stressors are vulnerable to these rigid or loose boundaries. Couples may feel so isolated they decide to separate or divorce. Couples who have such loose boundaries may discuss marital problems and/or get most of their support from people outside the couple subsystem and then the couple subsystem is not able to serve its function of protection. The couple subsystem must achieve a boundary that supports each other and protects them from the demands of other subsystems (Belsky et al., 1983; Lutz & Hock, 2002; Mercer et al., 1993; Minuchin, 1974). If couples are not able to provide this support to one another, their subsystem and the hierarchy will be weakened (Minuchin, 1974). These families are more susceptible to postpartum depression. Couples who keep their relationship together during pregnancy, who do not argue more than usual during pregnancy and couples where the partners favor the pregnancy are all examples of subsystems which are handling the transition period well and are not experiencing extra stress in the relationship. This is the inverse of the couple's stress measured for Analysis I. Those three items (stay together during pregnancy, do not argue more than usual, partner wants the baby) will be used as indicators of non-stressed couple's relationships in this analysis.

      Help caring for her baby. Social support is the leading protective factor in postpartum depression literature (Dennis & Chung-Lee, 2006; Green et al., 2006; Haslam et al., 2006; Jesse & Swanson, 2007; Shaw et al., 2006). Women who report less social support have higher rates of depression postpartum (Webster et al., 2000). Much of the postpartum depression literature on social support focuses on family support. Minuchin (1974) would suggest that it is not just help from anyone that will protect the family, but help which is occurring in the marital subsystem and can act as a buffer against depression. In structural family theory, it is the couple's support of each other which can buffer against individual and family pathology. In fact, it is a woman's perception that she is supported by her family and specifically her partner when she needs it that is most important. Stress related to childcare has been cited as a risk factor associated with postpartum depression (Appolonio, & Fingerhut, 2008). Glangeaud-Freudenthal and colleagues (1999) found that symptoms of postpartum mood disorders were related to a woman's perception that she would have little or no help with childcare. Help with caring for a newborn can provide support and offer women a plan, which could ease anticipatory stress that is associated with the postpartum time. Most of the literature regarding childcare does not quantify how much

23

assistance is offered or when the help with childcare occurred. Without specifying, it is hard to know exactly what is meant by support in these examples. Receiving help with childcare would be important to support the mother, but specifically support from the partner is what will strengthen the couple subsystem and thus protect the whole family. The woman's perception of who will help her care for her baby will be used as an indicator for this analysis.

Provider support. Close relationships with medical professionals have been identified as an influential factor for the women who seek treatment for postpartum depression (Dennis & Chung-Lee, 2006). Support received from a medical provider during pregnancy and postpartum influences both mental and physical health outcomes. One of the main goals of prenatal care is to protect both the woman and her baby from pregnancy and postpartum complications (Novick, 2009). There is research to show that a women's perception about the success of her pregnancy predicts her role adjustment postpartum (McKee et al., 2001; Mothander, 1992). Her feelings of success during pregnancy can also relate to her relationship with her medical provider. Building a relationship with their medical provider and the woman's belief that she is handling pregnancy well predicts positive experiences during pregnancy. Women who report liking their medical provider are more likely to attend medical appointments (Dibbelt, Schaidhammer, Fleischer, & Greitemann, 2009; Griffin et al., 2004; Willems, De Maesschalck, Deveugele, Derese, De Maeseneer, 2005). In fact, good interactions between medical providers and patients is a primary element of high-quality medical care and results in superior mental and physical health outcomes for patients. (Dibbelt et al., 2009; Griffin et al., 2004; Hanson et al., 2009). Specifically, a patient's positive feelings about his or her medical doctor have been shown to reduce depression and anxiety symptoms.

The type of relationship a woman has with her prenatal provider can been seen as a type of pregnancy support. Supportive relationships foster better feelings about maternal self-efficacy as well as better health outcomes (Novick, 2009). Two ways healthcare provider support can be assessed are based on when women begin receiving prenatal care and if prenatal providers offer a supportive relationship including discussing postpartum depression with their patients. When women delay prenatal care they are less likely to build a strong relationship with their provider and have less opportunity to receive extra services, education or counseling (Gazmararian, Arrington, Bailey, Schwartz, & Koplan, 1999). Women report wanting their provider to talk to them about postpartum depression and this type of education or counseling is viewed as

supportive and relationship building (Hanson et al., 2009; Novick, 2009). These two indicators will be used in this analysis, (1) when a woman begins receiving prenatal care and (2) if a woman's medical provider talks to her about postpartum depression.

     Initiation of prenatal care. There are many social, environmental and personal barriers which keep women and their families from receiving antenatal acute and preventive care (Cook et al., 1999). Sometimes these barriers keep women from ever receiving prenatal care, but other times it delays the initiation of prenatal care. According to Braveman et al.(2000) researchers, healthcare providers and patients alike still have not determined what the ideal course of prenatal care would involve, but everyone agrees that prenatal care needs to begin during the first trimester. The first trimester is when necessary risk assessments are completed and health promotion occurs. Women who begin prenatal care in the first trimester have seven to nine months to build a relationship with their prenatal provider. This is a way to get to know their medical provider and feel supported though their medical care. Women who enter prenatal care late do not have as much time to bond with their medical provider or receive the benefits of extra counseling or services. Not all women receive prenatal care in the first trimester and some never receive prenatal care (Cook et al., 1999).

     Babies of women who do not receive prenatal care are at risk for developing both physical and emotional complications. One study done on health outcomes for women with no prenatal care, found that these women were not psychologically prepared to go home and care for an infant (Friedman et al., 2009a). Not being physically or psychologically prepared could impact the chances of experiencing postpartum depression symptoms. According to Friedman et al. (2009a), infants had more medical problems and women often lost custody of their baby when they did not receive any medical care. Babies were admitted into the neonatal intensive care unit (NICU) more often than women who received prenatal care. These babies were admitted for many medical reasons including respiratory distress, apnea, tachypnea, microcephaly, prematurity, malformations, eclampsia, abruption, placental abruption, jaundice, narcotic withdrawal, and more. Other studies have also shown that no prenatal care leads to poor health outcomes (Braveman et al., 2000; Gazmararian et al., 1999). The women in the Friedman et al. (2009a) study were reported to child protective services for neglect and babies were either removed from their custody or families were required to participate in home-based social services programs and supervision. All of these complications add extra stress to the postpartum

25

time and therefore impact a woman's mood. Women who never receive prenatal care are also at risk for many different medical problems. Women who do not seek prenatal care until late in their pregnancy, second or third trimester, are more likely to experience postpartum complication including postpartum depression (Cook et al., 1999).

Overall, receiving prenatal care early, in the first trimester, benefits both the mother and her baby. Early prenatal care is a way for women to build a relationship with their prenatal care provider, emotionally prepare for their baby as well as protect themselves and their baby from extra complications that lead to postpartum depression.

Provider discussed mood at prenatal visits. Initiating prenatal care in the first trimester is one way for women to build relationships with their medical provider, but the communication between providers and pregnant women is also critical to their relationship (Willems et al., 2005). In healthcare literature, good medical provider and patient communication includes medical providers who give more information and education to patients, more questions asked by both patient and the medical provider and more shared decision making. Prenatal care guidelines require medical providers to complete all necessary assessment procedures and laboratory testing, but also recommend that medical providers offer women education and counseling during prenatal care (Hanson et al., 2009). Discussing perinatal mood disorders and treatment options would be one of the possible education and counseling topics for parental providers.

While parental care guidelines recommend education and counseling, not all medical providers talk to women and their families about postpartum depression. Some women seek their own education by attending childbirth education programs. However, many families are unable to attend these programs due to logistical barriers. Childbirth education programs are not realistic for many women and families, which increases the need for medical provider's to offer this education in prenatal appointments (Novick, 2009). Not only is education and counseling part of prenatal care guidelines, but women have also reported wanting this type of relationship with their prenatal providers. According to Armstrong et al. (2005), women report needing support from medical providers and wanted to make decisions about their prenatal care with their medical provider. They also report feeling unsupported when medical providers did not offer education and guidance. Novick (2009) also found that women value counseling and education from their prenatal providers. The women in Novick's study specifically said they would like their medical provider to discuss the emotional changes in pregnancy and postpartum. Medical

providers who discuss postpartum depression with their patients are educating women about depression as well as offering support which could protect women from experiencing postpartum depression symptoms.

Goals and Hypothesis of Analysis II: Protective Factors During Pregnancy Against Postpartum Depression

The overall goal of Analysis II is to test if (1) non-stressed marital relationships, (2) partner's help with caring for the baby and/or (3) medical provider support during pregnancy buffer the effects of a history of depression. While studies show increased social support can help mothers (Dennis & Chung-Lee, 2006; Green et al., 2006; Haslam et al., 2006; Shaw et al., 2006), the research is not conclusive. There is little research to show what specific types of factors protect mothers. Because a history of depression is a well-established biological risk factor (Beck, 2001; Blum, 2007; Forty et al., 2006; Leigh & Milgrom, 2008), women with a personal or family history of depression are considered high risk patients for postpartum depression. A history of depression will be used in this analysis as a way to examine factors which may protect women from the onset of postpartum depression symptoms. It is hypothesized that women who report non-stressed partner relationships and/or women receiving help from their partner will be protected from postpartum depression symptoms because the couple subsystem can protect moms from pathology more than support from outside the couple subsystem. Learning more about protective factors will not only offer empirical data specific to family support or medical provider support during pregnancy, but also examine buffers for women who have a history of depression. Ultimately, the information gained from this analysis can provide practical information to inform future education, screening and treatment for woman and their families.

CHAPTER 3. Method

Participants

The study sample was recruited from a population of English-speaking women who recently delivered a child on the obstetric services of four large urban hospitals in Utah from 2005-2007. Women were invited to participate in the study while hospitalized within 24-48 hours after delivery of a singleton, term (≥ 37 weeks) live-born infant. Women were excluded from the study if they were currently diagnosed with or being treated for a mood disorder based on patient self-report or documentation in the hospital medical record. Adolescents who had recently given birth were considered emancipated and were able to provide their own informed consent. One thousand five hundred sixty eight women participated in the study. Eighty-three percent of the women were White, 10% Hispanic, 3% Asian Pacific Islander, and 4% other. Eighty-three percent of the women were married. The youngest participant was 15 years old and the oldest was 44, with the average age being 27 years old. The average amount of school the participants had completed was 14 years, while the range of school completed was between 2 years and 27 years. Most of the women were insured (63%), 24% had Medicaid and 25% reported that they were self-pay. Thirteen percent of the women in this sample reported a family history of psychiatric illness and 23% reported a personal history of a mood disorder. Thirty percent of the sample reported that they are stay-at-home mothers and the other 70% reported they were currently employed in various occupations. The majority of the women's partners were also employed and 10% of the partners were unemployed. Descriptive statistics can also be viewed in Table 2.

Table 2

Sociodemographic Characteristics

Characteristic	Frequency	%
Age (years)		
15-20	145	9.3
21-25	473	30.4
26-30	555	35.6
31-35	290	18.7

36-40	80	5.1
41-44	14	0.9
Marital Status		
Single	202	13.2
Married	1306	83.3
Divorced	60	3.5
Race		
White	1293	82.5
Hispanic	153	9.8
Black	17	1.0
Asian/pacific islander	40	2.6
Other	24	1.5
Insured (# of women with insurance)	1389	88.6
Education		
≤11th grade	136	8.9
12th grade	348	22.7
1-2 yr college	330	21.6
3-4 yr college	492	32.1
≥5 yr college	224	14.7
Pregnancy Complications (# of women with complications)	65	4.1
Couples Stress (# of women with couple stress)	354	22.6
Financial Stress (# of women with financial stress)	820	52.3
Emotional Stress (# of women with emotional stress)	541	34.5
Traumatic Stress (# of women with Traumatic stress)	196	12.5
At-risk Women		
Personal History of Depression	278	17.7

Family History of Depression	210	13.4
Personal History of Postpartum Depression	137	8.7
Non-stressed Couples Relationship (# of women reporting non-stressed couples relationships)	1177	75.1
Partner Help with Childcare (# of women reporting partner help)	1234	78.7
Provider Support		
1st Prenatal Visit (Trimesters)		
1st Trimester (1-13 weeks)	1378	91.4
Second Trimester (14-26 weeks)	113	7.5
Third Trimester	17	1.1
Provider Discussed Mood	731	46.6
Postpartum Depression Risk Scores		
12-30 (High)	182	17.2
10-11 (High-Moderate)	104	9.9
5-9 (Moderate-Low)	465	44.2
1-4 (Low)	302	28.7

Note. Missing data values not included in table.

Measures

Pregnancy Risk Assessment Monitoring System (PRAMS). The PRAMS is a Center for Disease Control (CDC) and Prevention project run out of state health departments to gain population-based data on women's pregnancy and postpartum experiences and is used to assess pregnancy risk factors. The PRAMS questionnaire consists of many subscales; one of which is a pregnancy stressors subscale. This pregnancy stressors subscale is the only part of the PRAMS questionnaire used in this study. The subscale was developed in 1987 with the original PRAMS questionnaire (Centers for Disease Control and Prevention, 2009). The items in the subscale originally came from the life event inventory list and were selected and evaluated by the Pregnancy Risk Assessment System team before being included in the questionnaire (Ahluwalia, Merritt, Beck, & Rogers, 2001). Since 1987, the subscale has gone through five phases of

revision, and reliability and validity are continuously evaluated by Pregnancy Risk Assessment System team (Center for Disease Control and Prevention).

PRAMS pregnancy stress subscale consists of 13 items measuring couple stress, financial stress, emotional stress, and traumatic stress. The items were categorized and labeled by the CDC when the questionnaire originated. Three items measure couple stress, four items measure traumatic stress, four items measure financial stress and two items measure emotional stress. Each item in the pregnancy stress subscale of the PRAMS is coded as a yes-or-no variable. Ahluwalia and colleagues (2001) performed principal component analysis and found that the 13 items loaded on four conceptually distinct constructs. The four types of stress can be combined for a total stress score or the four stresses can be scored separately. In Analysis I and Analysis II, the four types of pregnancy risk factors will be coded dichotomously, indicating any existing or absence of stress as seen previously in Table 2.

Edinburgh Postnatal Depression Scale (EPDS). The EPDS is used to assess the mental health outcome of postpartum depression symptoms. It was developed in medical clinics in Livingston and Edinburgh, Scotland (Cox, Holden, & Sagovsky, 1987). The EPDS is a 10-item self-report scale. This was developed because it was not clear if other depression scales were applicable to postpartum women because some of the normal postpartum symptoms are thought to be depressive symptoms outside of the postpartum period (Cox, et al., 1987; Eberhard-Gran, Eskild, Samuelsen, & Tambs, 2006). The symptoms EPDS focuses on are the lack of pleasure, blaming oneself, feelings of anxiety or worry, feeling scared or panicky, feeling of being overwhelmed, difficulty sleeping because of unhappiness, feeling sad or miserable, crying, and thoughts of harming oneself (Cox et al., 1987). These items were created based on previously validated depression scales. Each statement is rated on a scale from 0–3 with zero equating to the absence of symptoms and three equaling the maximum severity and duration of symptoms (Eberhard-Gran et al., 2006). The items are focused on current symptoms asking the mother how she has been feeling during the past week. The mother chooses the best possible choice for her from the four possible responses. A total score ranging from 0–30 is possible. Seven of the 10 items are reversed scored to address response set bias.

Reliability. Internal consistency of the EPDS has been shown to be high. Cox and colleagues (1987) reported an alpha coefficient of 0.87. Other studies have estimated the Cronbach's alpha as 0.85 (Adewuya, Ola, Dada, & Fasoto, 2006), 0.90 (Adouard, Glangeaud-

Freudenthal, & Golse, 2004), 0.79 (Benvenuti, Ferrara, Niccolai, Valoriani, Cox, 1999), and 0.81 (Eberhard-Gran et al., 2006). While the literature has shown the EPDS has good internal consistency (Adewuya, et al., 2006; Adouard et al., 2004; Benvenuti et al., 1999; Cox et al., 1987; Eberhard-Gran et al., 2006) only a few studies discussed test-retest reliability. Overall, the EPDS has shown good test-retest reliability (Adouard et al., 2004; Guedeney & Fermanian, 1998).

Validity. The EPDS has good face validity. According to Adouard and colleagues (2004), their study confirms the good face validity of the EPDS. According to Adouard and colleagues (2004), the construct validity was compared to other scales and found that the EPDS has good construct validity. Since the EPDS is based on other validated scales, it uses depression-specific items which are specific to the postpartum period. Since the EPDS is made of other validated scale items and assesses symptoms specific to postpartum depression, the content validity is good. While cutoff scores have been deemed very similar among all EPDS studies and such consistency validates the concurrent validity, a cutoff score will not be used in this study. In this study, a woman's total EPDS score will be used as the continuous outcome variable.

Patient interviews and medical chart review. All the other information was gathered from either a structured interview with postpartum women in the hospital or review of their medical chart. Information about a woman's depression history was gathered by asking each woman about her history and their family history of psychiatric disorders. Women were asked if they have ever experienced depression in the past, postpartum depression or if any immediate family members have been diagnosed with depression in the past. This variable will be used as a dichotomous variable in Analysis II for any personal or family history of depression. Information regarding future childcare was gathered in the same interview by asking women to list individuals who would help them care for their baby. Responses were coded dichotomously to reflect whether or not they reported that their partner will help care for the baby. Interviewers asked women how many years of education they had completed. This variable will be a continuous variable by looking at few to many years of educational attainment and the raw number of years was used in the analysis. Pregnancy complications and insurance status information was gathered from the women's medical charts. The women's medical chart offered information regarding types of pregnancy complications. Type of complications will not be used in this study, thus, pregnancy complication will be coded as a dichotomous variable. Insurance

32

status will be coded as a dichotomous variable. Women were considered insured if they reported having private insurance or publicly funded prenatal or medical insurance, and they were considered uninsured if they did not report any health insurance during their pregnancy. Self-reported maternal race/ethnicity was collected using Utah state birth record categories, which was found in women's medical charts. Eighty-three percent of the sample was white. Race was coded as a dichotomous variable due to the homogeneous participant sample.

Data Collection Procedures

After Institutional Review Board approval at each participating institution was obtained, study coordinators obtained written informed consent and demographic data. Demographic data includes maternal age, education, marital status, and insurance status. Pregnancy complications, when women began prenatal care, who would help women care for their baby, and whether the healthcare provider discussed mood issues was recorded. In addition, personal and family psychiatric history data was collected. Pregnancy stressors were identified via self-administration of the 13 "stressors" questions from the PRAMS (Appendix A).

Six to eight weeks after delivery, patients received a self-administered questionnaire by mail that contained the EPDS (Cox & Holden, 2003; Cox et al., 1987). The criterion used to define "screening positive for postpartum depression" was a pre-specified score of ≥12 on the EPDS. Women who screened positive on the EPDS were contacted and referred to support services. Information regarding whether they were already being evaluated and treated for postpartum depression was collected. The pregnancy care provider of all women screening positive for depression was notified via mail that their patient had screened positive as part of the study. Women screening positive who were unable to be contacted via telephone were sent a letter informing them of their postpartum depression screening results.

Analytic Procedures

To test which factors put women more at risk for postpartum depression and which factors are protective factors, a hierarchal regression analysis and a moderated multiple regression analyses were conducted. SPSS 15.0 for Windows Grad Pack (Norusis, 2006) was used for the analysis and to compute descriptive statistics. Missing data were handled using listwise deletion. It is expected that the data will have a normal distribution due to the sample size, but the skewness and kurtosis for the dependent variable will be examined to detect any

values greater than an absolute value of two (Pedhazur & Schmelkin, 1991). Once the distributions and relationships of the data have been assessed, reliability of the measures will be examined.

Measurement Reliability

The reliability of the PRAMS was examined prior to testing the hypotheses. The reliability of the EPDS was not tested in this study because the investigator did not have access to the responses to each individual item for the EPDS from this secondary data set. While it was tested in this study, the EPDS has had good internal consistency in previous studies (Adewuya, et al., 2006; Adouard, Glangeaud-Freudenthal, & Golse, 2004; Benvenuti et al., 1999) with varying samples. With regard to internal consistency of the PRAMS, Cronbach's coefficient alpha, which is the most widely used measure of reliability (DeVellis, 2003), may not be appropriate. Bollen and Lennox's (1991) discussion on construct measurement distinguishes between effect indicators and causal or composite indicators. The effect indicators seek to measure items which are influenced by the already established existence of the latent construct, whereas composite indicators measure items that determine the existence of the latent construct. The PRAMS measures composite indicators. Composite indicators can have positive, negative or no correlations, but can still be useful predictive indicators (Bollen & Lennox, 1991). In other words, total scores on the PRAMS indicate whether participants are stressed, but there is no latent variable (such as latent stress) that should predict scores on the individual PRAMS items and would give reason to expect high inter-item correlations. Therefore, the Cronbach's alpha was computed but a high alpha representing internal consistency was not expected for the PRAMS scale. Cronbach alpha scores between 0.6 and 0.9 were considered sufficient for the PRAMS (Adewuya, et al., 2006). Table 3 shows the skewness and kurtosis estimation for the dependant variable (EPDS). Regression assumptions suggest that error is normally distributed if the dependant variable is normally distributed. Based on the Skewness and Kurtosis estimate, the variables are normally distributed.

Table 3

Skewness and Kurtosis of Dependant Variable

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
EPDS Total	.892	.075	.849	.151

A Pearson correlation matrix was computed to detect collinearity among the independent variables. These analyses contain two continuous independent variables, with all other independent variables being categorical or dichotomous. When assessing for collinearity, only continuous independent variables are assessed. Therefore, the matrix was computed for the only two continuous independent variables in the analysis and the continuous dependent variable. Table 4 displays the correlation matrix and because none of the values are greater than 0.6 no problem with collinearity was detected.

Table 4

Pearson Correlation Matrix

Pearson Correlations			
Variables	Age	Education	EPDS
Age	1.0000000		
Education	.368**	1.0000000	
EPDS	-.033	-.098**	1.0000000

Note. ** Correlation is significant at the 0.01 level (2-tailed).

Internal consistency of the PRAMS scale was then estimated. The PRAMS Cronbach Alpha estimate was 0.6. Cutoff of 0.6 was met, suggesting that the PRAMS scale has internal consistency and could be used for this study.

Analysis I and Analysis II Variables

In Analysis I, there are ten predictors; age, marital status, race, insurance status, years of education, couple's stress, financial stress, emotional stress, traumatic stress and pregnancy

complications. The purpose of Analysis II is to assess for interaction effects. Therefore, the predictors in Analysis II are a personal or family history of depression, non-stressed couples relationships variable, help with childcare and medical provider support. In both analyses the outcome is postpartum depression. A description of how each variable has been coded for the analyses is provided in Table 5.

Table 5

Explication of Variable Coding

Variable	Response Range	How variable was coded
Age	15-44	Continuous: 15-44
Marital status	3 possible responses (3 items): 1. S= single or engaged 2. M= married 3. D= divorces	Dichotomy: S or D = 0 M = 1
Race	5 possible responses (5 items): 1. W= White 2. H= Hispanic 3. B= Black 4. A= Asian/pacific islander 5. O= Other	Dichotomy: H, B, A = 0 W = 1
Insurance status	4 Possible Responses (4 items): N = none S = self M= medicaid I - private insurance	Dichotomy: N = 0 S, M, I = 1
Years of education	2-27	Continuous: 2-27
Pregnancy complications	12 different responses (none or type of pregnancy complication)	Dichotomy: None = 0

		Any type = 1
Couple's stress	4 possible responses (3 items):	Dichotomy:
	1. 3 No	3 No = 0
	2. 1 Yes and 2 No	Any amount of Yes = 1
	3. 2 Yes and 1 No	
	4. 3 Yes	
Financial stress	5 possible responses (4 items):	Dichotomy:
	1. 4 No	4 No = 0
	2. 1 Yes and 3 No	Any amount of Yes = 1
	3. 2 Yes and 2 No	
	4. 3 Yes and 1 No	
Emotional stress	3 possible responses (2 items):	Dichotomy:
	1. 2 No	2 No = 0
	2. 1 Yes and 1 No	Any amount of Yes = 1
	3. 2 Yes	
Traumatic stress	5 possible responses (4 items):	Dichotomy:
	1. 4 No	4 No = 0
	2. 1 Yes and 3 No	Any amount of Yes = 1
	3. 2 Yes and 2 No	
	4. 3 Yes and 1 No	
	5. 4 Yes	
History of depression	4 possible responses (3 items):	Dichotomy:
	1. 3 No	3 No = 0
	2. 1 Yes and 2 No	Any amount of Yes = 1
	3. 2 Yes and 1 No	
	4. 3 Yes	

Non-stressed couples relationship	4 possible responses (3 items):
	  1. 3 No
	  2. 1 Yes and 2 No
	  3. 2 Yes and 1 No
	  4. 3 Yes
		Dichotomy:
		  Any amount of Yes = 0
		  3 No = 1

Help with childcare	54 different responses (description of person helping with childcare)	Dichotomy:
		  Anyone other than husband
		   or partner = 0
		  Husband or partner = 1

Medical Provider support	2 Items:
	  1. weeks range from 1-41
	   (initiation of Prenatal care)
	  2. Yes=1 or No=0 (provider
	   discussed mood)
		Continuous:
		  0.00-4.31 Composite of z
		   scores for 2 items

Postpartum depression	Scores range 0-30 (10 items are scored 0-3)	Continuous: 0-30

Analysis I: The Impact of Couple Related Stress on Postpartum Depression

The purpose of Analysis I is to examine factors which put women at risk for the onset of postpartum depression symptoms. It is hypothesized that stress in the couple's relationship during pregnancy (divorce, argue, partner not wanting baby) will be related to higher postpartum depression scores, even after other demographic and stress-related risk factors are accounted for. To examine these predictors, the continuous outcome variable of postpartum depression will be regressed on ten predictors: age, race, marital status, years of education, insurance status, couple stress, financial stress, emotional stress, traumatic stress and pregnancy complications. Postpartum depression will be entered as the dependent variable and the predictors will be entered hierarchically in two blocks. Block one includes the control variables; age, race, marital status, years of education, insurance status and pregnancy complications. Block two includes the investigative variables; couple stress, financial stress, emotional stress and traumatic stress. Once all ten predictors are included in the regression equation in the two blocks the hypothesis that couple's stressors is related to higher postpartum depression scores even after other demographic and stress-related risk factors are taken into account will be tested. The squared correlation coefficient will be computed. The squared correlation coefficient will determine how much variance is explained by these predictors and the slope will determine the expected change in postpartum depression when the predictor changes respectively (Pedhazur & Schmelkin, 1991). To confirm the hypothesis the Beta will be computed, the t value will be examined and significance will be determined base on an alpha of .05. These results can be interpreted based on which predictors are identified as significant and the slopes between the significant predictors can be compared to determine how much postpartum depression scores increase when a certain predictor increases. If the net effect of couple stress on postpartum depression symptoms is significant and the slope indicates a greater level of expected change than other predictors, the hypothesis that couple stress is related to higher postpartum depression scores than other stress-related risk factors will be confirmed.

Analysis II: Protective Factors During Pregnancy Against Postpartum Depression

Moderated multiple regression analyses will be conducted to test whether any of the following pregnancy variables can protect at-risk women from postpartum depression symptoms. The potential protective variables include non-stressed relationships with significant others,

perceived support from the partner to care for the baby, and perceived provider support during pregnancy. Coding of these variables was presented in Table 2. The regression analysis will determine not only whether these protective factors have statistically significant main effects on postpartum depression symptoms, but also whether they moderate the impact for women who have a history of depression. The outcome (postpartum depression) will be regressed on (1) the risk factor variable (personal or family history of depression), (2) each protective factor variables (couples who report non-stressed pregnancy relationships, women who perceive their partner will help them care for their infant, provider support) and (3) each interaction variable (Risk X Partner Support, Risk X Husband Help, Risk X Provider Support). The interaction variables will be created by multiplying the sum score of each protective factor (non-stressed couple relationship, help with childcare, provider support) and risk factor (personal or family history of depression) as described in Baron and Kenny (1986), Frazier, Tix and Barron (2004) and Snyder and Mangrum (2005). The scores do not need to be standardized (Frazier et al., 2004).

Description of Regression Analyses. One regression equation will be computed to test the main effects and the three interaction effects. The continuous outcome (postpartum depression) will be entered into SPSS as the dependent variable. The risk factor variable (personal or family history of depression), the protective factor variables (couples who report non-stressed pregnancy relationships, women who report help from partner with childcare, medical provider support) and each interaction variable will be entered as independent variables. The regression equation will be computed to determine significance of the predictors on postpartum depression scores.

Interpreting the Regression Analyses. The squared correlation coefficient for the model will be computed and the critical F value will be used with an alpha level of 0.05. The main effects of history of depression, non-stressed couples relationships variable, help with childcare and medical provider support on postpartum depression scores, will all be examined based on the slope and the significance of the relationship detected. The results from the interaction terms will be examined in the same manner to determine whether or not these pregnancy protective factors moderate the relationship between history of depression and postpartum depression scores. If specific interactions are not significant, then a decision will be made about whether or not to keep that interaction term in the equation based on theoretical explanation of structural family theory. If a significant effect is observed, then it is important to look at what form of interaction

41

is occurring. To do this, a subgroup regression analysis will be conducted. The dichotomous protective factor variables can be split and analyzed separately to determine the intercept and slope of each group in the interaction variable. In this case, the two groups represent presence or absence of the protective factor (i.e. couples who report non-stressed pregnancy relationships and couples who report stress in their relationship, women who perceive their partner will help them care for their infant and women who do not, women who receive medical provider support and those who do not). For each group, the continuous outcome (postpartum depression) will be regressed on (1) the risk factor variable (personal or family history of depression). This can offer information about the relationship at different levels of the interaction. If the effect of history of depression on postpartum depression is significant for participants in stressed relationships and not significant for participants in non-stressed relationships, then the hypothesis that non-stressed couple relationships during pregnancy protects women from postpartum depression symptoms will be confirmed.

CHAPTER 4. Results

Analysis I: The Impact of Couple Related Stress on Postpartum Depression

      The first hypothesis was tested using a hierarchal regression analysis. In block one, the continuous outcome variable of postpartum depression was regressed on these control variables: age, race, marital status, years of education, insurance status and pregnancy complications. Then, in block two, couple stress, financial stress, emotional stress and traumatic stress were entered into the regression equation. When the analysis was run, a trend was observed in the data and residual plots were examined, therefore a non-normal distribution was suspected. A normality transformation was computed as a way to adjust data so it more closely met the regression assumptions and to increase the interpretability of the results. The four regression assumptions that needed to be met were (1) normality (2) linearity (3) independence and (4) homoscedasticity (Pedhazur & Schmelkin, 1991). Log transformation and reciprocal transformation were computed but the residual plot still suggested data was non-normal. EPDS postpartum depression scores range from 0-30, therefore it was thought that the 0 in the data set might be a problem when using log or reciprocal transformations. Square root transformations were computed and the residual plots changed slightly to indicate a normal distribution. The square root multiplied by EPDS postpartum depression scores plus one was used as a way to adjust for the 0 in the data set and to transform data using square root. This transformation changed the distribution on the residual plot to indicate a normal distribution. The regression equation was then computed once data was transformed using Sqrt(y+1) transformation. The model was significant and Table 6 outlines the regression equation results. Belsley, Kuh and Welsch (1980) recommend presenting the studentized residuals. Studentized residuals adjust for the differing variance in residuals and are therefore a good detection of outliers. Detection of outliers is important because outliers can alter the relationships assessed in the regression equation and can distort the significance tests (Pedhazur & Schmelkin, 1991). Therefore, studentized residuals will be used to verify the regression equation and determine normality of data. The studentized residual plot is presented in Figure 1.

43

Table 6

Hierarchical Regression Analysis I

Model	R Square	F Change
1	.013	2.086
2	.079	17.366 ***

Predictors	B	T
Age	.027	.791
Education	-.017	-.506
Insurance Status	.028	.898
Race	-.049	-1.511
Marital Status	.023	.654
Pregnancy Complications	.004	.128
Financial Stress	-.010	-.297
Couple Stress	.223	6.794***
Emotional Stress	.030	.972
Traumatic Stress	.115	3.416***

Note. Dependent Variable: Postpartum Depression

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 1

Studentized Residual Plot Analysis I

Normal Q-Q Plot of Studentized Residual
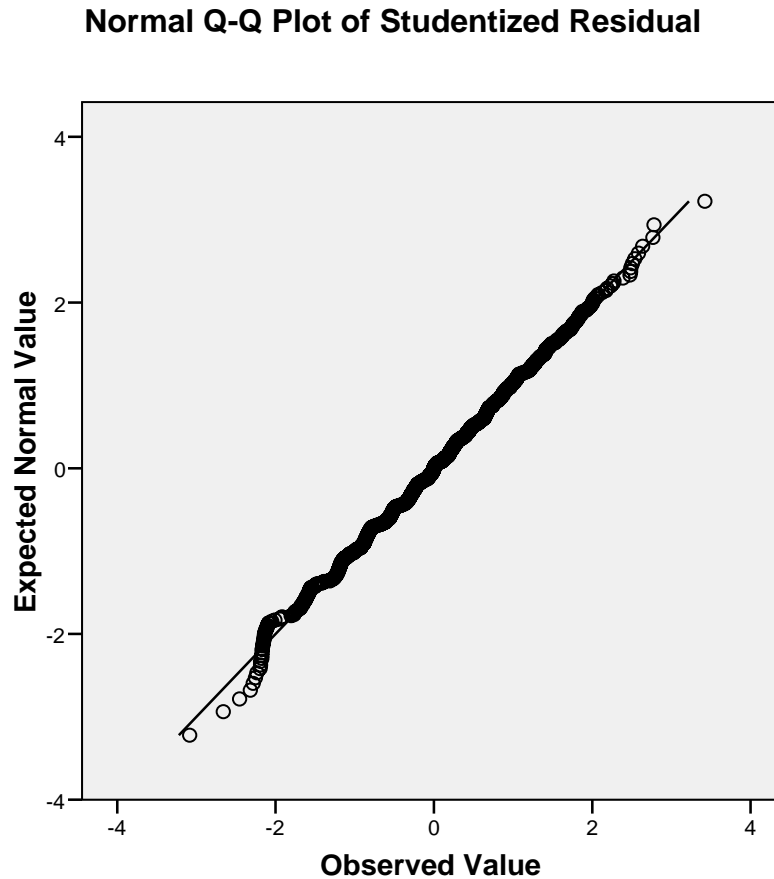
Analysis II: Protective Factors During Pregnancy Against Postpartum Depression

The square root transformation of sqrt(y+1) was also used when analyzing the data in the Analysis II. Postpartum depression was regressed on (1) the risk factor variable (personal or family history of depression), (2) each protective factor variables (couples who report non-stressed pregnancy relationships, women who perceive their partner will help them care for their infant, provider support) and (3) each interaction variables. This model was significant and Table 7 and Figure 2 outline the moderated multiple regression model.

Table 7

Moderated Multiple Regression Analysis II

Model	R Square	F
1	.113	17.361***

Predictors	B	T
Risk Factor (history of dep)	.310	3.085**
Couple Support	-.159	- 4.046***
Husband Help Childcare	-.036	-.987
Provider Support	-.010	-.261
Risk X Couple Support	-.133	-1.943*
Risk X Husband Help	.047	.502
Risk X Provider Support	.020	.532

Note. Dependent Variable: Postpartum Depression

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure 2

Studentized Residual Plot Analysis II

Normal Q-Q Plot of Studentized Residual
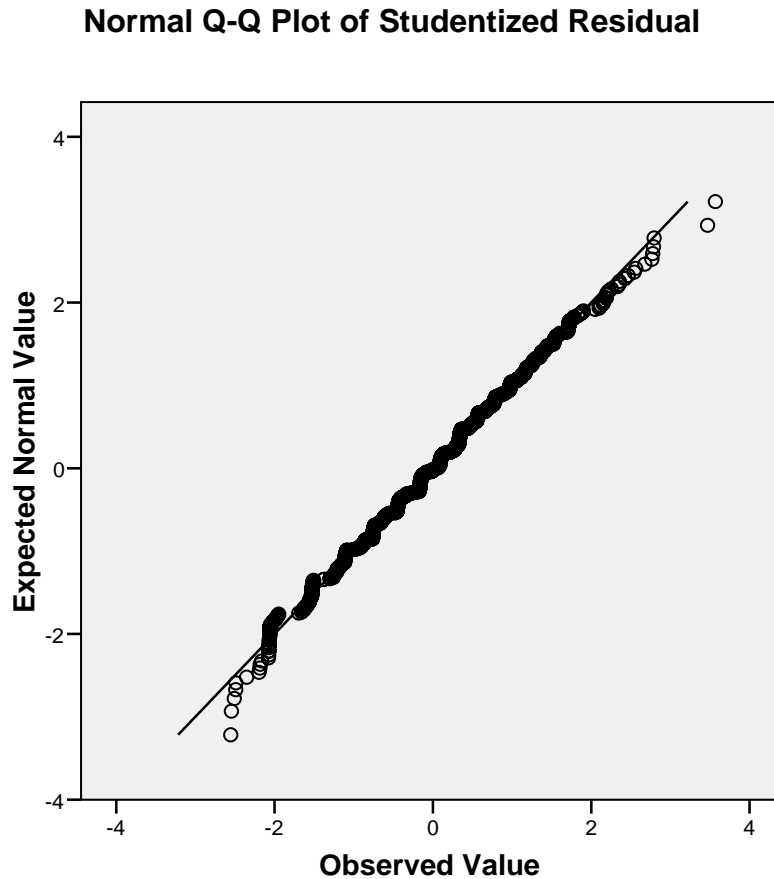
The significant interaction effect, risk factor and couple stress, was then explored further. A subgroup regression analysis was conducted. The dichotomous protective factor, couple stress, was split and analyzed as two separate variables (women who report couple stress and women who do not report couple stress). The continuous outcome (postpartum depression) was regressed on (1) the risk factor variable (personal or family history of depression) in two analyses, one with couples who report non-stressed pregnancy relationships and one with couples who report stress in their relationship. Table 8 outlines the split file regression analysis for couples who report non-stressed relationships. Table 9 and Figure 3 outline the split file regression analysis for couples who report stress in their relationship. None of the other interaction effects were explored because they were determined to not be statistically significant.

Table 8

Analysis II: Interaction effect for couples with non-stressed relationships

Model	R Square	F
Couples with Support	.040	33.236***
Predictors	B	T
Risk	.199	5.765***

Note. Dependent Variable: Postpartum Depression

* p < 0.05, ** p < 0.01, *** p < 0.001

Table 9

Analysis II: Interaction effect for couple with relationship stress

Model	R Square	F
Couples without Support	.126	28.308***
Predictors	B	T
Risk	.354	5.321***

Note. Dependent Variable: Postpartum Depression

* p < 0.05, ** p < 0.01, *** p < 0.001

Figure 3

Interaction Plot

Estimated Marginal Means of sqrtadd1EDPS
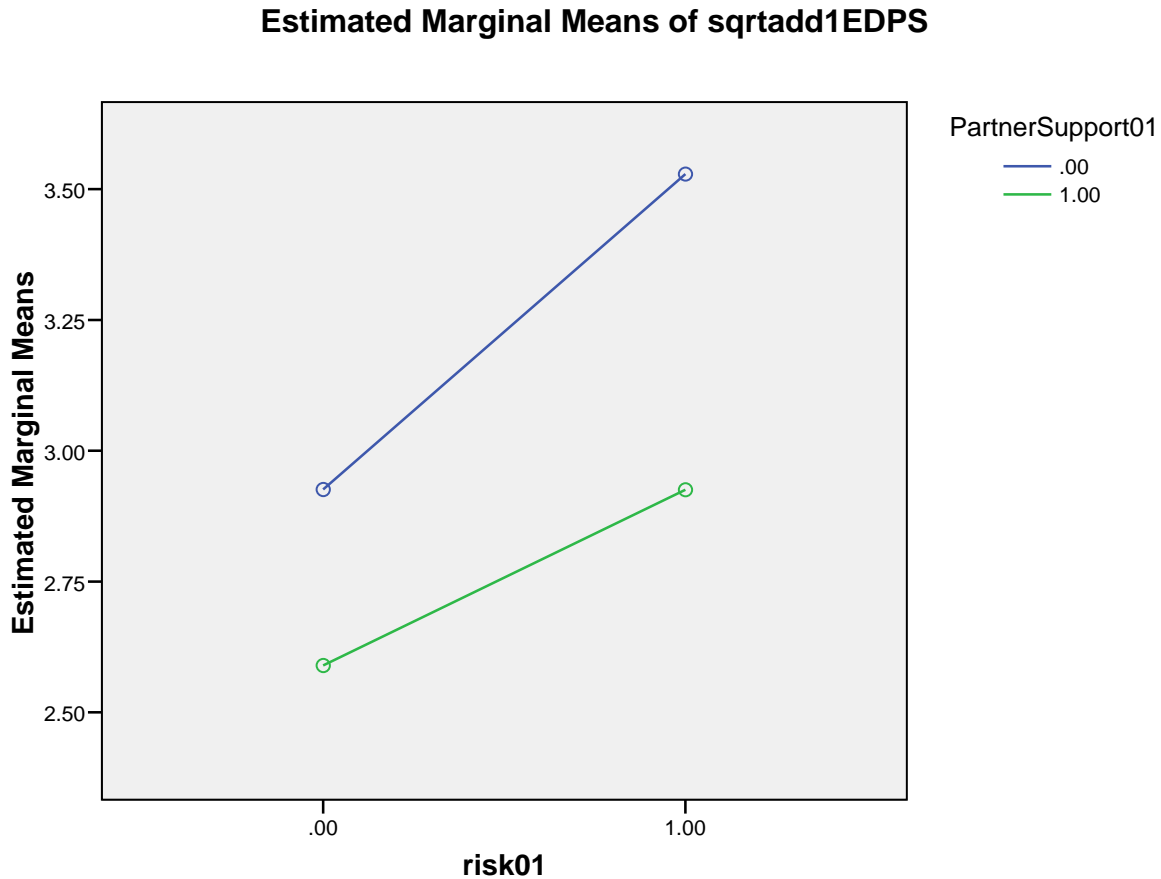
A post-hoc one-way analysis of variance (ANOVA) was conducted to verify the above interaction plot.

Summary of Results

The hypothesis for Analysis I was confirmed by the data. Stress in the couple's relationship during pregnancy (e.g., divorce, arguing, partner not wanting a baby) was related to higher postpartum depression scores, even after other demographic and stress-related risk factors were taken into account. The hypothesis for Analysis II was partially supported. Women who reported non-stressed couple relationships were more likely to be protected from postpartum depression symptoms when they had a history of depression. However, the hypothesis also stated that women whose partners would help them with childcare and women who received support

49

from their healthcare provider would be protected from postpartum depression symptoms was not supported in this analysis.

CHAPTER 5. Discussion

The purpose of this study was to (1) examine previously identified pregnancy stressors to determine which stressors increased women's risk for postpartum depression and (2) identify possible buffers for women who are at-risk for developing postpartum depression from a structural family theory perspective. Prior to this study, many psychosocial stressors had been identified as risk factors for postpartum depression. However, the lengthy taxonomies of risk factors were not extremely useful. Their length and complexity made it difficult to isolate significant predictors of postpartum depression from the multitude of identified risk factors. While this study confirmed two of the risk factors assessed in this study as significant predictors of postpartum depression (i.e., couple's stress, traumatic stress), the other two risk factors were not confirmed as significant (i.e., financial stress, emotional stress). The findings of this study not only provide more information about these already established risk factors, but also substantiate the theoretical notion introduced in this study regarding the importance of a couple's relationship during pregnancy. Until now, studies have focused on only the pregnant woman and did not typically include a couple or family conceptualization (Barnes, 2006; Bernazzani et al., 1997; Brown, 1986; Dulude et al., 2002; Glazier et al., 2004; Grote & Bledsoe, 2007; Robertson et al., 2004; Seguin et al., 1999). The results of this study move beyond this isolated approach by verifying significant risk factors and highlighting important relational factors. Specifically, the study provides evidence that supports the importance of conceptualizing postpartum depression from a family systems perspective. The following section examines the various risk factors studied in more detail.

Risk Factors for Pregnant Women

Couple's stress. Minuchin (1974) suggests that symptoms of one family member should not be viewed as an individual problem, but should be viewed as a problem within the family structure (Nichols & Schwartz, 2001). This study examined whether this was the case for postpartum depression by testing whether postpartum depression can be a manifestation of stress occurring not just in the woman, but in the couple's relationship. The results of this study suggest that this is the case. Analysis I supports the view that if a couple subsystem is stressed, then pathology in the mother is more likely to manifest itself. This is consistent not only with a structural family theory perspective, but also with the few studies that have acknowledged

51

couple's relationships in their studies of postpartum depression. Barnes (2006) and Beck (2001) both report that it is important to consider tension in marital relationships when assessing for postpartum depression. Additional research supports the notion that marital problems are a potential risk factor for women during their postpartum time period (Blum, 2007; Haslam et al., 2006; Whiffen & Johnson, 1998).

While these studies suggest that a couple's relationship is a point of interest during the postpartum time, they do not acknowledge the transition period of pregnancy. A transition period is the focus of structural family theory (how families adapt and change during transitions) and is missing in the current literature. The findings of this study fill this gap by assessing stress during pregnancy and how it affects the postpartum period. Cowan and colleagues (1994) explain that a life transition does not happen all in one day, one hour, or one specific moment. They suggest that all transitions must evolve before or after an event. In this case, giving birth is not the one moment in which parents transition into parenthood. There is a process leading up to and/or following the birth of a child that transitions parents into parenthood. The results from this study acknowledge this critical transition time by looking at events that happen during pregnancy and seeing how they affect the postpartum period. The results from this study also provide new information about the importance of the couple's relationship during pregnancy and into the postpartum period.

In this study, couple's stress predicts postpartum depression symptoms, even after accounting for nine other common types of pregnancy stressors. As structural family theorists would suggest, family structures which are not able to accommodate change may be more vulnerable to pathology and in this case postpartum depression (Minuchin & Fishman, 1981). The family structure is what creates, amplifies, or corrects pathology (Minuchin, 1974). Stress in the relationship is one indication that a family structure may not be accommodating change well. Barnes (2006), Beck (2001) and Green et al. (2006) found that postpartum depression is a common manifestation when a woman is not able to handle the life transition of having a baby. Based on these findings in the present study, it is not simply women not handling the transition, but rather the quality of a couple's relationship that affects women's mental health after pregnancy. Stress in the couple's relationship can cause the couple to feel less supported and maybe even isolated. Again, it has been reported that women who report feelings of isolation and lack of support during their pregnancy are more likely to develop postpartum depression (Brugha

et al., 2000; Cutrona, 1986; Paykel, Emms, Fletcher, & Rassaby, 1980; Robertson et al., 2004). This study illustrates that it is not just the woman's responsibility to handle this life transition, but rather the couple subsystem. The importance of a couple's relationship during pregnancy and postpartum can now be included in the understanding of postpartum depression.

Financial Stress. While the postpartum depression literature suggests that financial stress is a major risk factor for women, this study did not confirm this as a significant risk factor. In previous research, financial stress has been cited as a risk factor for postpartum depression (Beck, 2001; O'Hara & Swain, 1996; Patel et al.1999; Seguin et al., 1999; Warner et al, 1996.). Previous studies have included many financial issues including: low social economic status, low income and unemployment but often lump all these topics together to represent financial stress. It is these studies that have lead researchers and clinicians alike to believe that financial stress effects postpartum depression. Financial stress as a category was analyzed in Analysis I and was not a significant predictor of postpartum depression symptoms. Because this finding contradicts most of the postpartum depression literature regarding financial stress, it raises the question as to why financial stress was a risk factor in previous studies but not in the present study. As mentioned earlier, research on the financial stress risk factors do not always specify what type of stress makes women vulnerable to postpartum depression. The present study suggests that financial stress as a whole may not be a necessary risk factor to assess. One reason may be how financial stress was measured in the present study. Financial stress was assessed based on self report of four specific financial indicators. Previous studies assessed financial stress based on records of socioeconomic status (Seguin et al., 1999) or state unemployment records (Repetti et al., 1989). It could be that self report or the specific indicators measured in this study ((1) families moving to a new address, (2) partners losing jobs, (3) women losing jobs when they wanted to continue working, and (4) families not being able to pay their bills) limited the amount of financial stress measured and yielded different results than the broader categories of low socioeconomic status or unemployment. Another reason financial stress as a whole was not a significant risk factor may have been because of how the couple subsystem handled financial stress. If the couple was able to support each other while experiencing financial stress then the stress may not have any effect on the woman's postpartum mood.

From the structural family theory perspective, one role of the couple subsystem is to protect the couple from outside stress (Munichin, 1974). If other psychosocial stressors are also

53

present during this transition time, the couple has to work very hard to support one another and maintain the family hierarchy. The couple subsystem plays such a pivotal role that a well functioning subsystem could be buffering women from the effects of the financial stress which may be occurring at home. It may be the women who are experiencing financial stress are simultaneously feeling supported in their relationship and are able to maintain a well-functioning family structure. The previous studies indicating that financial stress is a risk factor (Patel et al.1999; Seguin et al., 1999; Warner et al, 1996) did not include an assessment of women's relationships which may have been the missing link. In fact, it may be that financial stress does not always predict postpartum depression but is a predictor when the stress interferes with how well the couple subsystem is functioning. Minuchin (1974) would suggest that relational problems or family structural problem are what lead to pathology. Financial stress is not inherently a relational problem and therefore may not be a risk factor unless it creates problems in the couple's relationship.

   Emotional stress. As was the case with financial stress, emotional stress was not a significant predictor of postpartum depression symptoms in this study. While the current literature suggested that financial and emotional stress would all be risk factors for postpartum depression (Curry et. al. 2006; Glazier et al., 2004; Varma et al., 2007), the results from this study did not concur. One reason for this could be similar to what was discussed about financial stress. Emotional stress may not be a risk factor unless couples are not able to handle the emotional stress in their life during pregnancy. Glazier and colleagues (2004) note that emotional distress during pregnancy puts women at increased risk of poor health outcomes, and research shows that emotional stress is predictable during pregnancy (Dulude et. al., 2002). Perhaps how women handle the emotional stress or the type of support they have in their family structure determines whether or not emotional stress puts them at risk for postpartum depression symptoms. In other words, if a woman with emotional stress is able to feel supported by her husband, the emotional stress may have less impact on her health than women who do not feel supported. From a structural family theory lens, family structures are able to protect family members from outside stressors (Minuchin, 1974). While the self reported emotional stress indicators used in this study (i.e., a close family member getting very sick and going to hospital or a close family or friend dying) are relational problems, they are not problems that automatically disrupt the couple subsystem or the family structure. In fact, some couples would

be able to support their partners through these events, which could have been the case for the women in this study. In this study, emotional stress was not a risk factor of postpartum depression. This is helpful information when aiming to learn more about the large number of risk factors currently reported in the literature. It may be that emotional stress is not a risk factor when isolated, but is a risk factor if it disrupts the couple subsystem.

  Traumatic stress. While financial stress, emotional stress and traumatic stress are all commonly cited risk factors in the literature, out of these three, traumatic stress was the only significant predictor of postpartum depression in this study. The results of this study matched the work done by Curry et al. (2006) and Keane and Kaloupek (1997), which state that traumatic experiences are a significant risk factor for postpartum depression. A structural family theory perspective would suggest that stress affecting the couple relationships or family structure could create pathology (Minuchin, 1974). Often traumatic experiences occur in the context of family relationships (i.e., sexual abuse, partner going to jail, physical fighting, consequences of family member with family abusing drug or alcohol). Thus, it is likely that the traumatic experience itself is part of the family structure and, therefore, the family structure is not protecting women from pathology during this transition time. If the traumatic experience occurs outside the family and the family is not able to protect and support the traumatized family member then pathology is also likely to cultivate. In this case, the couple's relationship is less likely to protect women from the cultivation of pathology when they have experienced traumatic stress during pregnancy.

Protective Factors for Pregnant Women

  Non-stressed couple's relationships. Using structural family theory to inform the conceptualization of postpartum depression was helpful when identifying risk factors and also when identifying protective factors. In Analysis II, non-stressed couple's relationships, as opposed to couple's stress, buffered women who were at risk for postpartum depression from postpartum depression symptoms. This confirms Minuchin's (1974) assertion that a well-functioning couple subsystem increases the likelihood of positive adjustment; this also is confirmed by the results of this study. The results show that women who are at risk for postpartum depression have higher rates of a history of depression than women who did not possess the risk factor (i.e., personal or family history of depression). However, women with couple stress have higher rates of depression symptoms and the effect of depression history on

current postpartum depression symptoms was weakened when women reported low stress in their relationships.

Previous research has shown that higher rates of social support are associated with lower levels of depression (Haslam et al., 2006; Shaw et al., 2006). In the present study, it is the effects of a non-stressed relationship that protect women. Partner support can have a pronounced effect on women's moods during the postpartum period (Barnes, 2006). Gottman and Porterfield (1981) found that husbands who were able to read their wives cues reported increased marital satisfaction. Husbands who paid attention to their wives and successfully understood what their wives communicated or needed was one way a relationship could be supported. As structural family theory suggests, a couple who is able to handle the transition of pregnancy without stressing their relationship and still support each other is critical to helping the mother through this postpartum period and crucial for the protection of the couple and the children (Minuchin, 1974). This buffering effect could be the explanation for why financial stress and emotional stress were not significant risk factors in Analysis I. In other words, if the couple subsystem is functioning in a supportive way it can protect it's family members from outside stressors (Minuchin, 1974).

Help caring for her baby. While the hypothesis was confirmed that non-stressed couple's relationships buffer at-risk women from postpartum depression, the other protective factors were not significant. From a structural family theory lens, husbands helping care for the child could provide support and strengthen the couple subsystem. However, the results for the present study illustrate that a husband stating that they would help care for the child did not significantly buffer women who were at risk from postpartum depression. It may be that the physical help from husbands to care for their baby is a support and does protect against postpartum depression, but the anticipation of it is not enough to buffer women. The current literature shows that for women with postpartum depression, the overwhelming feeling of caring for a newborn can really increase their need to receive instrumental and emotional support from their spouse (Barnes, 2006; Dennis & Chung-Lee, 2006). However, this study only assessed woman's perception that she would have help from her partner caring for the baby. In this case, the notion or perception that she would have help was not a buffer from postpartum depression symptoms. It may be that this is a significant protective factor during the postpartum time, but does not provide protection to women during the transition from pregnancy to postpartum.

Provider support. Medical provider support also had no significant effect on postpartum depression symptoms. Typically, prenatal care is associated with protecting against low birth weights and infant mortality (McKee et al., 2001; Pagnini & Reichman, 2000), and there is some research to indicate that women who do not receive prenatal care are at higher risk for developing postpartum complications (Cook et al., 1999). Kim and colleagues (2006) noted that women who seek prenatal care early in their pregnancies are at lower risk for developing postpartum depression. This finding was not confirmed as significant in this study. Furthermore, the current literature has mixed results regarding the efficacy of pregnancy and postpartum education (Hanson et al., 2009). In this case, no significant effect was found from healthcare providers discussing mood disorders at the prenatal visits. While Armstrong et al. (2005) and Novick (2009) found that women value counseling and education from their prenatal providers, it did not have any effect on postpartum depression symptoms in this study. One possible explanation for this result may involve inadequacies in the measurement of provider support. In particular, responses to a question concerning providers' discussion of mood disorders could mean that a) the medical provider is a concerned support provider and wants to check on the patient's (participant's) mental health; and/or b) the patient (participant) has a mood disorders or is symptomatic for mood disorders and this has been brought to the provider's attention. If the former holds true, one might expect that scores on the index of provider support would be associated with decreased postpartum depression symptoms. If the latter holds true, one might expect that scores on the index of provider support would be associated with increased postpartum depression symptoms. Perhaps these two processes cancel each other out, resulting in statistical suppression (Paulhus, Robins, Trzesniewski, & Tracy, 2004) of provider support with postpartum depression in the present study. Another explanation could be that provider support, support from outside the family, does not buffer women in the same way that a family structure can buffer women. Munuchin (1974) would say that a family members main support is established in the way the family is structured rather than in outside support systems.

Discussion Summary

The results of this study enhance the current understanding of postpartum depression risk factors and protective factors by highlighting the importance of family structure during pregnancy. Pajulo and colleagues (2001) also acknowledged the importance of understanding

women's relationships during this time. They reported that women who had experienced difficulties with their mothers, friends or their partners were at higher risk for postpartum depression. Along with confirming that couple's stress is a risk factor, this study also indicates that traumatic stress is a significant risk factor for postpartum depression symptoms.

This study was not able to confirm two other commonly noted risk factors. Postpartum depression literature states that financial stress and emotional stress are common risk factors (Curry et. al. 2006; Glazier et al., 2004; Patel et al., 1999; Varma et al., 2007). However, these stressors as a group were not significant predictors of postpartum depression symptoms. From a family systems perspective, it is possible that the financial and emotional categories were not significant predictors because the relational stresses were the main risk factors and they were accounted for in the couple and traumatic stress categories.

One protective factor was also established as a result of this study. Non-stressed couple's relationship did buffer women from postpartum depression symptoms. Minuchin would suggest that support should come from within the family system to protect women (Minuchin, 1974) and in this case outside support did not have a significant effect on a woman's postpartum depression symptoms. While Seguin and colleagues (1999) found that the support women received during pregnancy and postpartum can act as a buffer against stress in their lives, the results from the present study show that it is not just any support but rather the effects of a non-stressed couple relationship.

CHAPTER 6. Post-Hoc Exploratory Analyses

Three exploratory analyses were conducted after completing the proposed analyses to explore data and to verify that the originally proposed analyses are not limiting the story that the data tells. The post-hoc analyses were intended to supplement the original study, but are not within the scope of the original study. Therefore the variables assessed in the post-hoc exploratory analyses were not focal points of the original study, but provide adjunct information and furthermore, provide direction for future research.

Learning which stressors put women more at risk for postpartum depression and identifying possible buffers for women who are at risk for developing postpartum depression was the aim of this project and the exploratory analyses advance this goal. Three post-hoc analyses were conducted as a way to continue learning about the risk and protective factors and to assess the methods used in the original analyses. In the first exploratory analysis, four of the dichotomous variables were recoded and a regression analysis was computed to learn about the potential lack of variability caused by coding variables dichotomously. This analysis allows for an examination of the methods used in the originally proposed analysis. The second exploratory analysis involved a further examination of the pregnancy stressors. The pregnancy stressors in the PRAMS subscale are categorized into four stress categories (financial, couple, emotional, traumatic) and coded dichotomously in original Analysis I. In the exploratory analysis, each individual pregnancy stressor is analyzed to learn more about the specific pregnancy stressor events rather than the general types of stress (couple, financial, emotional, traumatic). This analysis yields more detailed information about the risk factors. The third exploratory analysis is a post-hoc analysis examining the demographic variable of race. In the originally proposed analyses, race was identified as a possible predictor of postpartum depression. With structural family theory as a guide, it was hypothesized that if race predicted postpartum depression it would be due to external stress or strain that a couple's race may put on the couple's relationship. Minuchin (1974) would suggest that all the stresses inside and outside the family filter through the family structure. Exploratory Analysis III examines couple stress as a mediator between the demographic variable race and postpartum depression scores. All three exploratory analyses use the transformed outcome variable of postpartum depression as a way to adjust for the skewness and kurtosis in the original data. Data was transformed using Sqrt(y+1) transformation. Residual plots indicating normal data were produced for each exploratory analysis.

Analytic Procedures for Exploratory Analysis I: Pregnancy Stressor Categories as Continuous Variables

The methods used to conceptualize stress in the literature vary. The originally proposed analyses measured stress dichotomously by the existence or absence of, whereas many studies look at cumulative stress (Brown, 1994; Dulude et. al, 2002; Glazier et al., 2004; Grote & Bledsoe, 2007; Tessier et al., 1992). From a structural family theory lens, any amount of stress requires a family structure to be flexible and still support it's members (Minuchin, 1974). From this theoretical framework, it is not about the amount of stress, but rather how the family handles any stress. Therefore, in the originally proposed analysis, stress was measured dichotomously as the existence of stress or the absence of stress. While some studies have measured stress in this way (Mercer, Ferketich, DeJoseph, Katharyn, & Sollid, 1988; Misri, Kostaras, Fox, & Kostaras, 2000), other studies (Brown, 1994; Dulude et. al, 2002; Grote & Bledsoe, 2007; Tessier et al., 1992) suggest that the amount of stress is what is important. With the aim of the original proposed Analysis I being to understand which risk factors put women more at risk for postpartum depression, questions arose regarding the best way to code the pregnancy stressor variables to learn about these risk factors. In harmony with the structural family theoretical perspective, the original proposed analysis coded the four risk factor variables dichotomously as a way to examine the existence or absence of stress. In Exploratory Analysis I, the dichotomous variables were recoded as continuous variables to measure cumulative stress similar to many studies on stress in the current literature. Recoding the pregnancy stressors by summing the stress scores allows for more variability and may yield new findings. Analysis I was reanalyzed using hierarchal regression. The continuous outcome variable of postpartum depression was regressed on the same ten predictors: age, race, marital status, years of education, insurance status, couple stress, financial stress, emotional stress, traumatic stress and pregnancy complications. Postpartum depression was entered into SPSS as the dependent variable and the predictors were entered hierarchically in two blocks. Block one included all the control variables; age, race, marital status, years of education, insurance status and pregnancy complications. Block two included the exploratory variables, which are the stress variables recoded as continuous variables, including couple stress, financial stress, emotional stress and traumatic stress. The Beta coefficients were computed, the t value was examined and significance was determined based on alpha .05 or less. These results were interpreted based on which predictors were

identified as significant and the slopes between the significant predictors were compared to the dichotomously coded variables. After comparing the two models, the most parsimonious model is discussed in the conclusion section.

Results for Exploratory Analysis I: Pregnancy Stressor Categories as Continuous Variables

The originally proposed Analysis I hierarchal regression model was reanalyzed by regressing postpartum depression on the six control variables: age, race, marital status, years of education, and insurance status and pregnancy complications in the first block. The recoded continuous variables, couple stress, financial stress, emotional stress and traumatic stress were added in the second block. The results for this regression model are shown in Table 10.

Table 10

Exploratory Analysis I: Hierarchical Regression Recoded

Model	R Square	F Change
1	.013	2.036*
2	.070	14.869 ***

Predictors	B	T
Age	.021	.605
Education	-.021	-.608
Insurance Status	.025	.814
Race	-.049	-1.501
Marital Status	.023	.645
Pregnancy Complications	.006	.185
Financial Stress	-.020	-.576
Couple Stress	.214	6.249***
Emotional Stress	.039	1.253
Traumatic Stress	.093	2.644**

Note. Dependent Variable: Postpartum Depression

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Analytic Procedures for Exploratory Analysis II: Examining Pregnancy Stressors in Depth

In the originally proposed Analysis I, the PRAMS pregnancy stressors were categorized into four groups: couple stress, financial stress, emotional stress, and traumatic stress. The items were categorized and labeled by the CDC when the questionnaire originated. The four types of pregnancy stresses were included in the analysis based on a literature search related to postpartum depression risk factors. Again, the main goal of the originally proposed Analysis I was to learn what types of risk factors put women more at risk for postpartum depression. This exploratory analysis allows for a more in depth examination of the individual items on the PRAMS subscale. In this analysis, the continuous outcome variable of postpartum depression was regressed on the 13 PRAMS pregnancy stress items as seen in Appendix A. The squared correlation coefficients were computed. The squared correlation coefficient determined how much variance is explained by these predictors and the slope will determine the expected change in postpartum depression when the predictor changes respectively (Pedhazur & Schmelkin, 1991). The Beta coefficients were computed, the t value was examined and the significance was determined base on the alpha value of .05 or less. These results were interpreted based on which predictors were identified as significant and the slopes between the significant predictors were compared to determine how much postpartum depression scores increased when a certain predictor increased. This analysis yielded information regarding how specific pregnancy events predict postpartum depression.

Results for Exploratory Analysis II: Examining Pregnancy Stressors in Depth

The continuous outcome variable of postpartum depression was regressed on 13 predictors. The 13 predictors are the individual items on the PRAMS pregnancy stress scale as seen in Appendix A. The results from this analysis are outlined in Table 11.

Table 11

Exploratory Analysis II: Pregnancy Stressors

Model	R Square	F
1	.090	7.633***

Predictors	B	T
A. Family member sick	.024	.742
B. Separation/divorce	.026	.781
C. Moved	.058	-1.884
D. Homeless	-.040	-1.226
E. Partner lost job	-.083	-2.623**
F. Lost job	.012	.384
G. Argued with partner	.190	5.934***
H. Partner not want pregnancy	.024	.774
I. Could not pay bills	.111	3.322***
J. Physical fight	.006	.204
K. You or partner in jail	.075	2.305*
L. Drug problem someone close	.065	1.998*
M. Death of someone close	.019	.604

Note. Dependent Variable: Postpartum Depression

* p < 0.05, ** p < 0.01, *** p < 0.001

Analytic Procedures for Exploratory Analysis III: Couple Stress as a Mediator

The goal of all the exploratory analyses is to learn more about what story the pregnancy and postpartum data tells. Therefore, Exploratory Analysis III looked at variables which were included in the original analyses but, were not the focal point, to determine if any of the variables needed further exploration. While conducting the originally proposed Analysis I and Analysis II, a trend was noted in the demographic variable, race. The first block of the hierarchal regression Analysis I, included all the control variables and none of these variables were statistically significant at a p < 0.05 level, however, the race variable with a p value of 0.068 suggested it could be an important predictor for postpartum depression. However, in block two of Analysis I the race variable became less significant. An exploratory analysis was run to learn more about

this demographic variable. It appeared the variability in the race variable could be important when understanding what risk factors predict postpartum depression.

Couple stress was a significant predictor in each analysis. Because this paper is based on the theoretical premise that couple stress during pregnancy influences postpartum depression, it is theoretically hypothesized that couple stress may mediate the relationship between race and postpartum depression. While it was hypothesized in Analysis II that couple stress would moderate the relationship between the risk factor (personal or family history of depression) and postpartum depression, it may also be possible that couple stress is a mediator. In this exploratory analysis, couple stress is hypothesized to mediate the relationship between race and postpartum depression. The conceptual model is shown in Figure 4.

Figure 4

Conceptual Model: Exploratory Analysis III on Couple Stress as a Mediator
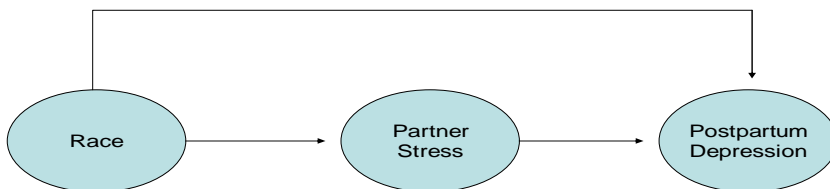
Stepwise mediation analytic procedures. Prior to the stepwise mediation, a regression analysis was computed including only the control variables as predictors to learn more about the relationship between the control variables and postpartum depression. Then a stepwise mediation analysis was conducted to determine the relationship between race, couple stress and postpartum depression. The three step mediation analytic procedure was proposed by Barron and Kenny (1986). The first step examines whether or not the control variable (race) predicts postpartum depression by regressing the postpartum depression score on the race variable. The Beta coefficient will be computed, the t value will be examined and significance will be determined base on alpha .05 or less. The second step examines whether or not race predicts the mediator (couple stress). The mediator (couple stress) is regressed on race to determine whether a significant relationship exists. The relationship is determined by the beta coefficient and the t value of alpha .05 or less. The third step controls for race by examining whether or not the mediator (couple stress) and race predict postpartum depression. Postpartum depression will be regressed on couple stress and race and the significance of this relationship will be determined by examining the beta coefficient and the t values significance of an alpha at .05 or less. This step determines the mediation by regressing postpartum depression on both race and the mediator (couple stress). Mediation will appear based on finding an insignificant or reduced

65

relationship between race and postpartum depression and a significant relationship between couple stress and postpartum depression in this final step.

Results for Exploratory Analysis III: Couple Stress as a Mediator

Postpartum depression was regressed on all the control variables to examine the relationship between the control variables and the outcome as seen in Table 12.

Table 12

Exploratory Analysis III: Postpartum Depression regressed on Control Variables

Model	R Square	F	Sig.
1	.014	2.272	.035
Predictors	B	T	Sig.
Age	.025	.740	.460
Education	-.047	-1.368	.172
Insurance Status	.041	1.303	.193
Race	-.060	-1.827	.068
Marital Status	-.057	-1.663	.097
Pregnancy Complications	-.004	-.111	.911

Note. Dependent Variable: Postpartum Depression $* p < 0.05, ** p < 0.01, *** p < 0.001$

The meditational analysis was then conducted in three steps. In the first step postpartum depression was regressed on the race variable as seen in Table 13.

Table 13

Exploratory Analysis III: Postpartum Depression regressed on Race

Model	R Square	F
1	.006	6.115*
Predictors	B	T
Race	-.007	-2.740*

Note. Dependent Variable: Postpartum Depression

$* p < 0.05, ** p < 0.01, *** p < 0.001$

In the second step, the mediator (couple stress) was regressed on race. The results are outlined in Table 14.

Table 14

Exploratory Analysis III: Couple Stress regressed on Race

Model	R Square	F
1	.016	24.027***
Predictors	B	T
Race	-.128	-4.996***

Note. Dependent Variable: Couple Stress

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

In the third step, postpartum depression was regressed on both race and the mediator (Couple stress). This final step is shown in Table 15.

Table 15

Exploratory Analysis III: Postpartum Depression Regressed on Race and Couple Stress

Model	R Square	F
1	.063	33.981***
Predictors	B	T
Race	-.046	-1.486
Couple Stress	.242	7.862***

Note. Dependent Variable: Postpartum Depression

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Summary of Results for Post-Hoc Exploratory Analyses

The results for Exploratory Analysis I are similar to the results in the originally proposed Analysis I. It was therefore determined that the way pregnancy stressor variables are coded does not impact the findings in this study. In other words, couple, emotional, traumatic and financial stress were conceptualized similarly when measuring the existence of the stress (dichotomously)

or measuring the total stress score (sum of stress). In Exploratory Analysis II, each of the five pregnancy stressors had unique significant effects on women's postpartum depression symptoms (i.e., a partner's job loss, arguing with partner more than usual, could not pay the bills, a woman or her partner were put in jail or a person close to the woman was having a drug problem), suggesting the original effects were not driven by one particular stressor. The hypothesis for Exploratory Analyses III was confirmed. Couple stress mediated the relationship between race and postpartum depression.

Discussion of Post-Hoc Exploratory Analyses

The exploratory analyses were conducted to gain more insight from the data by gathering more information about the various risk and protective factors for pregnant women. They also offered a way to explore the PRAMS measure using a different method and an opportunity to explore any unexpected information gained from the originally proposed analyses.

In this section, the results from the post-hoc exploratory analyses are discussed in relation to the results from the originally proposed analyses to enhance our understanding of the issues. Additional information was gained that, although it was not discussed in the original proposed study, adds extended opportunities for further study. For example, it was determined in the original proposed analysis that traumatic stress during pregnancy is a significant risk factor for postpartum depression. Then Post-Hoc Exploratory Analysis II augmented this finding by gaining more specificity about the individual traumatic stressors themselves. As stated before, the original study was not developed to test some of the information gained in these post-hoc exploratory analyses. For example, race was not the focus of the originally proposed study, but became a focal point of Exploratory Analysis III. Although not the primary focus of this study, the current section is a bonus included as a catalyst for generating new hypotheses in this area. It also creates awareness of how understanding additional related complexities might be especially helpful in identifying risk and protective factors.

Risk Factors For Pregnant Women

Exploratory Analysis I tested the various ways to conceptualize the stressors measured in the PRAMS. The results were consistent with a structural family therapy perspective. A structural family theorist would suggest that any stress in the relationship could impact the functioning of the couple and therefore the family. Therefore, theoretically, it was logical that the

dichotomous and continuous coded variables both told the same story. However, additional analysis determined that how these variables were coded in this analysis did not change the implications of these analyses. Conceptually, structural family theorists are interested in the existence of stress and either way these stressors were conceptualized captured the existence of stress. These findings match the structural family theory focus on the existence of stress over the quantity of stress, but also emphasize the significance of the results. Using two different methods (originally proposed Analysis I and Exploratory Analysis I), the same hypothesis was confirmed. Both methods indicate that stress in the couple subsystem and traumatic stress during pregnancy are risk factors for postpartum depression.

Couple's stress. Similar to the originally proposed analysis, couple's stress played a critical role in the risk of postpartum depression. While the originally proposed Analysis I found the category of couple's stress to be significant, Exploratory Analysis II found one main indicator of couple stress, as it was categorized in the PRAMS measure, to be significant. Women stating they argued more than usual with their partner during pregnancy was shown to be a significant risk factor. Consistent with research indicating that tension in the marital dyad is a risk factor for the onset of postpartum depression (Barnes, 2006; Beck, 2001; Blum, 2007; Haslam et al., 2006; Whiffen & Johnson, 1998), women arguing with their partner more than usual was a significant predictor of postpartum depression symptoms. Gottman (1993) states that it is important for married couples to achieve a balance between their positive and negative affect. When couples are arguing more, the relationship may begin to have more costs than benefits to individual partners. Overall, Gottman reports that the balance theory, having equal or more positive interactions to negative interactions in a relationship, is an important aspect to stabilize couple's relationships. When couples do not have a balance between positive and negative, the relationships are stressed. Also, Gottman et al. (1976) found that couples who were distressed perceived the quality of the interaction in their relationship more negatively than non-distressed couples. If a couple's relationship is stressed, they may perceive more negative interaction or less support from their partner and argue more. As follows, stressed relationships or arguing with their partner more than before the pregnancy increase women's postpartum depression symptoms.

Financial stress. While the postpartum depression literature suggests that financial stress is a major risk factor for women, the originally proposed study did not find the category of

financial stress to be a significant predictor. However, when looking at the category more in depth, Exploratory Analysis II confirmed one significant financial stress indicator. The one significant indicator was women not being able to pay their bills. While this result matches the literature suggesting that financial problems for women are a risk factor for postpartum depression (Curry et al., 2006; Patel et. al., 1999; Seguin et. al., 1999), there is much unpredictability in these findings. The literature indicates that financial stress is a predictor of postpartum depression. The originally proposed Analysis I did not find financial stress to be a significant indicator. Post-Hoc Exploratory Analysis II found one indicator of financial stress to be a significant predictor (women not being able to pay their bills). Overall these varying results suggest that as a predictor financial stress merits further research. While further exploration is still necessary, there are a few possible explanations for this changeability.

The first reason could be similar to the findings in the original analyses that did not match the literature. It is possible that this variable, a woman not being able to pay the bills, is an indicator of a disrupted couple subsystem. This variable could be an indicator of a family structure problem. Not having the funds to pay the bills could indicate that the assigned roles in the family structure are not being fulfilled. Therefore the structure is not fulfilling prescribed duties to protect the family members from stress as well as the structure not being able to support the family during this transition time. Other reasons for this inconsistency in findings could be due to methodological issues. It could simply be measurement error in the financial stress category. This inconsistency could also indicate a problem of multicollinarity or it could be statistical suppression (Paulhus et al., 2004). There is a pattern in the results of Exploratory Analysis II, which makes a logical case for how statistical suppression could be occurring. The variable, partner lost job, has a negative effect on postpartum depression, such that participants were less depressed when their partner lost their job. However, the variable could not pay bills, has a positive effect on postpartum depression, such that participants were more depressed when they couldn't pay their bills. It is possible that the financial category results had no effect because the sums across these two variables cancel each other out. In other words, adding a postpartum depression buffer (partner lost job) with a postpartum depression risk factor (could not pay bills) could make the overall effect of the summary financial stress variable not significant. While it logically makes sense that women not being able to pay their bills would be a stress, further research is needed.

Emotional stress. Similar to the originally proposed analyses, emotional stress was not a risk factor for pregnant women in this study. The emotional stress category was not shown to be a risk factor in Analysis I and neither were the individual emotional stress indicators when analyzed in Exploratory Analysis II. Again, this may be an indication that the family structure or couple subsystem is able to support the mother during this time and therefore the emotional stress is not putting women at risk for postpartum depression. It is possible that emotional stress is a type of stress that can be easily buffered by emotional support. This is true in the context of other life events, but has not been studied regarding pregnancy and postpartum depression. McCurdy (2005) found that partner support buffered parents experiencing increased stress from reacting unfavorably to their children compared to parents who did not have partner support. Greeff and Du Toit (2009) found that family support is one resiliency factor that enables people to withstand emotional stress. While this idea of couple stress buffering emotional stress has not been studied in relation to pregnancy stress and postpartum depression these results indicate that emotional stress is not always a risk factor of postpartum depression and therefore couples may be buffered by the couple's relationship. In the present study, couple's stress is consistently a risk factor, therefore, emotional stress may only be significant if such stress impacts the couple's relationship.

Traumatic stress. Three indicators of traumatic stress were shown to be significant risk factors of postpartum depression symptoms. The three indicators were: a woman going to jail, a woman's partner going to jail, or someone close to the woman having a drug problem. While two of these indicators were measured together (You or your husband or partner went to jail during your pregnancy) they will be discussed separately because the implication on the pregnancy and the family could be different depending on which member of the couple was incarcerated. From the present data there is no way to know the number of women who went to jail verses the number of partners who were put in jail but, 70 women reported that either they or their partners went to jail during their pregnancy (about 5% of the sample). To date, the mood related effects of a woman going to jail during pregnancy or her partner going to jail while she was pregnant have not been well researched. There are very few studies looking at the relationship between women being incarcerated and postpartum depression. However, the few studies assessing the pregnancy and postpartum period for incarcerated women suggest positive outcomes. These studies show that women in jail or prison have better birth outcomes related to postpartum

depression than a woman not incarcerated who gave birth to her baby on a maternity unit in the hospital (Cordero, Hines, Shibley, & Landon,1991; Egley, Miller, Grandos, & Ingram-Fogel, 1992; Martin, Rieger, Kupper, Robert, Qaqish,1997). Also, Williams and Schulte-Day (2006) studied women who were incarcerated at the time they gave birth and found that these women had lower postpartum depression rates than women who were not incarcerated. In general, research has shown incarceration has positive effects on pregnancy and the postpartum period. However, many of these studies only considered women who were incarcerated for long stints of time. The present study did not gather data regarding how long or for what reason women were in jail during pregnancy. It could be presumed that being put in jail and released in short periods of time during pregnancy is disruptive to women's lives and traumatic for women's pregnancies. Also, the reason for the incarceration may play a role in how traumatic the experiences are for women. Future research in this area is vital to a more definitive understanding of this complex risk factor.

The effect of the second traumatic stressor, a woman's partner in jail during her pregnancy, also is novel. No past research has looked specifically at the effects of postpartum depression when a woman's partner was in jail during her pregnancy. However, theoretically, this would be in line with a structural family theory perspective. Structural family theory suggests that additional stresses can be difficult for family structures to cope with and, therefore, pathology cultivates (Minuchin & Fishman, 1981). From this theoretical lens, it could also be assumed that a couple would have trouble maintaining a strong, well-functioning couple subsystem when one or both partners are in jail. This traumatic stress is, again, a relationship stressor. A partner being put in jail could affect the amount of stress in the couple's relationship.

The third significant traumatic indicator was if someone close to the pregnant woman had a drug problem. Current literature discusses topics similar to this, but no research has been conducted specifically about the effects on a pregnancy when someone close to the pregnant woman has a drug problem. There is research illustrating that pregnant women with drug problems often experience mood issues (Pajulo, Savonlahti, Sourander, Helenius, & Piha, 2001; Ross & Dennis, 2009) but no research illustrating the effect on a woman if her close family member or friend had the drug problem. There is also research indicating a common association between pregnant women being victims of physical abuse when their partners use drugs (Liebschutz el al., 2002; Pirard, Sharon, Kang, Angarita, & Gastfriend, 2005; Schneider,

Cronkite, & Timko, 2008; Slesnick, Bartle-Haring, & Gangamma, 2006), and therefore an association between physical abuse and postpartum depression (Curry et al., 2006; Keane & Kaloupek, 1997), but nothing specifically addressing an association between postpartum depression and a woman's close family or friend using drugs. Theoretically a drug problem of someone close to the pregnant woman could change the family structure. If the drug problem was with the woman's partner, this would affect the couple subsystem, and if the drug problem is with a close friend or relative the woman may be focusing on this person and not on maintaining her hierarchal role in her family structure. Someone close to the woman having a drug problem is another relationship stressor. This study continues to illustrate the point that focusing on woman's family relationships is an important factor when considering who is at risk for postpartum depression.

The traumatic stress findings coincide with the results from the original Analysis I, indicating traumatic stress as a significant risk factor for postpartum depression. These findings also expand the findings from the originally proposed Analysis I by offering a more detailed account of which traumatic stressors are significant when analyzed as separate indicators. These findings are cutting edge because these risk factors have not been acknowledged in the postpartum depression literature before. The three significant indicators (a woman going to jail, a woman's partner going to jail, or someone close to the woman having a drug problem) are all new risk factors to the postpartum depression literature and need further exploration.

Race, couple stress and postpartum depression. A new category of stressors was highlighted by the post-hoc exploratory analyses. While race was not the pivotal hypothesis for this project, it was a demographic variable examined in the two original analyses and proved to be a notable variable when understanding pregnancy stress and postpartum depression. A trend was observed while conducting the original proposed Analysis I and Analysis II in the demographic variable, race. This trend suggests that race may have an affect on postpartum depression. The exploratory analyses were designed to learn more about the story within the data and the trend observed in the race variable suggests that race is an important variable to explore further. Specifically, Post-Hoc Exploratory Analysis III aimed to learn more about the relationship between race and postpartum depression. In the past, racial minorities have been shown to have higher rates of postpartum depression (Kurki et. al., 2000), which provided

73

additional motivation for further exploration of the race variable Host-Hoc Exploratory Analysis III.

Researchers have acknowledged the effects of stress due to social stratification and cultural disadvantages on families during pregnancy (Britton, 2008; Kim et al., 2006; McKee, Cunningham, Jankowski, & Zayas, 2001). Structural family theory highlights the influence of the larger cultural system in a person's life (Minuchin, 1974). As it was discussed earlier, an important function of each family is to protect itself from external stresses specific to the culture and the social context in which they live (Nichols & Schwartz, 2001). Race was measured in this study because it is one way that people are marginalized and, thus, may feel external pressure from the environment in which they live (Butz, & Plant, 2009; Fujimoto & Härtel, 2004). As it was discussed earlier, a trend was observed which identified race in this study as a possible predictor of postpartum depression. However, couples' stress mediated the relationship between race and postpartum depression. This illustrates that race does not directly affect postpartum depression. Rather, race affects partner stress, which in turn increases postpartum depression symptoms. This finding suggests that while the risk factor is couple's stress, one way couple's stress may be created is based on the experiences a woman has due to her race.

Consistent with structural family theory and the overall results of this study, individual symptoms are important to note, but looking at the context surrounding the individual symptoms are also important. Minuchin (1974), states that individual problems are seen not only as an expression of the entire family's dysfunction, but should also be broadened to see the social context in which the problem exists. From a structural family theory lens, problems are better understood in the context in which they live, rather than interpreting the problem as an isolated entity (Minuchin,1974). This is important when considering a demographic variable such as race. Additional stress can be difficult for family structures to cope with and, therefore, pathology can cultivate (Minuchin & Fishman, 1981). Minuchin asserts a couple subsystem that is not able to support it's members will be more vulnerable to outside stresses, but the reverse could in fact be true as well. The stress of larger sociocultural stresses could be so powerful that families may have less energy to support each other. Socially oppressed populations, like families that experience the consequences of racial oppression, may then have more stress in their relationships. It is important to keep in mind that a woman's race is not only about her physical makeup, but also could be about hidden factors (i.e. social connotations and possible social

marginalization). These hidden factors could be affecting the couple's relationship but may not be seen or may not be obvious. These can also be confounding factors. Howard and colleagues (2008) concluded that white women often live in more protected environments during their pregnancy and often have better access to healthcare than many other races. Therefore, minorities may experience more outside pressure and more stress from the larger culture based on their living environment and or their lack of easy healthcare access than couples who do not experience these challenges. Also, couples who are not required to deal with the consequences of racial prejudices may not experience the same amount of outside pressure that then affects their relationship. Race has been a significant predictor of postpartum depression (even after controlling other demographic variables) in multiple studies (Howard, Strobino, Sherman, & Crum, 2008; Howell, Mora & Leventhal, 2006; Segre, Losch & O'Hara, 2006). In the present study, race had a direct impact on the couple's stress, which in turn increased women's postpartum depression symptoms.

Protective Factors For Pregnant Women

   Help caring for her baby. Exploratory Analysis II presented new information that theoretically is linked to a strong couple subsystem buffering women from postpartum depression and the buffer may be partners helping women at home more. In the original analysis, the woman's perception that the husband would help care for the child was not enough support to protect her from postpartum depression symptoms. While the literature shows a woman's belief that she has help caring for a newborn can provide reassurance and offer the woman a plan for her postpartum time (Glangeaud-Freudenthal et al.,1999), the original proposed analysis did not find these benefits to be enough to protect her from postpartum depression symptoms. The perception of help is said to ease the anticipatory stress that is associated with the postpartum time. In this case, relieving the anticipatory stress did not have an effect on postpartum depression symptoms. However, it may be that the actual help (rather than the anticipation of help) from a husband who was not working is a buffer. In the Exploratory Analysis II, there was evidence that husbands being at home and potentially helping care for the baby was a protective factor. In structural family theory, one part of the family system affects all parts of the system (Nichols & Schwartz, 2001). For example, losing a job would effect the whole system as well as a husband helping at home would impact the family structure. In Exploratory Analysis II, a

partner losing a job significantly decreased postpartum depression symptoms. Therefore, having a partner who lost his job is related to less depression.

The logical hypothesis, conversely, may have been that losing a job could create financial strain and therefore increase conflict within the couple's relationships consequently impacting postpartum depression symptoms. However, based on the results of Exploratory Analysis II, this is not the case. Only one type of financial stress predicted postpartum depression (women not being able to pay their bills). Husband losing a job was not a financial stress in Exploratory Analysis II at all, but rather a buffer against postpartum depression. While it is possible this is a spurious finding, there are a few possible theoretical reasons for this unique situation. From a structural family theorist lens this could indicate that the partner has more time to support the couple subsystem and, therefore, the baby. It could also indicate that losing a job strengthens the hierarchy and perhaps equals out the power between the partners or equals out the responsibilities at home. These findings indicate that there is a correlation between when a husband is no longer required to go to work each day and decreasing women's postpartum depression. Removing the variance due to not being able to pay bills then could allow a partner losing his job to have a positive impact on the relationship and, thus, lower postpartum depression symptoms. In other words, the left over positive effect of a partner losing a job is due to the partner having more time for the couple subsystem and in turn time to support the baby. Couples who are able to support and be present for each others' experiences of the postpartum time can help the adjustment period (Barnes, 2006). Women who have help with caring for their baby have been shown to have less depressive symptoms (Hunker, Patrick, Albrechet, & Wisner, 2009).

The explanation that when a husband losses his job he will be able to help women at home and thus strengthen the couple subsystem is the most likely theoretical understanding from a structural family theory lens. However, there is an alternate hypothesis about this finding. One explanation is that while losing a job may have caused some financial strain, the loss of the job also lessens the family stress and creates a positive buffer for postpartum depression. It may be that the husband's job was very stressful for the couple or family. Thus, the job itself could have caused stress in the couple's relationship. The benefits to the couple's relationships of losing this stressful job could outweigh the loss of income. Again, this variable may have been significant because the financial stressor, could not pay bills, was controlled for in the analysis. While this

was an unexpected finding, these few explanations of how this job loss actually strengthens the couple's relationship and in turn had a positive effect on women's postpartum depression symptoms is in sinc with a structural family theory perspective.

Discussion Summary For Post-Hoc Exploratory Analyses

While a woman going to jail and a woman not being able to pay her bills could be considered individual factors related to the pregnant woman, it is important to note that the majority of the significant risk factors found in this post-hoc exploratory analyses were relationship factors. Couple's stress, traumatic stress, arguing with partner, partner going to jail and a close friend or a relative having a drug problem are all factors related to the relationships in a woman's life. Therefore, the results of this study both confirmed the current understanding that the individual risk factors are important to consider when understanding postpartum depression, but also expanded this concept to illustrate that understanding the family structure is crucial. These five individual items that were predictive of postpartum depression symptoms help clarify more information about the long lists of postpartum depression risk factors, suggesting that arguing with a partner more, going to jail, partner going to jail, someone close with drug problem, or not being able to pay bills are important risk factors for pregnant women. It was also discovered that race plays a role in woman's postpartum depression based on the couples relationship. More research needs to be conducted regarding the race risk factor. Along with gaining more detail about the specific risk factors, surprising information was discovered about one protective factor. The financial risk factor of a partner losing his job was revealed as a protective factor rather than a risk factor. The post-hoc exploratory analyses generated new information and provided a well-defined direction for future research.

CHAPTER 7. Conclusion

The original proposed study illustrates that a couple's relationship significantly affects symptoms of depression in postpartum mothers. A couple's relationship, depending on the stress level experienced in the relationship, can be both a risk and protective factor for pregnant mothers. This research offers families, practitioners and researchers information as they develop screening tools, treatment protocols and increase the overall understanding of postpartum depression. Structural family theory informed this study in a way that highlights the importance of a well functioning couple subsystem and stresses the need to assess women's relationships during pregnancy. It also builds a case for including a relational component when assessing and treating women for postpartum depression. Overall, the findings suggest that it is not just the woman's responsibility to handle this life transition, but rather the couple subsystem. The post-hoc analyses reinforced the original findings which show that the couple's relationship has a significant effect on postpartum depression symptoms.

This study has demonstrated essentiality of including a systems perspective in the theoretical understanding of postpartum depression. In addition to demonstrating that a couple's relationship could contribute to either the increase in postpartum depression symptoms or the protection from postpartum depression, this study provides information that can be used to develop new hypothesis for postpartum research. The post-hoc analyses generated new information which was outside the scope of this study and therefore conclusions cannot be drawn at this time. However, the findings from the post-hoc analyses provide explicit direction for future research. The overall study implications include both research and clinical implications. In conclusion, the study limitations, future research and clinical implications will be discussed in the remainder of this chapter.

Limitations and Future Research

There were several limitations in this study, the first being the study's sample demographics. While race was a significant variable in the study, overall the sample was not very diverse. Therefore, the results cannot be generalized to more diverse populations without verifying evidence. It is recommended for future research that the findings from this study are reassessed with more diverse populations. The second limitation is that the outcome variable, postpartum depression scores, was missing data points, approximately 516. This represents 30%

of the sample and therefore it cannot be assumed that the results of this study would be the same if the researcher had this data available. The third limitation was the PRAMS measure. When conducting a regression analysis with the individual financial items on the PRAMS measure, compared to the financial subscale, different results were obtained. The subscale for financial stress used in Analysis I did not indicate any significant effect on postpartum depression symptoms. However, when the items were analyzed individually, two of the financial indicators were a significant predictor when measuring all the pregnancy stressors together. This contradiction in findings could be an example of statistical suppression. The individual items measuring financial stress turned out to only partially be stressors. The variable partner lost his job was correlated with less postpartum depression, whereas, the variable could not pay bills, was correlated with more postpartum depression. It is possible that summing these two indicators together neutralizes the measured stress. Another limitation of the PRAMS measure is the limited items measuring emotional stress. In future research regarding pregnancy stressors, adding more items to measure each construct in the PRAMS may offer more validity.

The findings from Exploratory Analysis II suggest that a partner losing a job may lessen women's postpartum depression symptoms. A structural family theorist would agree that this may allow a partner to have more time for the couple subsystem and, in that way, lower women's depression symptoms. This was not indicated, however, in Analysis II. Husbands helping care for the infant did not buffer women from postpartum depression. While these variables may be measuring different constructs, more research needs to be conducted to look at how a partner losing his job may help women. These results were inconclusive and conducting more research on how couple subsystems support each other. Specifically, the types of responsibilities and pressures that may interfere with couple's supporting each other (i.e. partner employment) could offer more information about exactly how a couple's relationship can offer protection for women from postpartum depression symptoms. Most of the literature regarding childcare does not quantify how much assistance is offered or when the help with childcare occurred. Therefore, specifying types of help and how much could offer information regarding treatment for at risk postpartum women.

Most postpartum depression research focuses on the woman only and the results from this study indicates the need to look at the woman's relationships. More research will need to be done to assess the risk factor of a close family or friend with a drug problem as well as the risk

79

factors of a woman's partner in jail during her pregnancy and someone close to the woman having a drug problem. No past research has looked specifically at the effects of postpartum depression when considering these three contextual issues. With these issues in mind, dyadic studies would be useful. It could help discern whether women with postpartum depression merely see the relationship as more conflictual/stressful, or whether their partners agree with this assessment.

Continuing to use a structural family theory lens would assist postpartum depression research because structural family theory focuses on how families organize and reorganize the family structure (Minchuin, 1974). Organizing and reorganizing a family system occurs during any transition, including having a baby and managing additional psychological stressors. A family member staying home during times he or she once was at work, a partner going to jail, drug abuse and of course pregnancy and postpartum would all be examples of life transitions. Using family systems theory as a framework for postpartum depression research has yielded new and influential findings. Continuing to use this framework can help practitioners and researchers alike to develop a more comprehensive understanding of postpartum depression.

Clinical Implications

Screening. Identifying postpartum depression is a critical goal for healthcare providers, and many practitioners, researchers and patients are advocating for routine screening and education (Buist et. al., 2006; Goldsmith, 2007; Martin & Redshaw, 2009; Lau, Wong, & Chan, 2010). There is evidence that detection and treatment by medical providers is limited and needs improvements (Goodman & Tyer-Viola, 2010). Some people are pushing for formal identification methods for postpartum depression and even universal screening. It is suggested that a criteria must be developed by a national screening committee to establish a national policy (Paulden, Palmer, Hewitt & Gilbody, 2010). Some professionals have argued against the lengthy screening tools and recommend two or three screening questions that providers could ask during their medical appointments (Cox et al., 1987). Some of the current screening tools are very long because so many sources of stress have been identified for pregnant women (Barnes, 2006; Bernazzani et al., 1997; Brown, 1986; Dulude et al., 2002; Glazier et al., 2004; Grote & Bledsoe, 2007; Robertson et al., 2004; Seguin, Potvin, St-Denis, & LoiseUe, 1995). Many practitioners complain that these lengthy lists are too cumbersome to help them screen women during their

medical appointments. The present study has identified five predictors of postpartum depression symptoms with the primary stressors being relationship factors. In particular, stress in the couple's relationship was a consistent predictor of postpartum depression. While more research needs to be conducted to determine the validity of these indicators as a screening measure, the present study suggests these indicators may narrow down the current screening assessments. Overall, this study has established that it is important to consider relationship dynamics and relationship issues when screening women for postpartum depression.

Education. The result of poor screening protocols is that many women go undiagnosed and untreated (Dennis & Chung-Lee, 2006). One of the important aspects of screening is that it also provides an opportunity for practitioners to educate women and their families about postpartum depression. In general, women tend to be undereducated about postpartum depression and therefore do not seek treatment (Whiffen & Johnson, 1998). Among reasons reported by mothers who do not seek treatment is that mothers lack knowledge about postpartum depression and report that they do not know where to seek assistance (Dennis & Chung-Lee, 2006). Another reason is that mothers report they are unaware of possible treatments and believe that many of their symptoms are a normal part of motherhood. Countless mothers with postpartum depression deal with a mix of negative feelings about their depression symptoms and, therefore, do not disclose their feelings of depression to anyone (Dennis & Chung-Lee, 2006). Most of all, mothers report a fear that if they disclose their feelings they will be labeled mentally ill, or they may even lose their child. Educating others about postpartum depression is the only way to break this trend and, in particular, educate them about risk and protective factors.

Therefore, education is part of the prenatal care guidelines (Hanson et al., 2009). In addition to it being part of the guidelines, pregnant women report wanting this type of relationship with their prenatal providers. Some women seek their own education by attending childbirth education programs. The present study found that provider support did not have a significant effect on postpartum depression symptoms. However, what is being taught or how it is being taught could make a difference in how helpful the education is to pregnant women, and the current measure of provider support may not have tapped provider's education. One expectation many women have is that they will instinctually know how to take care of their children and will naturally be good at parenting. Another common expectation is that mothers should be self-sacrificing, loving at all times, and capable of managing the overwhelming

demands of an infant without ever asking for help (Barnes, 2006). It is these unrealistic expectations that have lead women to be fearful, shameful, and guilt ridden about their postpartum depressive symptoms (Barnes, 2006; Dennis & Chung-Lee, 2006; Buist et al., 2006; Whiffen & Johnson, 1998). Educating couples together, rather than just the mother, may be one way to eliminate the idea that women have to know all the answers by themselves. Also, talking to couples about the transition to parents could dispel some of these unrealistic expectations that contribute to not seeking help. It could be helpful to educate couples about the risk and protective factors that couple's relationships play in postpartum depression symptoms. Providing this education would not be to scare couples that experience more stress and less supportive relationships during this time, but rather to help them look for warning sings and encourage them to seek help. Based on this study, it is also suggested that educating couples about structural family theory may be a way for couples to learn more about what affects postpartum depression and eliminate some of the shame and blame that women may experience.

Although this study did not find provider support to make a significant difference on postpartum depression symptoms, the study did find significant risk factors and a buffer that would be informative to pregnant women and their families. The results of the present study lead to the recommendation to educate couples together about postpartum depression, educate them about the role their relationship can play as both a protective and a risk factor, and to provide some explanation based on Minuchin's structural family theory to help understand the functioning of the family unit during transition.

Interventions. The literature discusses many possible treatments for postpartum depression, but studies shows that while many women experience postpartum depression, the majority of women do not seek treatment (Dennis & Chung-Lee, 2006; McIntosh, 1993). One reason may be that traditional treatments identify the woman as the only patient, and these treatments typically use the medical model to explain postpartum depression (Barnes, 2006). In the medical model, postpartum depression is considered an illness of biological origins and hormonal changes and, therefore, is treated with depression medications. Women who have been treated for postpartum depression in the past have reported that they did not want pharmacological treatments (Dennis & Chung-Lee, 2006). Many women report wanting treatment that would allow them to talk about their feelings. The results of the present study show that it is important to consider the biological, psychological and social aspects of

depression. For example, knowing that prior depression and, especially, that prior postpartum depression are predictors for postpartum depression is essential for health care providers and women who are pregnant (Blum, 2007; Forty et al., 2006). Also, it is helpful to know that couple stress, traumatic stress, a partner going to jail, someone close having a drug problem, the pregnant woman being put in jail and not being able to pay the bills are all important risk factors for postpartum depression. Likewise, studies have identified psychosocial protective factors. One established protective factor for postpartum women is social support (Dennis & Chung-Lee, 2006; Green et al., 2006; Haslam et al., 2006; Shaw et al., 2006). The results from the present study suggest that non-stressed couple relationships protect women from postpartum depression symptoms. Therefore, the couple's relationship may be one of the most influential types of social support.

From a structural family theory lens, treatment options should be available both to the woman and to the couple or family. Minuchin (1974) theorizes that problems in a family are due to the family's inability to adjust to change and transition (Minuchin, 1974; Nichols & Schwartz, 2001); therefore, treating everyone that is going through the transition period would better facilitate a functional change. Antenatal couple's therapy would be one way to provide psychoeducation, validation and a place for families to process their new needs during this transition time. Also, many couples have less time for each other during pregnancy and once the baby is born (Barnes, 2006), so couples therapy could be a time in which they focus on their relationship and how to support each other. The therapist could talk to the couple about the risks and protective functions their relationship can serve and the therapy can be used discuss ways to support each other. Then, couples can practice at home what was discussed in therapy. Barnes (2006) reports that including both partners in prenatal psychotherapy is one way to prevent problems in the couple's relationship postpartum. Women with postpartum depression also reported liking support groups and psychoeducational seminars about postpartum depression (Barnes, 2006; Blum, 2007; Dennis & Chung-Lee, 2006; Pearlstein et al., 2006), and these could be attended by the couples rather than just the mother. Overall, treatment should include the couple and not exclude other family members who are also accommodating the structural change in the family.

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Appendix A.

Pregnancy Risk Assessment Monitoring System Pregnancy Stressors

(Used under Public Domain)

During the 12 months before your baby was born…

"For each of item answer yes if it happened to you or no if it did not."

a.	A close family member was very sick and had to go into the hospital.	No	Yes
b.	You got separated or divorced from your husband or partner.	No	Yes
c.	You moved to a new address.	No	Yes
d.	You were homeless.	No	Yes
e.	Your husband or partner lost his job.	No	Yes
f.	You lost your job even though you wanted to go on working.	No	Yes
g.	You argued with your husband or partner more than usual.	No	Yes
h.	Your husband or partner said he didn't want you to be pregnant.	No	Yes
i.	You had a lot of bills you couldn't pay.	No	Yes
j.	You were in a physical fight.	No	Yes
k.	You or your husband or partner went to jail.	No	Yes
l.	Someone close to you had a bad problem with drinking or drugs.	No	Yes
m.	Someone close to you died.	No	Yes