I, Jennifer Rode, hereby submit this original work as part of the requirements for the degree of Doctor of Philosophy in Nursing - Doctoral Program.

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The Protective Effects of Social Support on Postpartum Depression: Does Emotional Intelligence Matter?

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The Protective Effects of Social Support on Postpartum Depression:

Does Emotional Intelligence Matter?

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Abstract

Postpartum depression (PPD) is estimated to affect one in five women each year. Social support, one of the strongest predictors of PPD, has been considered to be a potentially effective point of intervention. Unfortunately, efforts to reduce the prevalence of PPD via social support interventions have been largely ineffective. It is unclear why there has been incongruence between the strong protective effects of social support and its limited utility in interventions.

One factor that has been largely overlooked in these efforts is women’s ability to actually utilize social support. Emotional intelligence, or women’s ability to understand and use their own and others’ emotions, may play a role in this process. Emotional intelligence may affect women’s use of social support, and corresponding risk for PPD. Building on existing models of the protective effects of social support, this research examined pregnant women’s emotional intelligence and its relationship to social support and subsequent symptoms of PPD. Results support the inclusion of emotional intelligence in models of social support and Symptoms of PPD. This study used a web-based, time-sequenced, data collection design. Structural equation modeling was used for analyses.
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Dedication:

To my family, my cheerleaders of all ages, who fill my heart every day.

To Joe, who is my rock. Thank you for your love and support on this roller coaster of a journey. Thank you for the hours and hours of listening, advising, laughing and caring. Thank you for your constant devotion to the four girls in your life.

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To Nora, who has a heart of gold. Your hugs and words of love always warm my heart. Your smile and tender care lifts us all up.

To Claire, my fountain of youth. You remind me to appreciate the simple beauty in life, the value of swings, tickles, puppies, and toast. Thank you for the joy and laughter you bring into my life every day.

To my parents, who have always encouraged me to follow my dreams. Your lifelong support, shown in so many ways, has meant the world to me. Thank you for cheering on the Rode family at every step.
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Chapter 1: Introduction

Overview

Postpartum depression (PPD) is estimated to affect between 9-19% of mothers, which by current birthrate estimates accounts for up to 25 million women each year (CIA, 2012; Gavin et al., 2005; Mishina, Yamamoto & Ito, 2012; Vesga-Lopez, 2008). Efforts to reduce the prevalence of PPD have identified factors that lower the risk, or ‘protect’ one from PPD. Among those, social support emerges as one of PPD’s strongest protective factors (Beck, 2001; Cooper, Murray & West, 1996; Lanes, Kuk & Tamim, 2011; Leahy-Warren, McCarthy & Corcoran, 2011; O’Hara & Swain, 1996). Numerous intervention studies have targeted social support with group meetings and home visits to prevent PPD (Brugha et al., 2000; Morrell, Spiby, Stewart, Walters and Morgan, 2000; Reid, Glazener, Murray and Taylor, 2002; Tam et al. 2003). However, these efforts have been largely ineffective (Dennis & Creedy, 2004). One factor that has been unexplored is a perinatal woman’s ability to identify and utilize her existing support network. Taking advantage of social support may be dependent on a mother’s ability to recognize her emotional needs, her available support, and to best match these. A woman experiencing increased irritability or a sense of being overwhelmed may be more inclined to seek emotional support from friends if she can recognize the implications of the feeling and can also recognize the subtle cues from others signaling available support (Lumley, Ovies, Stettner, Wehmer & Lakey, 1996). Emotional Intelligence, defined in this study as an individual’s ability to recognize and reason about emotions and to use emotions to regulate thought (Mayer, Salovey & Caruso, 2004), may play a role in this process. Determining women’s Emotional Intelligence ability, and how individual differences
affect their use of social support, may better explain a woman’s risk for PPD and lead to strategies to lower that risk.

Emotional Intelligence has been linked to relationship support, relationship depth, levels of conflict, and objective and subjective quality of social interactions (Brackett, Warner & Bosco, 2005; Lopes et al., 2004; Mayer & Salovey, 1997). Because high levels of Emotional Intelligence may lead to relationships with improved interactions and less conflict, it may allow a new mother to more easily identify and elicit support from existing friends and family. A better understanding of Emotional Intelligence, social support, and their combined effects on PPD may contribute to newly targeted programs to prevent PPD, with more effective results. This may include programs to help new mothers ameliorate their existing social support, and to better identify and access social support when it is needed. The purpose of this study is to examine the combined role of Emotional Intelligence and social support in decreasing the symptoms of PPD.

**Statement of the Problem**

**Implications of postpartum depression.** PPD is defined in this study as major and/or minor depression beginning in the year following childbirth (O’Hara, 2009; Robertson, Celasun & Stewart, 2003). While prevalence estimates of PPD may vary, the effects of PPD are much clearer. The effects on mothers suffering from depression are extensive. Mothers report guilt for the burden their depression places upon their children and fear of harming their children due to unpredictable bouts of anger (Beck, 2006). Long term maternal effects specific to PPD include a 25% chance of non-pregnancy depression relapse, and a 41% chance of depression relapse during a future pregnancy (Wisner, 2003; Wisner, Perel, Peindl & Hanusa, 2004). Furthermore, research on people suffering
from depression in the general population shows long term effects in physical health status, including cardiovascular health, mobility, and diabetes. People who suffer from depression have an increased risk for coronary artery disease, stroke, and overall cardiac mortality (Penninx, et al., 2001; Rozanski, Blumenthal & Kaplan, 1999; Williams, 2005). Depression also affects mobility as it can lead to higher rates of chronic neck and back pain (Linton, 2000; Pincus, Burton, Vogel & Field, 2002). Those who have depression demonstrate a 63% increase in risk for acquiring Type 2 diabetes and those with existing diabetes end up with more complications (deGroot, Anderson, Freeland, Clouse & Lustman, 2001; Golden et al., 2004). For women in particular, the World Health Organization’s most recent estimate has declared depression to have the highest disease burden, implying that the effects of depression on overall health and disability are greater than for any other disease (World Health Organization, 2008).

Mother-infant relations are also affected by PPD. Depressed mothers and their infants are less likely to have secure attachment patterns, which can impair a child’s social, psychological, behavioral, and cognitive development (Misri & Kendrick, 2008). Attachment patterns are an infant/child’s representation of their relationship with their mother, and are built upon the quality of interactions with their mothers, including mother’s sensitive responsiveness to their infant (Ainsworth, Blehar, Waters & Wall, 1978; DeWolff & vanIjzendoorn, 1997). Mothers with depression demonstrate less eye contact and less communicative behavior (Hwa-Froelich, Cook & Flick, 2008), as well as being less attentive to their infants behaviors (Stanley, Murray & Stein, 2004). Infants with depressed mothers have displayed behaviors such as less eye gaze, increased withdrawal behavior, increased fussiness, and less playing, indicating impaired mother-
infant interactions, and subsequent insecure attachment patterns (Carter, Garrity-Rokous, Chazan-Cohen, Little & Briggs-Gowan, 2001; Cohn, Campbell, Matias & Hopkins, 1990; Field et al., 1985; Murray & Cooper, 1996). Many of these infant behaviors are believed to continue over time with negative long-term social and emotional developmental consequences for the child (Beck, 1998; Murray & Cooper, 1996; O’Hara, 2009). Violent behaviors in older children have also been found to be higher in children of mothers who previously experienced PPD (Hay, Pawlby, Angold, Harold & Sharp, 2003). Consequently, left untreated, PPD can jeopardize a mother’s and a child’s immediate and future well-being.

**Prevention of postpartum depression.** The etiology of PPD remains unclear, yet salient risk factors include marital conflict, low self-esteem, history of depression, stressful life events, and lack of social support (Beck, 2001; Dennis, Janssen & Singer, 2004). Social support, defined in this study as resources provided by other persons (Cohen & Syme, 1985), has been frequently investigated as a factor in PPD. It is often investigated as having two dimensions: Functional Social Support and Social Network. Functional Social Support is defined in this study as emotional and tangible support provided by others. Social Network is defined in this study as the size and familiarity of available social resources. Additionally, Stressful Life Events, defined as events having demands, constraints, and opportunities that exceed personal resources (Lazarus and Folkman, 1984) are strongly supported as a contributing factor to PPD (Beck, 2001; Divney et al., 2012; O’Hara & Swain, 1996). Although emerging research has also explored biologic factors, including nutrition, endocrine and genetic polymorphisms as causal to PPD, results have been inconclusive (Bloch, Daly & Rubinow, 2003; Corwin,
Kohen, Jarrett & Stafford, 2010; Ellsworth-Bowers & Corwin, 2012). A full review of biologic causal factors is beyond the scope of this study.

**Social support theory.** Most of the social support literature has subscribed to one of two models to explain the effect of social support on stress and depression: a stress-buffering effect model and a direct effect model. The stress-buffering model, based in coping theory (Lazarus & Folkman, 1984) suggests that when one encounters a threatening situation, one then appraises the situation based on relevant resources available to them. Social support is viewed as a potential resource, for example in providing companionship and tangible assistance. As such, it may reduce, or buffer, the harmful effects that stress has on depression. The direct effect model suggests that one’s social support provides a benefit to one’s mental health even in the absence of a stressful situation. Grounded in a social constructionist perspective, it suggests that social support provides on-going feedback that shapes one’s self-esteem and self-regulation (Cohen & Wills, 1985). One’s perception of the world, including self-perception, is a reflection of context, including how they are viewed by others (Dewey, 1917/1997; Mead, 1934). Therefore, on-going assurance of self-worth, positive feedback, and companionship via social support will augment one’s overall self-esteem and self-efficacy, and contribute to positive mental health.

One extensive review of studies (Cohen & Wills, 1985) sought to examine evidence to support a predominant model on the effects of social support on health. Results showed that both stress-buffering effects and direct effects are supported in different areas of social support. Stressful situations were found to be buffered by one’s
perception of social support. Direct effects, in the absence of a specific event, were found to be affected by one’s social network.

**Social support evidence.** In response to research which supports the protective effects of social support, much interventional research to reduce PPD has focused on social support. Interventions include efforts to expand social support and to create “novel” social support by introducing a new individual to the existing support system of perinatal women (Armstrong, Fraser, Dadds, & Morris, 1999; Brugha et al., 2000; Reid, et al., 2002). However, a meta-analysis evaluating the effectiveness of seven of these interventions found almost no beneficial effects in the prevention of PPD (Dennis and Creedy, 2004). In other words, the evidence-based protective effects of social support have not been successfully translated to an effective intervention. It is unclear why these interventions had collectively disappointing results. One possibility may be that many of the interventions attempted to augment social support by introducing a novel support resource into the mother’s social support system. This approach assumes that a mother will be able to successfully connect with and utilize a new resource to lower the risk of PPD. Limited research has examined mother’s internal resources that may enhance the identification and utilization of one’s *existing* social support.

**Social support gap.** The disconnect between the protective effects of social support and ineffective social support interventions call for a different approach. One reasonable direction is to shift the focus from expanding mother’s social resources to a focus on the mother and her ability to identify and utilize available social support. Early evidence suggests that Emotional Intelligence may contribute to one’s ability in identifying potential social support. A mother with a high level of Emotional Intelligence
may better recognize and respond to subtle emotional cues in others. This sense of emotional synchrony, or shared emotional understanding, can deepen trust and levels of intimacy (Davis, 2006). A mother who has the ability to more easily create these relationships will likely have a larger social network from which to draw support. In fact, studies support this relationship as Emotional Intelligence is found to be positively related to perceived social support and social network size (Lopes, Salovey & Straus, 2003; Lumley et al., 1996). Eliciting social support may also relate to Emotional Intelligence as relationships that have a deeper sense of trust and intimacy are likely to provide a more salient source of support. Evidence of this is demonstrated in studies that show a relationship between Emotional Intelligence and interpersonal relationship quality, including measures of depth, support and conflict, and increased levels of perceived support (Brackett, et al., 2005; Lopes et al., 2003) This newly gleaned information may be used in the future to create interventions to more effectively strengthen natural, or existing, social support systems, and enhance the protective relationship of social support and PPD, thus decreasing the incidence of PPD.

**Purpose**

The purpose of this research is to examine the combined role of Emotional Intelligence and Social Support in decreasing the symptoms of PPD. This study proposes that Emotional Intelligence affects the overall level of social support. It also proposes that Emotional Intelligence affects the protective effects of social support on the relationship between stressful life events and PPD. It will examine these relationships for both dimensions of Social Support: Functional Social Support and Social Network. The framework guiding this study is depicted in the following theoretical model, Figure 1-1.
A brief explanation of five hypothesized pathways is provided for each hypothesis. Hypothesis 1a, 1b, and 1c are all a replication of previous literature, and will be revisited to support previous findings. These relationships are foundational to the further testing of Emotional Intelligence and Social Support. Hypotheses 2 and 3 are the newly proposed theoretical links and are the primary focus of this study. More extensive discussion of these pathways will be provided in Chapter Two.

**Research Hypotheses**

*Hypothesis 1a:* Social Support will be negatively related to Symptoms of PPD.

Research supporting the protective effects of social support on depression is extensive (Beck, 2001; Cooper, et al., 1996; Lanes, et al., 2011; Leahy-Warren, et al., 2011; O’Hara & Swain, 1996). Social support may provide positive feedback to enhance one’s self-esteem, or reinforce self-protective behaviors. For postpartum women, this
may include affirmation of mothering responsibilities or assistance with infant care to allow for a mother’s necessary rest.

**Hypothesis 1b:** Stressful Life Events will be positively related to Symptoms of PPD.

Stressful life events represent events having demands, constraints, and opportunities that exceed personal resources (Lazarus and Folkman, 1986). High levels of these demands may exceed one’s available resources and lead to depression (Lazarus & Foldman, 1984). Stressful life events are consistently found to have a positive relationship with levels of PPD (Beck, 2001; Divney et al., 2012; O’Hara, 2009).

**Hypothesis 1c:** Social Support will negatively affect the positive relationship of Stressful Life Events on Symptoms of PPD.

Among individuals who experience high levels of stressful life events, social support is believed to buffer the effects of these events. In particular, buffering effects from social support have been found to result in lower levels of depression (Cohen & Wills, 1985; Jawad, Sibai & Chaaya, 2009; Moak & Agrawal, 2009; Yang et al., 2010).

**Hypothesis 2:** Emotional Intelligence will be positively related to Social Support.

Research supporting the effects of Emotional Intelligence on overall levels of social support include evidence that self-disclosure can lead to higher levels of instrumental and emotional support, to more friends, and to greater levels of intimacy (Graham, Huang, Clark, & Helgeson, 2008; Lippert and Prager, 2001). Because self-disclosure requires identification and expression of emotions, key components of Emotional Intelligence, a person with high levels of Emotional Intelligence may be more likely to report higher levels social support.
Hypothesis 3: Emotional Intelligence will have a positive effect on the moderating relationship of Social Support to Stressful Life Events and Symptoms of PPD.

Research supporting the effects of Emotional Intelligence on the stress-buffering relationship includes evidence that higher levels of Emotional Intelligence are correlated with higher levels of seeking instrumental and emotional social support (Gohm & Clore, 2002). Therefore, despite varying levels of social support, mothers with higher levels of EI may more actively elicit social support. A mother with low levels of Emotional Intelligence may be less likely to call for help in times of stress.

Overview of the Study

To test these hypotheses a time-sequenced, survey-based study examined each of these hypotheses in a population of women from their third trimester to 9 weeks postpartum. Data were collected to measure Emotional Intelligence, Functional Social Support, Social Network, and Stressful Life Events while women were in their third trimester. Symptoms of Postpartum Depression were measured in the same women between 9 and 13 weeks past their due date. Analyses of the proposed relationships were examined using structural equation modeling. Specifically, the proposed relationships were examined in a series of 3 structural models. A more detailed discussion of these analyses is provided in Chapters 3 and 4.

Significance of the Study

This study examined the social support-PPD relationship from a new perspective by incorporating emotional intelligence into a model that includes both social support and stressful life events. Research using social support interventions has had dismal results, as
the incidence of PPD was not affected by the interventions. The influence of mothers’ individual Emotional Intelligence abilities on their level of social support and on the buffering relationship of social support to stressful life events and postpartum depression was explored. Results of this study may lead to better identification of who is truly at risk for PPD. It may also guide interventional studies to improve existing Emotional Intelligence and social support, thus lowering the harmful effects of PPD, and improving the lives among those mothers who are affected.
Chapter 2: Review of Literature

This chapter will review the major concepts within the proposed research. It begins with a brief review of postpartum depression (PPD). Predictors of PPD are then reviewed with a focus on the two predictors included in this study: stressful life events and social support. The construct of emotional intelligence is examined specifically in relation to social support. Finally, research hypotheses are presented within a conceptual model that guides this research proposal.

Postpartum Depression

Postpartum depression is not recognized by the American Psychiatric Association as a unique disorder, but is rather considered a major or minor depressive disorder that has a postpartum onset (American Psychiatric Association, 2000; Mancini, Carlson & Albers, 2007). A recent meta-synthesis of postpartum depression estimated overall prevalence rates to be 8-51% (Gavin et al., 2005). Unfortunately, PPD is considered to be largely under-diagnosed, due to very limited routine screening and because many PPD symptoms are similar to symptoms experienced in the normal adaptive process following childbirth (Mancini et al., 2007). Criteria for major depressive disorder include having depressed mood or loss in pleasure on a daily basis, as well as having at least four of the following additional symptoms: sleep disturbance, unanticipated weight loss, loss in energy, agitation/retardation, feelings of worthlessness/ guilt, decreased concentration, or thoughts of self-harm (American Psychiatric Association, 2000). Minor depression constitutes the same criteria; however it is considered to encompass milder symptoms and can last longer than major depression. In this study, PPD is defined as major or minor depression beginning in the year following childbirth (O’Hara, 2009).
Does EI Matter?

Predictors of postpartum depression. Isolated causes of PPD remain elusive; however, evidence strongly supports the connection of PPD to psychosocial factors (Beck, 2001; Logsdon & Usui, 2001; O’Hara & Swain, 1996; Robertson, Grace, Wallington & Stewart, 2004). More recently, biologic factors have been examined, including nutritional deficits, endocrine changes, and genetic polymorphisms. Although the results are somewhat inconsistent, research suggests that each of these factors may play a role in PPD (Bloch, et al., 2003; Corwin, et al., 2010; Ellsworth-Bowers & Corwin, 2012). While recognizing the potential contribution of biologic factors to PPD, the focus of this study is to address the inconsistent results of psychosocial interventional research specifically related to social support. Therefore, review of the emerging biologic risk factors will not be discussed in this report.

The vast majority of research to identify causal factors of PPD report salient psychosocial risk factors. Among these, low levels of social support and high levels of stressful life events consistently rank as factors that are highly predictive of PPD (Beck, 2001; Logsdon & Usui, 2001; O’Hara & Swain, 1996; Robertson, et al., 2004). Two meta-analyses found that low levels of social support and high levels of stressful life events strongly predicted PPD (Beck, 2001; O’Hara & Swain, 1996). Similarly, a systematic review examining risk factors which contribute to PPD ranked low levels of social support and stressful life events among the strongest predictors of PPD (Robertson et al., 2003).

Predictor: stressful life events. Stressful life events are repeatedly found to be predictors of both general depression and PPD (Beck, 2001; Brown & Harris, 1978; O’Hara & Swain, 1996). Stressful life events are events that have demands, constraints,
and opportunities that exceed personal capabilities. Theory suggests that when faced with one of these events one will evaluate the significance of the event and then appraise the extent to which they can cope with the event (Lazarus & Folkman, 1984). Therefore, a person experiencing a high number of and intensity of stressful life events would require more coping resources. This may lead to high levels of stress if the amount of resources needed exceeds the coping resources available. This imbalance of demands and resources is believed to contribute to an increase in physical and psychological problems (Paykel, Emms, Fletcher & Rassaby, 1980; Sarason, Johnson & Seigel, 1978).

Components of stressful life events vary, however, in general, there are common themes including problems with housing, employment, relationships, health, and legal issues. Pregnancy, childbirth, and mothering during postpartum period are often considered stressful life events. Additional stressful life events during this perinatal period which require coping resources may lead to overwhelming demands. Research suggests that postpartum mothers who lack the resources to cope with these demands are more likely to develop PPD. Two meta-analyses examining stressful life events as predictors of PPD found moderate effect sizes \( r = .29; r = .38 \) (Beck, 2001; O’Hara & Swain, 1996). In both of these studies, stressful life events were among the strongest predictors of PPD. More recent published studies are equally supportive of the relationship of stressful life events to PPD (Ritter, Hobfoll, Lavin, Cameron, & Hulsizer, 2000; Surkan, Peterson, Hughes & Gottleib, 2006).

In spite of this well-supported relationship, there are some limitations in the research methods of these studies. First, timing of the data collection may have an impact on one’s perspective of hardship (Paykel, 2003). For example, a depressed person may
have a more negative view of their recent life events and the impact of these events than a non-depressed person. Ideally, information regarding stressful life events would be collected prior to the onset of PPD. Some of the recent studies examining stressful life events measure one’s perception of life events simultaneous to the assessment of depression (Séguin, Potvin, St. Denis & Loiselle, 1999; Surkan et al., 2006).

Additionally, when asked about stressful life events, there is an inconsistency in the time these events occurred. Some women are asked to remember events that occurred in the past year (Ritter et al., 2000), others are asked to recall events that occurred during pregnancy (Collins, Dunkel-Schetter, Lobel & Scrimshaw, 1993), and others are asked to recall “recent” events (Brugha et al., 1998; Séguin et al., 1999). Questionnaires that capture only “recent” events may miss earlier events that continue to affect the participants. Ideally, data collection that inquires about a consistent time period, such as the previous year, will provide results that provide a better picture of the effects of these life stressors.

While many of these studies have included the traditional themes mentioned above, none of the recent articles used measurement tools that were validated with a perinatal population. Existing questionnaires were adapted for this population, though a clear explanation of how they were adapted is not provided. Additionally, the inclusion/exclusion of different categories of stressful events is inconsistent and often vague. Some studies include more information regarding relationship problems (Brugha et al., 1998; Ritter et al., 2000), while others seem to ignore this area (Collins et al., 1993; Surkan et al., 2006). Further, a clear distinction of what constitutes stressful life events will allow for more accurate interpretation of results.
**Predictor: social support.** Social support, defined in this study as resources provided by other persons (Cohen & Syme, 1985), is consistently found to be a protective factor in both general and postpartum populations. One of the major challenges to furthering the knowledge of social support has been inconsistency in defining the construct. Models of social support abound, and in many cases, measures used lack evidence of reliability or validity (Collins et al., 1993; Sagrestano, Feldman, Rini, Woo & Dunkel-Schettner, 1999; Silver, Heneghan, Bauman & Stein, 2006; Targoz et al., 2003). Further, social support is often operationalized in different ways; therefore collective results are difficult interpret. In spite of these incongruencies, there are some conceptual themes that are common to many of the more popular models. Social support is often viewed at having two dimensions including Functional Social Support and Social Networks. The following section reviews each of these dimensions, including their theories and implications for the postpartum population.

**Functional social support.** In general, functions of social support are often represented with some variation of emotional, instrumental, informational, and companionship functions (Wills & Shinar, 2000). Functional Social Support is defined in this study as emotional and tangible support provided by others. Emotional support is considered caring, listening, companionship and encouragement. It tends to provide a sense of acceptance and belonging, distraction from negative events, and increase positive affect. This type of support is believed to help people better appraise negative events and to increase their self-esteem. Tangible support is considered an act of assistance such as lending money or providing transportation. This type of support contributes to practical problem solving.
**Social network.** Social Network is defined in this study as the size and familiarity of available social resources. Overwhelmingly, large social networks are associated with better health outcomes (House, Landis, & Umberson, 1988; Seeman, 1996). In general, social network is considered to include factors such as network size, diversity of members, frequency of contact and level of intimacy (Berkman & Syme, 1979; Gottleib, 1985). Network size is the number of people or groups in one’s social world, while diversity is the variation in roles for each of the members. Research suggests that larger, more diverse social network groups are more protective than small, homogeneous groups (Gottleib, 1985). Diverse members in one’s social network may fulfill multiple social roles, such as wife, friend, volunteer, employee, and church member. These multiple role identities are believed to contribute to one’s adaptation to stress (Berkman, Glass, Brissette, & Seeman, 2000; Thoits, 1983). For example, diverse network members with multiple roles may provide a larger pod of people who can help one during times of distress. Additionally, the multiple roles and responsibilities associated with each role may bring increased life-meaning and self-esteem, which are both found to improve one’s adaptation to stress (Burton, 1998; Thoits, 1983). Strong social networks are also shown to increase one’s positive affect (Cohen, 1988), which may indirectly affect health through altered immune response (Uchino, 2006). Finally, contact with multiple groups and people may expose a person to a variety of coping mechanisms, which may improve one’s appraisal of their own stressful events. For example, friendship with another mother of a small child may provide insight into how she uses a community mom’s group to counter social isolation. Similarly, a spousal relationship may provide behavioral modeling to address fatigue, such as jogging, or sports participation. Finally, active
membership in a church may provide a spiritual coping strategy to address the feeling of being overwhelmed, including prayer or meditation for coping. In sum, exposure to different roles may better model coping strategies in times of stress (Gore, 1985).

**Existing social support models.** This study is grounded in two well accepted theoretical models of the beneficial effects of social support on well-being, the direct effect model and the stress-buffering effect model (Cohen & Wills, 1985). The direct effect model proposes beneficial effects of social support regardless of the presence of stress. The stress-buffering effect model posits that the beneficial effects of social support are realized in response to stress. That is, social support is proposed to mitigate the negative effects of stress to improve one’s well-being.

The direct effects model suggests that social support provides on-going, beneficial effects to improve well-being (Cohen, 1988). One proposed benefits of social support is increased informational support. For postpartum women, this might include information on how to access healthcare providers, on healthy behaviors of postpartum (breastfeeding, nutritional needs, baby care), and in solving logistical problems such as transportation and child care.

Direct effects model also suggests that social support provides psychological effects that improve self-esteem and self-worth. Supportive relationships can result in positive affect via messages of encouragement, affection, and affirmation (Abbey, Abramis & Caplan, 1985). Social support is believed to provide feelings of self-worth from a sense of predictability in role expectations (Cohen, 1988; Thoits, 1983). For postpartum women, these psychological effects may present as encouragement related to the physical demands of caring for an infant, or as affirmation regarding a mother’s plan
to balance work/family. Role expectations in new mothers may present as she is able to accept encouragement from her friends and family for her role as a mother. These social support efforts can enhance women’s well-being physically and mentally, resulting in improved overall health.

Alternatively, the stress-buffering effects model assumes that stress has negative consequences on well-being. These effects can be a result of both biological and behavioral responses (Cohen, 1988). Biological responses may include neuroendocrine and/or immune response. Behavioral activity may include decreased sleep and changes in eating habits.

This model incorporates the theory of stress, appraisal and coping proposed by Lazarus and Folkman (1984). A brief review of this theory begins with an individual encountering a stressful situation. One responds with an appraisal to determine the level of threat or harm that may accompany the stressor, followed by an evaluation of what resources are available to cope with the stressor. Appraisal reflects the fluid, unique characteristics and resources of the individual and the context of the stressor. Social support is one example of a resource that would be available to cope with a stressful event. Coping strategies are chosen and the extent to which stress is reduced depends on the selection of the appropriate strategy and the individual’s ability to execute the strategy.

Childcare needs for postpartum women, for example, may be a situation that is perceived as stressful. Finding trustworthy, reliable childcare when a mother returns to works may feel overwhelming. A mother’s appraisal of her situation includes available resources, including social support. In response to this appraisal, she may perceive many
coping options for her childcare needs. With a large social network, she may decide to solicit childcare provider information to connect her to a trustworthy childcare resource. She may solicit affirmation from her partner or parents in her efforts to evaluate different childcare options. But in each of these cases, the respective social support resource provides additional resources to cope with the situation and subsequently reduce the overall effects of this threat. Therefore, social support is able to lessen the harmful effects of stress.

**Social support in the postpartum population.** Two meta-analyses conducted to evaluate predictors of PPD each found social support to be among its strongest predictors (Beck, 2001; O’Hara & Swain, 1996). These reviews and more recent literature further support a model of direct effects of social support on stress (Bielinski-Blattmann, Lemola, Jaussi, Stadimyer & Grob, 2009; Cheng & Pickler, 2009; Xie et al., 2010). Research examining Social Network is limited and inconsistent. Literature examining the direct effects of social network size on PPD has found inconsistent results (Brugha et al., 1998; Collins et al., 1993; Surkan et al., 2006). Roles within the social network are often presupposed by asking specifically about support received from the father of the baby, from the mother of participant, or from a general “friends and family” category (Brugha et al., 1998; Collins et al., 1993; Dennis & Ross, 2006; Dennis & Letourneau, 2007). Predetermined role categories may limit knowledge of support systems as non-traditional family structures become more common (Teachman, Tedrow & Crowder, 2000). One study examined the stress-buffering effects of structures of social support (Collins et al., 1993). The results of this examination did not support a model of stress-buffering effects of social network size on PPD.
Functional social support, including emotional and tangible support, is most often examined in relationship to PPD, for both direct effects and stress-buffering effects. Emotional support is often investigated, and is well supported as having direct protective effects in preventing PPD (Akincigil, Munch & Niemezyk, 2010; Bielinski et al., 2009; Collins et al., 1993; Dennis & Ross, 2006; Dennis & Letourneau, 2007; Séguin et al., 1999). Tangible support is also a function found to have direct protective effects on PPD (Cheng & Pickler, 2009; Collins et al., 1993; Gao, Chan & Mao, 2009; Séguin et al., 1999; Xie et al., 2010). Overall functional support has been examined as one’s satisfaction with their support and its direct effects are largely supported in postpartum women (Brugha et al., 1998; Collins et al., 1993; Logsdon, Birkimier & Usui, 2000; Surkan et al., 2006). Overall, direct effects of functional social support are well supported.

Research on the stress-buffering effects of functional social support is less conclusive. Collins and colleagues (1993) were one of the first to examine this relationship and found that the amount of social support received did, in fact buffer the effects of life stress on PPD. However, the functional social support did not have any stress-buffering effects. While Collins and colleagues were ground-breaking in their examination of these relationships, the study is limited by scales that were investigator-developed without evidence of reliability or validity. Brugha and colleagues (1998) examined functional social support from a mother’s “primary group” for a protective stress-buffering effect and did not find a significant relationship. The value assigned to measure level of support of the primary group, however, was interpreted by an interviewer rather than by a value assigned by the participant. This may account for
differences in results. Two recent studies specifically addressed stress-buffering effects in the postpartum population, and both were found to support a stress-buffering hypothesis. Cheng and Pickler (2009) found that perceived importance and received social support both buffer the negative effects of life stress on PPD. Akincigil and colleagues (2010) specifically investigated marital partner support. Within this relationship, functional social support measured as affection and encouragement, were found to buffer the effects of one’s stress to protect against PPD. However these results are also limited by the use of instruments without evidence of reliability and validity.

**Translation to practice**

In response to increasing evidence of the protective effects of social support on PPD, studies have tested the effectiveness of interventions to improve social support. These interventions have included group and individual educational classes, postpartum visits from nurses, midwives, and lay persons (those without healthcare training), interpersonal psychotherapy, and earlier postpartum follow-up appointments. A meta-analysis reviewed all randomized controlled trials which incorporated these types of psychosocial or psychological perinatal interventions to prevent PPD (Dennis & Creedy, 2004). The overall results of the 15 studies selected showed no significant benefit, as women who received interventions were equally likely to suffer from PPD as women who did not receive the interventions.

A closer review of the studies in this meta-analysis demonstrates the difficulty in improving one’s social support via external sources. While intensive, multiple visits have lowered the risk of PPD, less intensive, and more feasible, broad-based interventions have not been found to lower the risk PPD. Home visits from lay persons and earlier
postpartum follow-up visits with a provider were both found to be ineffective (Gunn, Lumley, Chondros & Young 1998; Morrell et al., 2000). Similarly, group based interventions were found to have no overall effect on PPD (Reid et al., 2002; Stamp, Williams & Crowther, 1995). Two trials of professional, intensive interventions, however, significantly lowered the risk of PPD (relative risk 0.68, 95% CI 0.55 to 0.84) (Dennis and Creedy, 2004). One trial employed 12 intensive nurse visits over 6 months, while another incorporated flexible midwife visits over 3 months (Armstrong, et al., 1999; MacArthur et al., 2002). Without effective targeting for those at risk, however, frequent, intensive visits from health care providers may prove to be too expensive for widespread use. Based on the results of these studies, effective interventions to increase one’s social support from an external perspective have either lacked feasibility for widespread implementation, or have lacked significant results.

Disappointing results from these trials are inconsistent with the research results that strongly support the impact of social support to protect against PPD (Beck, 2001; O’Hara & Swain, 1996). Possible explanations for these conflicting results may include individual differences in how social support is used, and a difference in the influence of one’s existing social support versus an external increase in social support. The trials mentioned above have focused on increasing social support by introducing a new social resource (group education, home visits). This approach assumes that postpartum women will be able to recognize and elicit support from a new addition to their support system. It also ignores the differences that may exist between women that can affect their ability to identify and utilize new social relationships.
In response to the disappointing results from external support interventions, new research is needed to examine what factors make women more effective at identifying and accessing social support. An emerging area of research has begun to examine the construct of Emotional Intelligence as a factor in the development and maintenance of relationships. Emotional Intelligence or one’s ability to recognize and reason about emotions and to use emotions to regulate thought may help a new mother to cultivate social support that will best work for her.

**Emotional intelligence and social support**

Emotional Intelligence is one factor that may have an important impact on the role of social support in preventing PPD. A newer construct, Emotional Intelligence represents an individual’s ability to recognize and reason about emotions and to use emotions to regulate thought (Mayer and Salovey, 1997). Preliminary research suggests that one’s level of Emotional Intelligence may affect their level of social support from friends and family. Before examining the literature to support this relationship, it is necessary to review the construct of Emotional Intelligence.

**Conceptual review of emotional intelligence.** While the idea of Emotional Intelligence has been highly popularized since the mid-1990’s, the presence of distinct emotional or social abilities was suggested in many early works on intelligence. In fact, the debate concerning the value of emotions versus reason to adaptive ability dates back to ancient Greece. Cicero claimed that emotions were the guiding force in making decisions, while the Stoics viewed emotions as an obstacle to rational thought. Early contributors to the development of Emotional Intelligence included Thorndike’s idea of

The first academic model of Emotional Intelligence was developed by Mayer and Salovey (1997). Their model assumes that Emotional Intelligence comes under the category of “hot” intelligences, concerned with personal and emotional information. Other types of intelligence in this class include social, practical, and personal intelligence (Mayer et al., 2004). Emotional Intelligence theory is based on the assumption that it is one of many distinct facets of intelligence each of which contributes to one’s life and experience. Empirical research has supported this theory with evidence that Emotional Intelligence has modest correlations with other measures of intelligence, such as verbal IQ (r = .36), perceptual-organizational IQ (r = .14) (Mayer et al., 2004), and general IQ (r = .14, r = .20, r = .33) (Christiansen, Janovics & Siers, 2010; Rode et al., 2007; Song et al., 2010). These relationships demonstrate that Emotional Intelligence is related, but distinct from other types of intelligences.

A subsequent model of Emotional Intelligence was introduced by Goleman (1995). Goleman viewed EQ (his notation for emotional intelligence) as a set of desirable personal qualities, including self-control, social skills, and conflict management, thus including both mental abilities and personality traits. The inclusion of personality traits into an intelligence construct was a significant break from earlier conceptions of Emotional Intelligence. Mayer and Salovey (1990) consider Emotional Intelligence a unique mental ability, rather than a combination of ability and personality traits. Researchers have varied in their conceptions of Emotional Intelligence as an ability, as a
combination of ability and personality, and even exclusively a trait (Bar-On, 1997; Petrides & Furnham, 2001; Schutte et al., 1998).

While all conceptions of Emotional Intelligence appear in the academic literature, the most widely accepted model of Emotional Intelligence is Mayer and Salovey’s (1990, 1997). This is likely due to the model’s distinct conception of Emotional Intelligence, and its congruence with other models of intelligence. Mayer and Salovey’s ability-based model of Emotional Intelligence is often considered the foundation to understanding Emotional Intelligence. This model identifies four branches of Emotional Intelligence with increasing levels of complexity, including perceiving emotions, using emotions to facilitate thought, understanding emotions, and managing emotions. Because the model includes a collection of specific abilities within a comprehensive model it is considered a global ability-based model. These specific abilities are categorized into the four branches described in Table 2-1.
Table 2-1.
Mayer and Salovey’s (1997) Four Branch Model of Emotional Intelligence

<table>
<thead>
<tr>
<th>Branch</th>
<th>Description</th>
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<tbody>
<tr>
<td>Branch 1</td>
<td>Perception, appraisal, and expression of emotions</td>
</tr>
<tr>
<td>Branch 2</td>
<td>Emotional facilitation of thinking</td>
</tr>
<tr>
<td>Branch 3</td>
<td>Understanding and analyzing emotions</td>
</tr>
<tr>
<td>Branch 4</td>
<td>Regulation of emotions to promote growth</td>
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</table>

The first branch of Emotional Intelligence concerns the perception, appraisal and expression of emotions (Mayer & Salovey, 1997). Perception of emotions involves recognizing facial cues, body posture and other non-verbal messages that indicate an emotion in one’s self and others (Mayer & Salovey, 1997). Emotional cues that are perceived are then appraised for meaning (Mayer & Salovey, 1997). For example, tensed facial muscles around the eyes may be recognized and then appraised as worry. Self identification of emotion may include one’s ability to recognize their feeling of hopelessness or their increased desire to withdraw from social interaction as sadness. Once identified, an individual may then be able to express the emotion verbally and non-verbally to others.

Using emotions to facilitate thought is the second branch of Emotional Intelligence. ‘Tuning in’ to one’s internal emotions in the context of the external world may allow an individual to use their emotions to prioritize action (Mayer & Salovey, 1997). For example, if a postpartum mother is feeling isolated and lonely, she may desire to talk with a friend or another mother. She needs to tune in to who will best fulfill her needs at this time. Mothers with higher levels of Emotional Intelligence will likely be better able to hypothetically feel emotions that result from the advice from another mother, laughter from her childhood friend, or emotional support from her spouse. For
example, a friend who often provides advice and ideas may consistently communicate a sense of calm. This anticipated emotional response may guide a mother who is feeling overwhelmed to seek out a sense of calm from her friend. Alternatively, a spouse may often provide reassurances of encouragement and love. A mother who is questioning her abilities and feeling helpless may anticipate that an evening spent with her spouse may fulfill some of these needs. These types of hypothetical information can be used to best utilize the available support. Mayer and Salovey describe this as an “emotional theater of the mind” (1997, p. 13).

Understanding emotions, the third branch of Emotional Intelligence, concerns one’s ability to predict emotional response norms, and to better understand the complexities of simultaneous emotions (Mayer & Salovey, 1997). For example, childbirth can elicit a wide range of conflicting emotions. What begins in the delivery room as excitement and fear may develop after delivery into joy and sadness as one considers the full implications of this major life event. A high level of Emotional Intelligence would enable a postpartum mother to anticipate these emotions and to better understand them as they experience childbirth, instead of being confused by the rush of unexpected and conflicting emotions.

The fourth branch of Emotional Intelligence concerns regulation of emotions to enhance personal growth (Mayer & Salovey, 1997). This may include emotion-based coping strategies or expression strategies (Mayer & Salovey, 1997). For example, expressing a sad emotion may proactively elicit necessary support. However, extensive or intense rumination may impair functioning, and actually inhibit one’s ability to effectively communicate with others. Regulating the intensity of one’s emotion may
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determine the likelihood of receiving emotional support versus dysfunctional isolation. One’s ability to regulate their emotions implies that a person can consciously regulate, or connect/disconnect from their emotions to benefit their personal goals (Mayer & Salovey, 1997).

One of the key aspects of this global model is that Emotional Intelligence is viewed as malleable with the potential to improve it with training (Mayer & Salovey, 1997). This potential for improved Emotional Intelligence has profound implications as a clinical intervention to improve one’s life situations.

Emotional intelligence and social support links. Understanding the effects of Emotional Intelligence on the protective effects of social support may better explain the individual differences that enhance social support to protect against PPD. Research suggests that Emotional Intelligence levels may affect one’s utilization of social support (Brackett, et al., 2005; Ciarrochi, Scott, Deane & Heaven 2003; Lopes et al., 2003; Lumley et al, 1996). A large, early study examining one’s ability to perceive and communicate emotions found that this ability was significantly related to perceived social support, social network size, and social skills (Lumley et al., 1996). These results were replicated in three studies which examined global Emotional Intelligence levels and found significant relationships with perceived support (Brackett et al., 2005; Ciarrochi, et al., 2003; Lopes et al., 2003). Interpersonal relationship quality has also been found to be related to Emotional Intelligence (Brackett et al., 2005; Lopes et al., 2003; Lopes et al. 2004; Schutte et al., 2001). Finally, indicators of social skills, or one’s ability to engage with others, are also found to be related to EI (Brackett, Rivers, Shiffman, Lerner & Salovey, 2006; Lumley et al., 1996; Schutte et al., 2001). Although these studies are
based exclusively in student populations, they demonstrate consistent support for the contribution of Emotional Intelligence to one’s ability to develop and elicit social support.

These results, when translated into a postpartum population may help to explain the differences in effective utilization of social support. Emotional Intelligence may affect a new mother’s ability to perceive and elicit new social support resources. It may also affect a new mother’s ability to activate and best utilize existing social support resource. For example, a mother with a seemingly large social support system may feel isolated when friends call less often, even though the underlying reason for their withdrawal is their fear of disturbing the new mother. A mother with a high level of Emotional Intelligence may be better able to recognize her own loneliness, and communicate that feeling to her friends. A mother with low levels of Emotional Intelligence may have more difficulty identifying her emotions, and thus struggle to elicit effective social support. One’s Emotional Intelligence level therefore may indicate who best utilizes available social support. Interventional research that implements external support resources may need to first identify and target women with higher levels of Emotional Intelligence, who are more likely to recognize and elicit this support. Additionally, effective interventions for women with lower levels of Emotional Intelligence may need to focus more on augmenting women’s Emotional Intelligence ability, before introducing more social support resources.

Postpartum women with high levels of Emotional Intelligence may be more adept at developing stronger interpersonal relationships. Perceiving emotion, one branch of Emotional Intelligence, is the ability to accurately understand emotions in self and others.
Accurate understanding of one’s own emotions is requisite to subsequent expression of emotion to others. This expression can strengthen relationships as it fosters a sense of trust and intimacy (Tiedens and Leach, 2004). Likewise, an accurate understanding of other’s emotions is associated with a more attuned sense of empathy, which can result in a sense of emotional synchrony and interdependency (Davis, 2006). Both partners feel vulnerable to the negative effects of one’s emotions, and thus both partners more readily monitor each other’s emotions and offer support. Women who have developed interdependent relationships with others will essentially have emotional companions who will more closely monitor their needs. These relationships will likely provide more emotional support and tangible assistance during stressful challenges of having a new baby.

A postpartum mother’s ability to use emotional information to inform their thinking may also contribute to better use of their existing social support. For example, new mothers are often bombarded with expectations of motherhood, which are often conflicting. Babysitting offers, thought to give mothers “a break,” are somewhat contradictory to expectations of mothers being a ‘supermom’ who can do it all. A mother’s ability to incorporate emotional responses into her judgments is crucial when evaluating what is most appropriate for her unique needs. Babysitter use may elicit a sense of relief for some mothers who feel overwhelmed with childcare. For others, babysitter use may elicit anxiety, as the notion of leaving their infant in the care of others may make them feel inadequate. Furthermore, values change, and mothers who declined initial offers of babysitting may begin feeling the anticipated relief of a “break” from childcare. Emotional Intelligence may facilitate the tuning-in to this emotional shift and
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subsequently use this information to make better informed decisions. In this scenario, using emotions may allow new mothers to more readily elicit social support when needed, despite the prevailing supermom mentality. Emotional information provides a new mother with insight into how well the alternatives match and meet their immediate need.

Similarly, emotional regulation may contribute to one’s use of social support. Mother’s who anticipate or experience distress may use a variety of strategies to regulate their emotional responses. Many of these regulation strategies are found to promote positive affect and social functioning (Gross & John, 2004). For example, a mother who is regularly home by herself with her infant may attempt to prevent feelings of loneliness by finding alternative options. This may include planning activities to avoid isolation, such as joining a mother’s group, or arranging visits with friends. Another strategy may involve changing an existing emotional response. For example, a mother with feelings of isolation or sadness may attempt to conjure up good feelings to shift her own emotions. This may involve calling people in her life with whom she shares happy memories, or those who can always make her laugh. Emotional regulation abilities, therefore, may be necessary for mother’s to effectively use their social support as an adaptive strategy to counter stress. In sum, Emotional Intelligence may play a significant role in one’s ability to identify and effectively elicit support within one’s existing network that, in turn, produces social support’s protective effects on well-being.

Emerging literature examining Emotional Intelligence suggests its potential to better explain the relationship of social support to PPD. This study will be the first known
investigation to combine these relationships, as outlined in following theoretical model (Figure 2-1).

Figure 2-1. Theoretical model examining combined effects of social support and Emotional Intelligence on PPD.

**Hypothesis 1a:** Social Support will be negatively related to Symptoms of PPD

**Hypothesis 1b:** Stressful Life Events will be positively related to Symptoms of PPD.

**Hypothesis 1c:** Social Support will negatively affect the positive relationship of Stressful Life Events on Symptoms of PPD.

**Hypothesis 2:** Emotional Intelligence will be positively related to Social Support.

**Hypothesis 3:** Emotional Intelligence will have a positive effect on the moderating relationship of Social Support to Stressful Life Events and Symptoms of PPD.
Conclusion

Previous literature provides a foundation to re-examine the effects of social support on the relationship of stressful life events to PPD. Direct effects of Functional Social Support, which consider the on-going emotional and tangible support that can directly lower the incidence of PPD, are largely supported (Bielinski-Blattmann, et al., 2009; Cheng & Pickler, 2009; Xie et al., 2010). Stress-buffering effects, which considers how Functional Social Support can diminish the negative effects of stressful life events that contribute to PPD is supported to some extent (Akincigil, et al., 2010; Cheng & Pickler, 2009; Collins et al., 1993). This inconsistency may be due to limitations in measurement tools. Though less frequently investigated, social network is also supported as having direct effect on PPD (Brugha et al., 1998; Dennis & Ross, 2006). However, specific structural roles are inconsistently investigated, and therefore more clarification is needed to better understand the dimension of social network. Translating the protective effects of social support to practice has had disappointing results (Dennis & Creedy, 2004). Interventions developed to increase one’s social support with lay home visits and support groups have been ineffective (Brugha et al., 2000; Morrell et al., 2000; Stamp, et al., 1995). New research is needed to better understand individual skills that may enhance one’s effective activation of social support in order to develop interventions to lower PPD.

Emotional Intelligence is one factor that may provide insight into the effective use of social support. People who are able to understand their emotional needs and also the emotional needs of others may be more likely to have a stronger sense of interpersonal trust and intimacy in their social network. Also, people who have to ability to incorporate
strategies to improve their emotional responses may more effectively seek out relevant social support in times of need. Understanding how Emotional Intelligence relates to the identification and use of social support may lead to more effective interventions that focus on increasing one’s Emotional Intelligence, which may indirectly affect their natural level of social support. Focusing on mother’s existing support system may better reflect the supported theoretical linkages and lead to anticipated results which lower PPD. This study will begin to clarify the relationship of Emotional Intelligence and social support in PPD. Results of the study will provide a foundation for interventions to enhance Emotional Intelligence and social support, and to better protect against PPD.
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Chapter 3: Methods

Design of the Study

This study used a time-sequenced data collection survey design with two data collection time points. Time-sequenced data collection was best suited for this research because it captures preliminary variables that can influence later developments. In this case, it showed how Emotional Intelligence, Stressful Life Events, and Social Support can influence the development of postpartum depression. The time order of the variables allowed for stronger conclusions regarding the predictive relationships among the independent variables and postpartum depression. This study had two time collection points, Time 1 and Time 2. Data were collected using web-based surveys, so that participants could complete the respective surveys anywhere that they were able to access the internet.

Sample and Participant Recruitment

Initial recruitment targeted pregnant women in their third trimester (Time 1) and participation continued through 10-12 weeks postpartum (Time 2). The sample was recruited from patients visiting five different OB/GYN offices in the Greater Cincinnati area, who were actively seeking routine antenatal care from physicians and midwives. Three of the five offices were located in suburban, middle-class neighborhoods. One office was in a small town, catering to a wider rural population, and one office was located in urban downtown, that catered specifically to uninsured or Medicaid insured pregnant women. Participants were contacted via e-mail to complete the second round of the data collection.

Recruitment
Pregnant women in their third trimester were given a flyer during their prenatal visit describing the study and inviting them to participate in the study (Appendix A). The flyer communicated inclusion criteria and a website address for the *Time1* questionnaire. Women who choose to participate accessed the website from a personal computer. This recruitment strategy resulted in strong, early participation rates. However, after 2-3 months of slowed participation rates, recruitment was broadened. A team of birthing instructors in the Greater Cincinnati area distributed the recruitment flyer to women enrolled in their classes. Although birthing class participants may represent a highly motivated group of pregnant women, they accounted for only four percent of total participants.

**Sample size.** Sample size determination was calculated based on recommendations for structural equation modeling analyses. Using recommendations from Bollen (1989) and convention, number of cases to parameter ratio of 10:1 ensures a stable model in a structural equation modeling (SEM) analysis. The two analyses proposed (See Data Analysis Section) had 13 and 14 parameters, respectively. Therefore, the minimum sample sizes for these analyses were \( n = 130 \) and \( n = 140 \). The target final sample size was \( n = 150 \) increase statistical power and to allow for exploratory post hoc analyses.

A limitation to time-sequenced data collection is participation drop-out, or attrition, in follow-up data collection. Attrition rates vary; however, based on previous research this study anticipated a potential 30% drop out rate in *Time 2* data collection. Calculating for an approximate 30% drop out rate for *Time 2* resulted in a target sample size of \( n = 195 \) (150 x 1.3 = 195) for *Time 1*. 
Inclusion criteria:

1) Women in their third trimester of pregnancy
2) Women who can access the internet and have an active e-mail account
3) Women who are 18 years and older
4) Women who can read and write English

Exclusion criteria:

1) No additional

Third trimester of pregnancy is considered the period from 27 weeks gestation until delivery. The recruitment flyer, however, was designed to appeal to a wide range of readers. It was assumed that women would self-identify more readily with a trimester milestone, rather than with a gestational marker of ‘greater than 27 weeks.’ Recruitment flyer terminology, therefore utilized ‘third trimester’ as inclusion criteria.

Data Collection Procedure

Women who choose to participate accessed the website address, provided on the recruitment flyer. This website informed them of study details, inclusion criteria, and consent. For those who choose to participate, eligibility questions asked participants if they were in their third trimester of pregnancy, if they had an active e-mail account, and if they were 18 years or older. Those who did not meet these criteria were directed to a webpage that informed them that they did not meet the criteria for this study. An affirmative “click” for each of these criteria brought participants to an informed consent document webpage. A “click” at the end of the document noted their consent to participate. Those who provided consent continued to the web-based survey, which included the following measurement instruments: Mayer-Salovey-Caruso Emotional
Intelligence Test, Postpartum Depression Screening Scale, Life Events Questionnaire, and Social Support Questionnaire. The Time 1 survey was estimated to take approximately 45 minutes to complete. A letter was sent to each participant within one week following their participation in Time 1 that included a note of thanks for participating and a $20 gift card to a local grocer to reimburse them for their time.

Participants were sent an e-mail 9 weeks following their expected date of delivery to complete Time 2 data collection. Gavin and colleagues (2005) found that PPD prevalence was highest at 2 and 3 months postpartum. Therefore, it was anticipated that data collection at 9-11 weeks postpartum will best capture those experiencing PPD. A link, embedded within the e-mail message, directed them to the Time 2 data collection website to complete the Postpartum Depression Screening Scale. This survey was estimated to take approximately 5 minutes to complete. Those who participated in Time 2 data collection received a second $20 grocer gift card to reimburse them for their time.

Participants who did not respond to the Time 2 data collection survey within one week of the e-mail request were sent a series of three weekly reminder e-mails to remind and encourage them to participate. Requests to participate were conducted exclusively via email as it provides a greater sense of anonymity which may reduce feelings of coercion.

Instrumentation: Time 1

Mayer-Salovey-Caruso Emotional Intelligence Test, MSCEIT V2.0. This 141-item test provides a global score for emotional intelligence, and four sub-scores that represent each branch of the global ability-based model of emotional intelligence (Mayer, Salovey, Caruso & Sitarenios, 2003). The first branch examines perception of emotions by having participants identify emotion in faces and in artwork. The second branch
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examines *facilitating thought* by asking participants to identify different moods that may assist in a specific task and to compare different moods to other sensations, such as color, or temperature. The third branch examines *emotional understanding* by asking participants to predict mood changes following specific situations and to identify moods that blend together. Finally, the fourth branch examines *managing of emotions* by asking participants to select optimal strategies to manage a specific mood and to strategies to help maintain relations with others.

While there are numerous emotional intelligence measures available, the MSCEIT V2.0 is the only measure that corresponds directly to the theoretical model of Emotional Intelligence. The widely accepted, global-ability based model of Emotional Intelligence considers it to be an ability rather than a collection of personality traits. The MSCEIT V2.0, the only ability based measure, conceptually matches the Emotional Intelligence theoretical model. Many of the other available Emotional Intelligence scales rely on a self-report methodology. Unfortunately, a self-report measure will only effectively measure one’s own perception of their Emotional Intelligence, which is likely to be more related to their personality rather than their actual ability. A self-report methodology may also be more vulnerable to social biases. The MSCEIT V2.0 provides information on specific abilities that can be augmented, exclusive of more stable personality traits. Future interventions targeting Emotional Intelligence will benefit from a measure that best captures Emotional Intelligence abilities contained within the intervention training.

The advantages of the MSCEIT V2.0, including its theoretical foundation and objective ability-based methodology, make it the best available measure for Emotional Intelligence.
Like traditional IQ tests, the MSCEIT requires participants to identify “correct” responses. However unlike traditional IQ tests, Emotional Intelligence measures must identify the correct response amidst infinite contextual variations of emotions. MSCEIT developers responded to this by using an empirically-derived scoring benchmark instead of an investigator determined correct response. Emotional responses are deemed correct if they converge with responses given by either lay-majority or emotion experts. These benchmark scores were empirically determined via responses from a large non-expert sample (n = 5,000) for “consensus scoring method” and via responses of a small sample (n = 30) of experts in Emotional Intelligence for “expert scoring method” (Mayer et al., 2003). Correlation between these two scoring methods is r = .91 (Mayer et al., 2003). This research will select the consensus scoring method and use the global Emotional Intelligence score (rather than individual branch scores) consistent with most of the validity studies using the MSCEIT (Mayer et al, 2003; Palmer, Gignac, Manocha & Stough, 2005).

Mayer and colleagues (2003) reported a split-half reliability of 0.93 for the MSCEIT’s overall Emotional Intelligence score. Reliability of the global measure score is consistently higher than that of the individual branches (Mayer et al., 2003; Rode et al., 2008). Discriminant validity of the global score has been demonstrated with respect to social biases and common personality traits; and convergent validity has been demonstrated with significant correlations to similar tests of emotional perceptions (Mayer et al., 2008; Rode et al., 2008). This measure has not been validated in the perinatal population. However, it has been widely used in university populations, and in a wide range of work settings. Normative data for adult women is available for the
MSCEIT V2.0, based on a female sample (n = 2,599) (Mayer, Salovey & Caruso, 2002). Women tended to score slightly higher than men in overall EI, however, this difference accounted for only 3.2% of the variance.

**Norbeck Social Support Questionnaire, NSSQ** (Appendix B). Based on Kahn’s (1979) definition of social support, this questionnaire asks respondents to identify significant people in their life who provide support for them (Norbeck, Lindsey & Carrieri, 1981). They are then asked to respond to 8-items related to social support for each person identified. Emotional support is measured for each person listed with four questions that consider support in the form of affirmation and affect. For example, questions ask how much this person makes them feel loved. Tangible support is measured with two hypothetical questions involving a $10 loan and help during sickness. Emotional and Tangible social support are combines to create a total score for Functional Social Support. The number of people listed, relationship duration, and frequency of contact provide a total score for Social Network.

Functional Social Support and Social Network in the NSSQ each have demonstrated test-retest reliability ranging from 0.85-0.92 in pregnant women. Functional Social Support has demonstrated acceptable internal reliability in pregnant women (α = 0.88 and .83; Norbeck & Anderson, 1989; Zachariah, 2009). Because Social Network is a formative variable, as opposed to a latent variable, internal consistency statistics are not relevant. Both social support measures have demonstrated significant correlations with measures of interpersonal need for inclusion and affection (Functional Social Support: .24**; Social Network: .19*), thereby demonstrating convergent validity. Both measures have demonstrated no correlation with interpersonal need for control.
Support: -.02 n/s, Social Network: -.04 n/s; Norbeck, Lindsay & Carreiri, 1983), thereby demonstrating discriminant validity. Finally predictive validity for both measures has been demonstrated with respect to negative mood (Norbeck et al., 1983). This instrument has been used extensively in perinatal populations (McKee, Zayas & Jankowski, 2004; Norbeck and Anderson, 1989; Zachariah, 2004, 2009).

For this study, Functional Social Support was originally calculated as a summative score of its three dimensions (affirmation, affect, aid) within the Norbeck Social Support Questionnaire. However, after reviewing correlation matrices, the summative score was found to be very highly correlated with the Social Network score ($r = .95$, $p<.01$). A brief explanation of the scale may clarify this issue. Sub-dimension scores of affirmation, affect, and aid are calculated based on the cumulative value of each support contact listed and the respective dimension value indicated. Therefore, the summative value of Functional Social Support is highly dependent upon the number of contacts listed. Using the same method, Social Network variable is calculated as a sum of the duration of relationship and frequency of contact for each support contact listed, in addition to the raw number of support contacts listed. Values for the two variables were both highly dependent on the number of contacts named by each participant. Conceptually, this causes a problem as it confounds the variables (House & Kahn, 1985), because of the shared variance owed to the number of contacts listed. To better reflect the conceptual distinction of Functional Social Support from Social Network, the sum of the means of each of the three dimensions, rather than the summative total of each dimension, was used for analysis. This procedure resulted in a correlation between the two variables of $r = -.12$ (n/s).
A review of the Norbeck Social Support Questionnaire literature revealed that previous researchers have also encountered high correlations between these variables (Falcon, Todorova & Tucker, 2009; Jones, Bogat, Davidson, Eye & Levendosky, 2005). Average scores were also used in these studies to account for the shared variance of number of contacts listed.

Social Network was calculated by summing the duration of relationship and frequency of contact for each support person listed, plus the number of support persons listed.

**Life Events Questionnaire, LEQ** (Appendix C). The variable Stressful Life Events was measured using Norbeck’s 82-item inventory questionnaire that is a modification the Life Experiences Survey, to better reflect an adult female population (Norbeck, 1984; Sarason, et al., 1978). This scale asks respondents about life events in the past year and about the extent to which each of the events has affected them. Categories in the questionnaire include health, work, school, residence, love and marriage, family and friends, parenting, personal or social, financial, and crime and legal matters. Respondents first indicate whether they consider an event that occurred was “good” or “bad,” and then they rate the effect of the event on their lives. Aggregation of these data provides a “negative events score,” a “positive events score,” and a “total events score” for each participant. To avoid dilution of the impact of negative life events, “negative events score” will represent Stressful Life Events for this study, as it demonstrates a much stronger relationship with anxiety and mood scales, than do the positive event score (Norbeck, 1984).
One week test-retest reliability for all three scores ranged from 0.78-0.83 in an adult female population (Norbeck, 1984). Concurrent validity of negative event scores was demonstrated with negative mood measures (Spielberger State-Trait Anxiety Inventory and Profile of Mood States) and with psychiatric symptom measures (Brief Symptom Inventory). In the same validation study, none of the negative mood states were associated with the positive events score (Norbeck, 1984).

Using the Life Events Questionnaire, Stressful Life Events score was calculated as a sum of strength ratings (1-4) of each event identified as having a bad effect on participant’s life. Scores of 1 indicated no effect while scores of 4 indicated a great effect.

**Demographics** (Appendix D). Sociodemographic questions included expected date of delivery, age, education level, marital status, number of children, ethnicity, and household income. It also included two questions regarding history of depression and current treatment for psychiatric illness. Included in the demographics questionnaire was a section for the participant to provide an e-mail address and postal address for *Time 2* invitations and for sending incentive payment.

**Instrumentation: Time 2**

**Postpartum Depression Screening Scale, PDSS.** The PDSS (Beck & Gable, 2000) provides a sensitive measure of symptoms specific to depression in the postpartum population. The 35-items uses a 5-point scale for women to indicate whether they “strongly agree” or “strongly disagree” with statements that represent how they have felt over the past 2 weeks (Beck & Gable, 2000). Aggregate scores are categorized into three levels of overall severity of depression symptoms: normal adjustment, significant symptoms of PPD, and positive screen for major PPD. Seven sub-scale scores are also
provided for dimensions including eating/sleeping disturbance, anxiety/insecurity, emotional liability, mental confusion, loss of self, guilt/shame and suicidal thoughts. In this study, Symptoms of PPD scores were computed as the overall sum of the 35 items of the Postpartum Depression Screening Scale.

The scale has strong evidence of reliability and validity. Reliability of each of the seven dimensions has been supported with alphas ranging from 0.83 to 0.94 in a population of women up to 12 weeks postpartum (Beck & Gable, 2000). Content validity has been supported by a clinical expert panel who reviewed each item in terms of how well it fit into the assigned dimensions (Beck & Gable, 2000). Factorial validity of the PDSS has been demonstrated with a confirmatory factor analysis supporting the overall model and the seven dimensions of the scale. Convergent validity has been demonstrated with high correlations to the Beck Depression Inventory (BDI) (r = 0.81) and to the Edinburgh Postnatal Depression Scale (EPDS) (r = 0.79) (Beck & Gable, 2001a). However, when comparing results of the three scales to results of the Structural Clinical Interview for DSM-IV Axis I Disorders (SCID), the PDSS was more strongly related to PPD diagnoses than were either the BDI or the EPDS (Beck & Gable, 2001b). Finally, the PDSS demonstrated a higher rate of both sensitivity and specificity (94%, 98%) than either the BDI (56%, 100%) or the EPDS (78%, 99%) (Beck & Gable, 2001a).

This study is primarily interested in level of depressive symptoms experienced by perinatal mothers. Therefore, only the overall score will be used for analysis; and in lieu of a cutoff score to indicate postpartum depression, outcomes will be evaluated based on the summed score of Symptoms of PPD.

**Data Analysis Procedure**
Data screening. Structural equation modeling was used to test the five hypotheses. Raw data were reviewed for normality, multicollinearity, and outliers. The data were then evaluated for missing data. Results are discussed in detail in Chapter 4.

Hypotheses and analyses. Two statistical models were analyzed to test the proposed hypotheses, which for reference are reproduced below. In order to meet parameter limitations to maintain statistical power, the dimensions of social support (Functional Social Support and Social Network) were analyzed separately. First, all of the analyses to test the hypotheses were run to examine Functional Social Support. Next, identical analyses were run using Social Network.

Multiple comparison analyses, like this one, sometimes apply a Bonferroni correction to reduce the chance of a Type I error (Shaffer, 1995). However, this correction is very conservative, and increases the chance of Type II error. Determination of what constitutes a family of variables which would require a Bonferroni correction for multiple comparison is not well defined (Perneger, 1998). This information and the low correlation of Social Network and Functional Social Support (r = -.12) contributed to the decision to omit the Bonferroni correction from these analyses.

Hypothesis 1a: Social support will be negatively related to Symptoms of PPD.

Hypothesis 1b: Stressful Life Events will be positively related to Symptoms of PPD.

Hypothesis 1c: Social Support will negatively affect the positive relationship of Stressful Life Events on Symptoms of PPD.

Hypothesis 2: Emotional Intelligence will be positively related to Social Support.

Hypothesis 3: Emotional Intelligence will have a positive effect on the
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*moderating relationship of Social Support to Stressful Life Events and Symptoms of PPD.*

Each proposed hypothesis specifies the expected direction of the effect. Although considered controversial by some (Lombardi & Hurlbert, 2009; Ruxton & Neuhauser, 2010), predicting the direction of the hypothesized effect provides justification for a one-tailed test of significance, rather than a more conventional two-tailed test (Tabachnick & Fidell, 2007). Two-tailed tests split half of the acceptable alpha (.05) probability to each side of the sample distribution (.025 on each end). One-tailed testing places the acceptable alpha (.05) to one side (one-sided hypothesis) of the sample distribution. However, to avoid generously increasing statistical power, with consideration of the small sample size, these analyses followed the more conservative two-tailed testing. It should be noted however, all the results reported as significant using the two-tailed test, are also significant using a one-tailed test.

**Model 1.** In the first analysis, Hypotheses 1a, 1b, 1c, and Hypothesis 2, were tested with the complete sample (target n = 150) using structural equation modeling (AMOS). The corresponding statistical model (Figure 3-1) was estimated and modified, as needed, based on the resulting fit statistics and modification indices. Note that d1 and d2 represent unexplained variance for each dependent variable. Specific fit indices and their interpretation are described in Chapter 4. To model a variable to represent the
moderation effects Stressful Life Events and Social Support were multiplied together.

**Figure 3-1.** Statistical Model 1 to test H1a, H1b, H1c, and H2

**Model 2.** Hypothesis 3 was tested using a multi-group analysis (Figure 3-2). The sample was split from the median EI score into two groups of equal size. The analysis simultaneously tested both groups with the constraint of invariant path coefficients. Multi-group analysis was used because there is no established procedure for incorporating three way interaction terms into structural equation modeling. Therefore, the analysis utilized in this study examined the three way interaction with a multi-group analysis of models that contained the two way interaction of social support x stressful life events.

Results are discussed in Chapter 4.
Figure 3-2. Statistical model 2 to test H3 using a multigroup analysis

Rigor

The formulation of this study has many components that enhance its overall rigor. The hypotheses are grounded in a well-supported theoretical framework. Existing theory and literature of Stressful Life Events, Social Support and PPD provide a solid foundation for further investigation and clarification. Emotional Intelligence is incorporated into this existing framework with a body of literature that supports its potential for its inclusion into this phenomenon. The inclusion of Emotional Intelligence into the postpartum depression research may provide essential and unique perspective to better understanding postpartum depression. Measurement tools selected for this study were chosen based on their demonstrated reliability and validity, and also for the relevance to the perinatal population. Additionally, structural equation modeling is a powerful statistical technique that allows for simultaneous analysis of relationships. This will provide for more
powerful and reliable results. Finally, a time-sequenced data collection design that incorporates a collection of predictor variables prior to collection of the outcome variable allows for stronger conclusions regarding causal relationships.

**Human Subjects**

**Recruitment.** Because participants were recruited from a nurse or receptionist in their OB/GYN offices or birthing class, they may have felt somewhat obligated to take part in the research. However, this location is ideal to capture women in their third trimester of pregnancy. The recruitment flyer (Appendix A) informed potential participants that their decision to participate would not be shared with their OB/GYN offices. Participants had the opportunity during Time 2 data collection to request that results of the Postpartum Depression Screening Scale be sent to their provider. Finally, confirmation that the participant met inclusion criteria relied on participant’s confirmation of eligibility requirements prior to consent in the Time 1 website.

Risks and discomforts from participation may have included distress from introspection regarding some emotionally-laden questionnaire content. This may cause a minimal amount of distress which is addressed below.

**Safety monitoring plan.** In response to the potential for distress, all participants were provided with information regarding counseling services available for PPD during both Time 1 and Time 2 data collection (Table 3-1). In addition, women were given the option in Time 2 data collection to provide permission to share Postpartum Depression Screening Scale results with their provider. For those who took this option, Postpartum Depression Screening Scale results were communicated to the OB/GYN offices. Respective providers then contacted these patients for appropriate follow-up. This may
also have offered an opportunity for providers to begin to incorporate PPD screening into their practice, if they had not already done so.

<table>
<thead>
<tr>
<th></th>
<th>Phone number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental Health America of Southwest Ohio (counseling referral)</td>
<td>513-721-2910 ext. 10</td>
</tr>
<tr>
<td>USA National Suicide Hotline</td>
<td>800-784-2433</td>
</tr>
<tr>
<td>Cincinnati Crisis Care Center (hotline)</td>
<td>513-281-2273</td>
</tr>
<tr>
<td>Mental Health Association of Southwest Ohio (hotline)</td>
<td>513-287-8542</td>
</tr>
</tbody>
</table>

Table 3-1. Crisis hotlines and counseling referral services information

**Benefits to participants.** Participants may have benefited from the study as it provided an opportunity for postpartum depression screening that may have otherwise been missed. This may have allowed women who are suffering from postpartum depression to better recognize and obtain help to treat their illness. The study may have also raised awareness of postpartum depression for those who were not depressed. This may allow for better monitoring of self and of others who are close to them in order to better recognize and address postpartum depression.

**Consent.** Brief information regarding the study was presented in the recruitment flyer (Appendix A). The flyer listed both the study website and the phone number of the primary researcher to call with questions. Participants had time to consider participation until they delivered their baby allowing for minimal time pressure.

Once participants accessed *Time 1* website, they were presented with detailed informed consent information, and reminded that the decision to participate will not affect their OB/GYN care. Continuing into the survey website was considered consent.
Participants received a $20 Kroger gift card incentive for each data collection period.

**Confidentiality of data/participants.** In order to contact participants for *Time 2* data collection, and to send them their Kroger gift card incentives, personal information was collected in this study. This included a personal e-mail address, and a postal mailing address. For participants who requested that their PDSS scores be shared with their provider, provider name, and participant birth date was also collected.

All information collected was stored in a secure electronic file space. FluidSurveys, the online survey software to be used for this study, incorporates encrypted password protection, with brute-force login protection. Only the primary researcher had access to the account. Additionally, login and surveys are protected using Secure Socket Layer Encryption (SSL), which will encrypt communication (256 bit) between the participant’s browser and the FluidSurveys server. Electronic data were downloaded for analysis. These electronic files were stored on the primary researchers personal research drive on the UC College of Nursing’s HIPPA compliant server.
Chapter 4 Results

This chapter describes the results of the study. It begins with data collection and preparation procedures employed and a description of the sample. Next, results of the measurement model are discussed. Finally, structural equation model tests used to test the hypotheses presented in the previous chapter are discussed.

Data Collection.

Recruitment with distribution of flyers began March 8, 2011 and ended December 13, 2011. During this time 219 participants completed Time 1 survey on-line. Of those, one participant completed only the demographics section and 12 participants did not take the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT). The remaining 206 participants were sent email invitations to complete Time 2 survey 9 weeks after their expected delivery date. Participants who did not respond to the first invitation within one week were sent additional email invitations each week for up to four weeks. Thirty-seven participants did not respond to the invitations. In total, 169 participants completed both Time 1 and Time 2 surveys, resulting in an 18% rate of attrition. A diagram depicting the data collection process and participant attrition is shown below in Figure 4-1.

Pearson’s Chi square test comparing those who completed only Time 1 and those who completed both Time 1 and Time 2 showed a significant difference related to participant level of education and household income. The 37 participants who did not complete Time 2 tended to have lower levels of education and lower levels of household income. Research has shown that women with lower levels of income and lower levels of education may have a higher risk of PPD (Mayberry, Horowitz & Declercq, 2007).
Therefore, the loss of these participants may increase the chance of Type 2 error with data that do not fully capture the proposed relationships.

Figure 4-1. Pictorial Representation of Participation and Attrition

**Data Preparation**

This section describes the data preparation procedures employed which included checking the accuracy of the data, analyses of missing data, coding procedures of the raw data, outlier analyses, and assumptions of normality, linearity, multicollinearity and internal reliability.

**Accuracy of data.** An initial review checked for validity of data using correlation matrices, range, mean, and standard deviations. All values and correlations were consistent with expectations, and mean values and ranges were similar to published standardized values (Beck & Gable, 2001a; Mayer et al., 2002; Norbeck, et al., 1983; Norbeck, 1984).
Missing data. Missing Data were examined for each variable. None of the variables had greater than 5% of data missing; therefore missing data were not considered a threat to the study’s validity (Tabachnick & Fidell, 2007).

As mentioned in the previous chapter, in order to meet parameter limitations for statistical power, the two dimensions of social support (Functional Social Support, Social Network) were examined separately.

Functional social support. Within the items measuring Functional Social Support from the Norbeck Social Support Questionnaire 2.3% of data were missing. Every participant provided a response for at least one of the two items in each of the three dimensions that were included to create the Functional Social Support measure. Therefore, in cases of omitted data, the dimension value was derived from the single item value.

Social network. Missing data for the two survey items in the Norbeck Social Support Questionnaire that are calculated into Social Network was 2.6%. Mean values from individual participant’s other support persons listed were imputed for missing data.

Stressful life events. Stressful Life Events was measured as an index of events taken from the Life Events Questionnaire. No response to items was interpreted as the participant not experiencing the respective event per questionnaire instructions. Therefore, missing data inquiry for this variable was not possible.

Emotional intelligence. The MSCEIT was administered and scored by Multiple Health Systems, Inc, who then provided branch and overall scores for emotional intelligence. Raw data for the 141 items had less .01% of data missing (27 items). In scoring the MSCEIT, Multiple Health Systems gives missing items a zero score,
consistent with the procedures developed by the researchers who developed the measure (Mayer et al., 2002).

**Symptoms of PPD.** The Postpartum Depression Screening Scale, which was used to measure Symptoms of PPD, had less than 1% of data missing. Standardized mean values provided in the Postpartum Depression Screening Scale manual were imputed per the manual recommendation for missing data (Beck & Gable, 2002).

After reviewing missing data, analyses were conducted to check for outliers and conformity with normality, linearity and multicollinearity assumptions and internal reliability.

**Outliers.** All composite variables were converted to z-scores and then reviewed for standard deviations greater than 3.29 (p<.001) (Tabacknick & Fidell, 2007) (See Table 4-1). Emotional Intelligence had one case with a minimum z-score value of -3.52; all other scores were within 3.29 standard deviations of the mean. Stressful Live Events had four cases above the 3.29 standard deviation cutoff, with a maximum z-score value of 4.87. Symptoms of PPD had one case that was close to the 3.29 standard deviation cutoff with a maximum value of 3.24. Raw data for each of these specific cases in question were reviewed, and all were deemed to be accurate, as there was no evidence of response sets or data coding errors. However, through open-ended survey questions not included in this report it was discovered that the participant with the highest score for Symptoms of PPD had given her baby up for adoption. This participant, therefore, was not considered a representative of the intended sample, and the case was deleted. This resulted in a revised sample total of n = 168.
Table 4-1.

*Standardized Minimum and Maximum Composite Scores*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Minimum</th>
<th># of cases</th>
<th>Maximum</th>
<th># of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z-score: MSCEIT</td>
<td>-3.52</td>
<td>1</td>
<td>2.0</td>
<td>n/a</td>
</tr>
<tr>
<td>Z-score: PDSS</td>
<td>-1.4</td>
<td>n/a</td>
<td>3.25</td>
<td>1</td>
</tr>
<tr>
<td>Z-score: Total Functional Support</td>
<td>-2.95</td>
<td>n/a</td>
<td>1.61</td>
<td>n/a</td>
</tr>
<tr>
<td>Z-score: Total Social Network</td>
<td>-1.55</td>
<td>n/a</td>
<td>2.07</td>
<td>n/a</td>
</tr>
<tr>
<td>Z-score: Total Stressful Life</td>
<td>-.89</td>
<td>n/a</td>
<td>4.87</td>
<td>4</td>
</tr>
</tbody>
</table>

*Note:* Standardized values of concern (close to or greater than |3.29|) are in bold. Numbers of extreme cases within each composite variable are listed to right of standardized value.

**Normality.** Analyses were run to evaluate skewness and kurtosis. All variables except Stressful Life Events had values less than one and were deemed acceptable. Histograms and Q-Q plots were also reviewed and were reasonably close to normal distributions. Stressful Life Events had skew = 2.454 and kurtosis = 6.848. To correct for this non-normal distribution, Stressful Life Events was computed using a log 10 transformation. Results of this transformation resulted in less skew (-.574) and less kurtosis (.112). Histogram and Q-Q plot for the transformed Stressful Life Events were also improved from the original variable. The log 10 transformed Stressful Life Events variable was used in all subsequent analyses. Future Stressful Life Events references in this report reflect the log 10 transformed Stressful Life Events variable.

**Linearity.** Bivariate scatter plots were examined for all variables. Results showed at least a weak linear relationship for all variables.
**Multicollinearity.** A correlation matrix (Table 4-2) for each variable showed that none of the bivariate correlations were greater than 0.35, implying no risk of multicollinearity.

**Internal reliability.** Cronbach alpha’s for each measure with this sample was greater than .7 providing strong support for internal reliability (Table 4-2). Stressful Life Events was not tested for internal reliability as it is an index of events, and not a conceptual measure. Similarly, Social Network was not tested for internal reliability as it a composite based on number of support persons listed, duration of each relationship and frequency of contact in each relationship, and not considered a latent variable.

**Description of Sample.**

The majority of participants were white (89%), followed by black (6%). Hispanic, Asian, and Other each accounted for less than 2% of participants. Eighteen percent of participants had a household income of less than $30,000. Household income between $30,000 - $49,000 accounted for 19% of the respondents. Twenty-four percent of participants reported a household income of $50,000 - $74,000. Twenty-three percent reported income between $75,000-100,000; and fourteen percent had an income over $100,000. Ten percent of participants had a high school education or less, while 62% had at least some college to a bachelor’s degree. Twenty-seven percent had earned a graduate degree. The average age of participants was 30 and ages ranged from 18-45. Eighty-three percent of participants were married. Fifty percent of participants did not have any other children, while 29% had one other child. All other participants had more than one child in addition to this pregnancy.
Sixteen percent of participants reported a history of depression in Time 1. Four percent of participants were currently being treated for a mental illness with therapy, and two percent were being treated with medication.

Based on estimated and actual dates of delivery provided by participants, 30% were between 27 – 30 weeks gestation when they completed Time 1 survey. Thirty-six percent were between 31 – 35 weeks gestation; and 32.4% were greater than 35 weeks gestation. Four participants were in their late second trimester, accounting for 1.6% of participants. Time 2 survey was completed by 62% of participants ranging from 7 – 10 weeks postpartum. Thirty-five percent of participants completed Time 2 between 11-14 weeks postpartum, and 3% of participants completed Time 2 between 14 – 24 weeks postpartum. Only two percent of participants delivered their baby prematurely. All other participants delivered between weeks 36 – 42 gestation.

**Measurement and Structural Model Testing**

Data analyses were completed in three steps. First the intercorrelations of the measures were examined to ensure that relationships among the variables were in the expected directions. Second, confirmatory factor analyses were performed to ensure the validity of the overall measurement model. Third, the specific hypotheses were tested by examining the results of six structural equation models. Inter-item correlations, means, and standard deviations are shown in Table 4-2. The intercorrelations were all in the expected direction except the correlation between Emotional Intelligence and Functional Social Support, which was significantly negatively correlated (r = -.17, p<.05)

Fit indices used included $\chi^2$ (Chi square), RMSEA (root mean square error of approximation), CFI (comparative fit index), and PGFI (parsimony goodness-of-fit
index) based on recommendations of Byrne (p.176, 2010). Chi square traditionally measures overall model fit. A significance level that is greater than 0.05 indicates non-significance, and thus represents a good model fit to the data. RMSEA considers model fit with respect to population covariance matrix (Byrne, 2010). RMSEA values less than 0.05 indicate a good model fit to the data (Byrne, 2010). CFI which is more sensitive to sample size provides a value between 0-1 (Byrne, 2010). Values greater than 0.95 indicate a good fit (Byrne, 2010). PGFI provides a value between 0-1, with higher values indicating a good fitting model (Byrne, 2010). No cutoff value currently exists; therefore the value provided will be assessed in tandem with the other fit indices provided.
Table 4-2.

*Cronbach’s Alpha, Means, Standard Deviations and Intercorrelations*

<table>
<thead>
<tr>
<th></th>
<th>Cronbach Alpha</th>
<th>Mean</th>
<th>S.D.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotional</td>
<td>0.74</td>
<td>103.07</td>
<td>12.90</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Functional</td>
<td>0.80</td>
<td>9.61</td>
<td>1.47</td>
<td>-0.17</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Support</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Social Network</td>
<td>n/a</td>
<td>99.33</td>
<td>50.64</td>
<td>0.07</td>
<td>-0.12</td>
<td>-0.09</td>
<td>-0.34</td>
<td>-0.03</td>
</tr>
<tr>
<td>4. Stressful</td>
<td>n/a</td>
<td>15.33</td>
<td>0.47</td>
<td>-0.09</td>
<td>-0.03</td>
<td>-0.34</td>
<td>-0.03</td>
<td></td>
</tr>
<tr>
<td>Life Events</td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Symptoms of PPD</td>
<td>0.95</td>
<td>63.32</td>
<td>20.24</td>
<td>-0.22</td>
<td>-0.20</td>
<td>-0.06</td>
<td>0.30</td>
<td>**</td>
</tr>
</tbody>
</table>

Note: n = 168, * indicates significance at p<.05 level, ** indicates significance at p<.01 level.
**Measurement model testing.** The measurement model examined three latent variables: Functional Social Support, Emotional Intelligence and Symptoms of PPD. Because Social Network and Stressful Life Events are observed variables and not intended to represent latent variables, these were not included in the measurement model. Functional Social Support was indicated by three dimensions in the Norbeck Social Support Questionnaire. Emotional Intelligence was indicated by the four branches included in the MSCEIT. The variable Symptoms of PPD was indicated by the seven sub-dimensions included in the Postpartum Depression Screening Scale.

An initial confirmatory factor analysis of the three latent variables resulted in a poor fit to the data, with the following fit indices: $\chi^2 = 166.743$ df = 74, $p < .01$, RMSEA .087, CFI .925, PGFI .618. Examination of the modification indices indicated that the model fit could be improved by relaxing constraints that were theoretically consistent with the model. First, a covariance was added between the error terms of two of the four Emotional Intelligence branches: “Understanding and analyzing emotions” and “Regulation of emotions to promote growth.” Shared variance between these branches was supported in a large scale validation study (Palmer, Gignac & Stough, 2005). Two additional co-variances were added between error terms in Symptoms of PPD. A covariance was added between the error terms of “Guilt/Shame” and “Suicidal Thoughts.” An additional covariance was added between the error terms of “Sleep/Eating Disturbance” and “Anxiety/Insecurity.” The revised model had improved goodness-of-fit indices, $\chi^2 = 131.103$ df = 71 $p < .01$, RMSEA .071, CFI .951, PGFI .608. No further modification indices were recommended in the revised model. Although the Chi square value remained below .05, results of the combination of fit indices were considered
acceptable improvement. When examined alone, Chi square value of < .05 suggests model rejection. However, use of multiple fit indices that provide multiple perspectives of model fit gives a much more comprehensive understanding of model fit (Byrne, 2010; Mulaik et al., 1989).

The confirmatory factor analysis indicated acceptable factor loadings, all significant at p<.01 level with regression weights greater than 0.41 (See Table 4-3). Overall these results supported the measurement model and the validity of the composite variables used in the hypothesis testing.

Table 4-3

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Functional Social Support</th>
<th>Emotional Intelligence</th>
<th>Symptoms of PPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affirmation</td>
<td>0.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affect</td>
<td>0.89</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aid</td>
<td>0.61</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception, appraisal, expression of emotions</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional facilitation of thinking</td>
<td>0.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understanding and analyzing emotions</td>
<td>0.41</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulation of emotions to promote growth</td>
<td>0.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping/Eating Disturbance</td>
<td></td>
<td>0.56</td>
<td></td>
</tr>
<tr>
<td>Anxiety/Insecurity</td>
<td></td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Emotional Lability</td>
<td></td>
<td>0.89</td>
<td></td>
</tr>
<tr>
<td>Mental Confusion</td>
<td></td>
<td>0.90</td>
<td></td>
</tr>
<tr>
<td>Loss of Self</td>
<td></td>
<td>0.88</td>
<td></td>
</tr>
<tr>
<td>Guilt/Shame</td>
<td></td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>Suicidal Thoughts</td>
<td></td>
<td>0.53</td>
<td></td>
</tr>
</tbody>
</table>
**Structural model testing.** The hypotheses were tested with three statistical models using structural equation modeling (Amos Graphics Student Version 5).

Structural equation Models 1 and 2 tested conceptual model 1 from the previous chapter. Model 1 tested the direct effects of social support and Stressful Life Events on Symptoms of PPD (H1a, H1b) and the direct effects of Emotional Intelligence on Social Support (H2). Model 2 tested the effects of the interaction term of Social Support x Stressful Life Events on Symptoms of PPD (H1c). Structural equation Model 3 tested conceptual model 2 from the previous chapter which focused on the three way interaction of social support x Stressful Life Events x Emotional Intelligence on Symptoms of PPD (H3). To maintain statistical power, the models included composite measures, instead of latent variables, and no attempt was made to model measurement error. The resulting models were essentially path analyses using structural equation modeling.

All of these models were first run using Functional Social Support to represent Social Support. Then the identical analyses were run using Social Network to represent Social Support. A summary of each of these models and their results are presented in Table 4-4.

Table 4-4

<table>
<thead>
<tr>
<th>Model Fit Indices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Models</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>FSS-Model 1: Original</td>
</tr>
<tr>
<td>FSS-Model 1: Revised</td>
</tr>
<tr>
<td>FSS-Model 2</td>
</tr>
<tr>
<td>FSS-Model 3 with all constraints</td>
</tr>
<tr>
<td>FSS-Model 3 releasing interaction parameter</td>
</tr>
<tr>
<td>SN-Model 1: Original</td>
</tr>
<tr>
<td>SN-Model 1: Revised</td>
</tr>
<tr>
<td>SN-Model 2</td>
</tr>
</tbody>
</table>
Functional social support-model 1. Depicted in Figure 4-2, Functional Social Support-Model 1 was run with the entire sample (n = 168) to test the direct effects of Functional Social Support and Stressful Life Events on Symptoms of PPD (H1a, H1b), as well as the direct effects of Emotional Intelligence on Functional Social Support (H2). Model fit was poor. Fit indices, shown in Table 4-4, indicated that the model was not a good fit to the data.

Examination of the modification indices suggested that model fit could be improved by adding a path from Emotional Intelligence to Symptoms of PPD. Conceptually, this path was reasonable. The addition of this parameter resulted in a saturated model, and subsequent perfect fit. A saturated model may not be helpful in testing a specific hypothesized model (Byrne, 2010). However, because this study is the first to introduce emotional intelligence to the postpartum depression-stress-social network relationship.
support relationship, it is essentially an exploratory analysis. Priority was placed on revealing the existence of a relationship, rather than confirming the proposed model.

Parameter estimates of the revised model are depicted in Figure 4-3. All relationships were significant. Emotional Intelligence had a negative effect on both Symptoms of PPD (standardized path coefficient = -.23, p < .01) and on Functional Social Support (standardized path coefficient = -.17, p = .03). Stressful Life Events had a positive effect on Symptoms of PPD (standardized path coefficient = .22, p < .01). Functional Social Support had a negative effect on Symptoms of PPD (standardized path coefficient = -.17, p = .03).

**FSS-Hypothesis 1a:** Functional Social Support will be negatively related to Symptoms of PPD. **Supported.**

**FSS-Hypothesis 1b:** Stressful Life Events will be positively related to Symptoms of PPD. **Supported.**

**FSS-Hypothesis 2:** Emotional Intelligence will be positively related to Functional Social Support. **Not Supported.**
Functional social support-model 2. Functional Social Support-Model 2 tested the interactive effects of Functional Social Support and Stressful Life Events on Symptoms of PPD (H1c) by adding the interaction term of Functional Social Support x Stressful Life Events to Model 1. The variables included in the interaction term were centered prior to creating the interaction term to reduce multicollinearity (Tabachnick & Fidell, 2007). Results showed a significant negative effect (standardized path coefficient = -.19, p < .01) (Figure 4-4).
The results of the interaction of Functional Social Support x Stressful Life Events were plotted for further interpretation (Figure 4-5). The plotted graph indicates that for participants with high levels of Functional Social Support, Stressful Life Events had negligible effects on Symptoms of PPD. However, for participants with low levels of Functional Social Support, Stressful Life Events did have an effect on Symptoms of PPD. Therefore the form of the interaction is consistent with Hypothesis 1c.
**Figure 4-5.** Plotted graph of Functional Social Support x Stressful Life Events to Symptoms of PPD

FSS-**Hypothesis 1c**  Functional Social Support will negatively affect the positive relationship of Stressful Life Events on Symptoms of PPD. **Supported.**

**Functional social support-model 3.** Functional Social Support-Model 3 used a split group analysis to test H3. Model 3 removed Emotional Intelligence as a variable in the statistical model and used it to compare two groups. Procedure to categorize groups for multigroup analyses using structural equation modeling conventionally applies a median split. Although there is not existing theory to support this method, it is believed that unequal sized groups that would result from alternative methods of group categorization may affect the reliability of the fit indices (Byrne, 2010) Following convention, the total sample (n = 168) was split into two groups based the median Emotional Intelligence (EI) score of 104.92, resulting in a High EI group (n = 84) and a
Low EI group (n = 84). Model 3 was run first with all parameters constrained to be equal between the two samples and then it was run again releasing the parameter constraint from the interaction of Functional Social Support x Stressful Life Events to Symptoms of PPD. If the constraint model fits to the data worse than the unconstraint model, the result will demonstrate the moderation or interaction effect of Emotional Intelligence on the relationship between the interaction of Stressful Life Events and Social Support, and Postpartum Depressive Symptoms.

Chi square and CFI were used to evaluate the model fit based on Byrne’s (p. 268, 2010) recommendation for multigroup analyses. Chi square values of each of these two analyses were compared and found to be significantly different ($\chi^2$ difference = 7.28, $p<.01$) (Table 4-5). The Low EI group showed a significant relationship between Functional Social Support x Stressful Life Events and Symptoms of PPD (standardized path coefficient = -.25, $p < .05$), while the high EI group did not have a significant relationship ($p = .17$) (See Figure 4-6).

Table 4-5

<table>
<thead>
<tr>
<th>Functional Social Support-Model 3 Chi Square Comparison</th>
<th>$X^2$ value</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSS-Model 3 with all constraints</td>
<td>17.208</td>
<td>7</td>
</tr>
<tr>
<td>FSS-Model 3 releasing interaction parameter</td>
<td>9.927</td>
<td>5</td>
</tr>
<tr>
<td>Change in $X^2$ value: significant</td>
<td>7.281</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: FSS = Functional Social Support, Chi square difference = 7.281, $p<.05$
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**Figure 4-6.** Functional Social Support-Model 3

*Note:* Standardized path coefficients shown: Low EI group, High EI group, * indicates $p < .05$, ** indicates $p < .01$

**FSS-Hypothesis 3:** Emotional Intelligence will have a positive effect on the moderating relationship of Functional Social Support to Stressful Life Events and Symptoms of PPD. **Not Supported.**

While a statistically significant difference was found between the constrained and unconstrained models, the interaction was not consistent with the hypothesized effects. Instead, Emotional Intelligence was found to have a negative effect on the moderating relationship of Functional Social Support to Stressful Life Events. In other words, mothers with low emotional intelligence had significant Functional Social Support buffering effects, whereas mothers with high Emotional Intelligence did not have significant Functional Social support buffering effects.

To visually represent the significant effects of Emotional Intelligence on the interaction of Functional Social Support x Stressful Life Events to Symptoms of PPD in
the Low EI group, a plotted graph is shown in Figure 4-7. The graph demonstrates that for the Low EI group, Functional Social Support has a distinct buffering effect on participants with high levels of Stressful Life Events.
Graph depicts the interaction of Functional Social Support and Stressful Life Events on Symptoms of PPD in participants in the Low EI group

*Figure 4-7.* Plotted graph of Low EI Model 3.

**Social network-model 1.** Identical analyses were run with Social Network in place of Functional Social Support. Social Network-Model 1 was run with the entire sample (n = 168) to test the direct effects of Social Network and Stressful Life Events on Symptoms of PPD (H1a, H1b), as well as the direct effects of Emotional Intelligence on Social Network (H2). As with the previous analyses, the original Social Network-Model 1 was also a poor fit to the data, with modification indices recommending a parameter to represent the relationship from Emotional Intelligence to Symptoms of PPD. The addition of this parameter created a saturated model, and perfect fit.

Social Network was not significantly related to Emotional Intelligence or to Symptoms of PPD. The relationship of Emotional Intelligence to Symptoms of PPD remained significant (standardized path coefficient = -.20, p = .006) and the relationship
of Stressful Life Events to Symptoms of PPD also remained significant (standardized path coefficient = .28, p < .001). Parameter estimates are depicted in Figure 4-8.

**Figure 4-8. Social Network-Model 1**

*Note:* Standardized path coefficients are shown* indicates p < .05, ** indicates p < .01

**SN-Hypothesis 1a:** Social Network will be negatively related to Symptoms of PPD. **Not Supported.**

**SN-Hypothesis 1b:** Stressful Life Events will be positively related to Symptoms of PPD. **Supported.**

**SN-Hypothesis 2:** Emotional Intelligence will be positively related to Social Network. **Not Supported.**

**Social network-model 2.** Following the earlier analyses, Social Network-Model 2 tested the interactive effects of Social Network and Stressful Life Events on Symptoms of PPD (H1c). Results were not significant (See Figure 4-9).
Figure 4-9. Social Network-Model 2

Note: Standardized path coefficients are shown, * indicates p < .05, ** indicates p < .01

**SN-Hypothesis 1c**  Social Network will negatively affect the positive relationship of Stressful Life Events on Symptoms of PPD. **Not Supported.**

**Social network-model 3.** Again, following the earlier analyses, Social Network-Model 3 used a split group analysis to test H3. The total sample (n = 168) was split into 2 groups based on participant median Emotional Intelligence score, resulting in a High EI group (n = 84) and a Low EI group (n = 84). The model was run first with constraints on all parameters and then it was run again releasing only the parameter constraint from Social Network x Stressful Life Events to Symptoms of PPD. Chi square values of each of these two analyses were compared and found to be not significantly different (Table 4-
6). Parameter estimates for the interaction relationship were also found to be not significant in either sample (Figure 4-10).

Table 4-6.

<table>
<thead>
<tr>
<th>Social Network-Model 3 Chi Square Comparison</th>
<th>$X^2$ value</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN-Model 3 with all constraints</td>
<td>2.324</td>
<td>7</td>
</tr>
<tr>
<td>SN-Model 3 releasing interaction parameter</td>
<td>1.986</td>
<td>5</td>
</tr>
<tr>
<td>Change in $X^2$ value: not significant</td>
<td>.338</td>
<td>1</td>
</tr>
</tbody>
</table>

*Figure 4-10. Social Network-Model 3*

*Note: Standardized path coefficients are shown: Low EI Group, High EI group, ** indicates $p < .01$*

*SN-Hypothesis 3:* Emotional Intelligence will have a positive effect on the moderating relationship of Social Network to Stressful Life Events and Symptoms of PPD. *Not Supported.*

**Summary**

This chapter detailed the results of the statistical analyses employed to test the hypotheses presented in Chapter 3. It began with a review of data collection and data preparation procedures employed. It then described characteristics of the sample. Next,
results of the measurement model testing were presented. Finally, results of six structural equation model tests were presented that tested the proposed hypotheses from Chapter 3. Using Functional Social Support, hypotheses replicating previous literature were supported. However, hypotheses incorporating Emotional Intelligence were significant, but not in the proposed direction. Hypothesis 2 proposed that Emotional Intelligence would be positively related to Functional Social Support, while the data instead supported a negative relationship. Hypothesis 3 proposed that Emotional Intelligence would have a positive effect on the buffering effects of Functional Social Support, and instead a negative effect was found. Using Social Network, only one hypothesis was supported. The data supported Hypothesis 1b which proposed that Stressful Life Events would be positively related to Symptoms of PPD. A summary of each of the hypotheses, and corresponding statistical model is presented in Table 4-7. Discussion of these results, implications for theory and practice, and limitations of the study will be presented in the next chapter.
<table>
<thead>
<tr>
<th>Model</th>
<th>Sample</th>
<th>Variables by Time Period</th>
<th>Hypotheses</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>FSS-Model 1</td>
<td>n = 168</td>
<td>Functional Social Support, Emotional Intelligence, Stressful Life Events</td>
<td>Symptoms of PPD</td>
<td>S</td>
</tr>
<tr>
<td>FSS-Model 2</td>
<td>n = 168</td>
<td>Functional Social Support x Stressful Life Events</td>
<td>Symptoms of PPD</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>split sample:</td>
<td></td>
<td>n = 84, n = 84</td>
</tr>
<tr>
<td>FSS-Model 3</td>
<td>n = 84</td>
<td>Functional Social Support x Stressful Life Events</td>
<td>Symptoms of PPD</td>
<td>N</td>
</tr>
<tr>
<td>SN-Model 1</td>
<td>n = 168</td>
<td>Social Network, Emotional Intelligence, Stressful Life Events</td>
<td>Symptoms of PPD</td>
<td>N</td>
</tr>
<tr>
<td>SN-Model 2</td>
<td>n = 168</td>
<td>Social Network x Stressful Life Events</td>
<td>Symptoms of PPD</td>
<td>N</td>
</tr>
<tr>
<td></td>
<td></td>
<td>split sample:</td>
<td></td>
<td>n = 84, n = 84</td>
</tr>
<tr>
<td>SN-Model 3</td>
<td>n = 84</td>
<td>Social Network x Stressful Life Events</td>
<td>Symptoms of PPD</td>
<td>N</td>
</tr>
</tbody>
</table>

Notes: S = Supported, N = Not Supported
Chapter 5: Discussion

The previous chapter discussed the results of the statistical analyses employed to test the proposed hypotheses. This chapter presents a summary of these findings and their implications. This includes a discussion of the theoretical and practical implications of the results, followed by a review of the study’s limitations and some overall conclusions.

Summary of Results

This study examined the combined role of Emotional Intelligence and Social Support (Functional Social Support and Social Network) in decreasing the Symptoms of Postpartum Depression (PPD). Previous research has found positive relationships between Stressful Life Events and PPD and negative relationships between Social Support and PPD. Similarly, results of the present study found a significant positive relationship between Stressful Life Events and Symptoms of PPD and a significant negative relationship between Functional Social Support and Symptoms of PPD. However, the relationship between the Social Network dimension of Social Support and Symptoms of PPD was not significant. On the other hand, Functional Social Support was also found to buffer the negative effects of Stressful Life Events on Symptoms of PPD, consistent with previous research. No corresponding buffering effects were found for the Social Network dimension of Social Support.

To better understand previous inconsistencies between theoretical support and poor interventional outcomes, this study proposed that the buffering effects of Social Support in the presence of Stressful Life Events were further moderated by Emotional Intelligence such that the buffering effects would be stronger when Emotional Intelligence was high. The results showed that the three way interaction of Stressful Life...
Events x Functional Social Support x Emotional Intelligence was significant. However, the nature of the interaction was not consistent with the hypothesized effects. In fact, the buffering effects of Functional Social Support were significant when Emotional Intelligence was low, but were not significant when Emotional Intelligence was high. Further, analyses testing the direct effects of Emotional Intelligence on Functional Support were significant; however, its impact was the reverse of the hypothesized direction. Mothers with high levels of Emotional Intelligence were found to report lower levels of Functional Social Support. Again, none of the corresponding analyses using Social Network had significant results. Finally, although the relationship was not included in the hypotheses, the analyses found significant negative direct effects for Emotional Intelligence on Symptoms of PPD. The following section discusses these findings in detail.

**Discussion of Major Findings**

**Social network.** Social Support was examined using two Social Support variables: Functional Social Support and Social Network. Analyses that tested hypotheses using the Social Network variable were not supported. Although it is possible that Functional Social Support does in part play a much more important role in Symptoms of PPD than does Social Network, another possibility is that the instrument used to measure Social Network may have contributed to its poor results. The aggregate score used to represent Social Network was comprised of the summed total of the number of support persons listed, the duration of relationship ranking for each of these support persons, and the frequency of contact ranking for each of these support persons. Thus, the components of Social Network were inconsistently weighted. The first component,
network size, used the raw value of support persons listed ranging from 1-20. The other two components, representing duration of relationship and frequency of contact used the summed value of scale ranking (from 1-5) for each of those support persons listed. The possible ranges for these dimensions were 1-100 \([(1-5) \text{ rank x (1-20) support persons}]. It is unclear why the developers chose to incorporate the three components using vastly different scale ranges. Conceptually, no evidence was found to support this decision. Further, the dimension values are highly dependent on each other, as network size is used to calculate the other two dimensions. It is unclear whether this statistical confound accurately captures the construct of Social Network.

The Social Network measure of duration of relationship and frequency of contact were based on predetermined scales of time. For example, options to evaluate frequency of contact were daily, weekly, monthly, a few times a year, and once a year or less. Thus, it assumes that the incremental effect on which participants benefit from social contact between each of the values is the same. The measure may not capture participants’ subjective view of desired level of frequency of contact. Further, it may overlook individuals who have a strong support network, but lack multiple long term relationships or lack the opportunity to communicate frequently with their support resources. Individuals who have strong relationships that are new or relationships which lack the opportunity or the need to communicate frequently would not be accurately considered by this measure.

On the other hand, the lack of significant findings for Social Network may also reflect the fact that Social Network may simply not be an important predictor of Symptoms of PPD. While Social Network has much support as a predictor in mental
DOES EI MATTER?

health, support for its role as a factor in postpartum depression has been inconsistent. (Collins et al., 1993; Brugha et al., 1998; Surkan et al., 2006). Measures of Social network vary considerably in their theoretical underpinnings and operational strategies which limits conclusions that may be drawn from the pool of research available. Unfortunately, given the limitations of the measure used in this study, conclusions regarding Social Network and Postpartum Depression remain uncertain. Future research using alternative Social Network measures is needed to more accurately explore the relationship of Social Network in relationship to Symptoms of PPD, Stressful Life Events and Emotional Intelligence.

Direct effects of emotional intelligence on functional social support. Hypothesis Two predicted that Emotional Intelligence would have a positive relationship with Functional Social Support. Instead, a significant negative relationship was found. This implies that persons with high levels of Emotional Intelligence are more likely to report lower levels of Functional Social Support. One reason for this relationship may be that persons with high levels of Emotional Intelligence may be more emotionally self-sufficient. The ability to manage emotions and to use emotions to facilitate thinking extends one’s internal resources. Therefore, individuals high in Emotional Intelligence may lack incentive or desire to have high levels of social support. In other words, higher levels of emotional intelligence may to some extent replace the need for extensive social support. An alternative explanation is that persons with low levels of Emotional Intelligence may report inflated values of Functional Social Support. Emotional Intelligence includes one’s ability to perceive and understand one’s own and other’s of emotions. Functional Social Support is comprised of emotional affirmation and emotional
 DOES EI MATTER?

affection from others. Therefore, it is possible that they overestimate their available Functional Social Support. Whatever the underlying reason, the unanticipated inverse relationship of Emotional Intelligence and Functional Social Support would benefit from future research which further explores this dynamic.

**Direct effects of emotional intelligence on symptoms of PPD.** The initial model proposed in this study suggested that the primary effects of Emotional Intelligence on Symptoms of PPD were indirect and were mediated by social support. While the presence of small, positive mediated effects were found, Emotional Intelligence was found to have relatively robust negative direct effects on Symptoms of PPD. As mentioned in Chapter 2, Emotional Intelligence has been traditionally examined from two competing perspectives: trait-based emotional intelligence and ability-based emotional intelligence. There is an increasing amount of literature that supports a relationship between trait-based Emotional Intelligence and mental health (Austin, Saklofske & Egan, 2005; Davis & Humphrey, 2012; Kong, Zhzo, & You, 2012; Tsauusis & Nikolaou, 2005). However, measures of trait-based Emotional Intelligence and measures of personality largely overlap, leading to results that are difficult to interpret (Zeidner, Matthews & Roberts, 2011). Ability-based measures of Emotional Intelligence, used in this study, however are distinct from personality. The ability-based Emotional Intelligence theoretical model suggests that those with high levels of emotional intelligence will be better able to understand and regulate emotions (Mayer et al., 2004). These abilities may lead to better coping strategies and less depression. This would clearly help mothers in the postpartum period as childbirth often brings enormous life changes, at least in the short term. Few studies have examined this relationship (Davis & Humphrey, 2012; MacCann, Fogarty,
Zeidner & Roberts, 2011). Results of a recent meta-analysis showed that Emotional Intelligence, as measured by the MSCEIT in 11 correlational studies, had a small effect ($r = .17$) on mental health (Martins, Ramalho & Morin, 2010). However, depression was examined in only three of those articles (Extremera, Fernandez-Berrocal & Ruiz-Aranda, 2006; Martinez-Pons, 1999; Rossen & Kranzler, 2009). This study adds to the literature by incorporating a robust, time-sequenced data collection design to support the emerging evidence of the protective effects of Emotional Intelligence on depression.

**Moderating effects of emotional intelligence.** This study hypothesized that emotional intelligence would have a positive effect on the moderating relationship of Functional Social Support to Stressful Life Events and Symptoms of PPD. The results did not support this prediction. Instead, they indicated that while mothers with low levels of Emotional Intelligence were able to utilize Functional Social Support to buffer the effects of Stressful Life Events, mothers with high levels of Emotional Intelligence did not experience stress buffering effects from Functional Social Support. It is possible that Emotional Intelligence may act as a substitute for Functional Social Support when coping with the effects of Stressful Life Events. This perspective is consistent with the notion that Emotional Intelligence serves as a resource for which mothers can draw to deal with the demands of motherhood and Stressful Life Events. Mothers with high levels of Emotional Intelligence may be more self-reliant and look to themselves to deal with stress rather than looking to others for assistance. This perspective also is consistent with the robust direct effects Emotional Intelligence had on Symptoms of PPD described above.

**Practical Implications.**
The theoretical contributions of this research are useful; however deriving practical implications are essential in translating this information to mothers at risk. Two areas to target for future research include a focus on improving Functional Social Support and Emotional Intelligence.

**Social support and symptoms of PPD.** This study examined Social Support from the perspective of Social Network and Functional Social Support. Social Network was not significantly related, neither directly nor indirectly, to Symptoms of PPD. Therefore, until future research can support this relationship, an intervention seeking to augment a mother’s Social Network may be misdirected.

Functional Social Support had strong direct effects on Symptoms of PPD. Therefore, a screening tool to measure Functional Social Support may quickly identify mothers at risk for PPD. Targeting these women may better direct efforts and funding to those who will benefit from an intervention. Implementing an intervention to augment one’s Functional Social Support may protect mothers against Symptoms of PPD. This study specifically looked at the three dimensions of affection, affirmation and tangible support. Future research, therefore, may find improved outcomes if the interventional focus is on these supported dimensions. This may include collaborative appointments with support persons to discuss and emphasize the importance of Functional Social Support.

The buffering effects of Functional Social Support will benefit from additional research to ensure that the present results are replicable in other samples. For women with high levels of Stressful Life Events, selective targeting should be used in attempts to augment Functional Social Support. Results from this study suggest that if these women
have high levels of Emotional Intelligence then Functional Social Support will not contribute as much to reducing the Symptoms of PPD resulting from Stressful Life Events. Mothers with low Emotional Intelligence in the presence of Stressful Life Events, would likely benefit from a Functional Social Support intervention. These results strongly suggest a screen for Emotional Intelligence to identify women for whom a Functional Social Support intervention would benefit.

**Emotional intelligence and symptoms of PPD.** Emotional Intelligence was found to have a strong negative relationship with Symptoms of PPD. These results suggest that a screen for Emotional Intelligence during pregnancy may help to better identify those at risk for Symptoms of PPD. Once identified, interventions to increase Emotional Intelligence in these women before delivery may lessen the risk of PPD.

As a relatively new construct, Emotional Intelligence research has been largely concerned with identifying and clarifying theoretical relationships. Very little has been devoted to the development and testing of interventions to increase one’s Emotional Intelligence. The ability-based theoretical model suggests that Emotional Intelligence can be improved with training (Mayer et al., 2004). In fact, the limited existing studies which have incorporated an Emotional Intelligence intervention have had success in improving one’s level of Emotional Intelligence (Crombie, Lombard & Noakes, 2011; Dacre Pool & Qualter, 2012; Nelis, Quoidbach, Mikolajczak & Hansenne, 2009; Peter & Brineberg, 2012). While more interventional studies are needed to demonstrate the effectiveness and feasibility of Emotional Intelligence training, emerging data, including this study highlight the potential importance of Emotional Intelligence interventions to both identify women at risk for Symptoms of PPD and to decrease the risk for Symptoms of PPD.
To better translate the significance of Emotional Intelligence to practice, a more efficient measure is needed to evaluate one’s ability-based Emotional Intelligence. This study utilized a measure of Emotional Intelligence that was comprehensive, which was advantageous in detecting new relationships. However, with 141 items, it would be impractical to use this as a screening measure in clinical settings. A brief, ability based measure is sorely needed that can accurately capture one’s level of Emotional Intelligence. In the longer term, these results suggest that developing Emotional Intelligence training that is specifically targeted to pregnant women could be very beneficial.

**Limitations**

This study was groundbreaking in that it introduced Emotional Intelligence to better understand predictors of postpartum depression. It was limited, however by its sampling method, sample size, and available measures.

**Sample.** Although efforts were made to recruit a diverse population, there remained limitations in the final sample. The participants in this study were volunteers who responded on-line to a flyer advertising the study. Flyers were specifically distributed in different OBGYN offices and in birthing classes in the Greater Cincinnati area to capture a diverse population. However, results may not represent women who tend to avoid surveys and also women who have no access to computers or email. Further, women who did not respond to the Time 2 invitation had significantly lower levels of income and education. These women (who could not be included in the data set for this study) may represent a unique segment of the population, and limit generalizability of this study. Further, recruiting participants from birthing classes may be
different from the general population as birthing class attendance demonstrates a high level of attention to pregnancy well-being.

The limited ethnic diversity of the sample was an additional limitation. Participants were 89% white, which again limits generalizability to other ethnicities. Results of this study provide a foundation for a follow-up study that examines these relationships in more diverse socioeconomic and racial groups. Finally, with 168 participants, the sample for this study was relatively small. This may have limited ability to detect or accurately model the underlying relationships.

As a web-based study, inclusion and exclusion criteria relied on participant self-selection and self-report. A limitation to this strategy was that the researcher was not able to verify the eligibility criteria of the participants. However, to decrease the likelihood of this occurrence, flyer distribution was targeted towards eligible participants.

Future research will benefit from recruiting more diverse and larger samples. Additionally, a methodology that does not exclude women with limited computer access is needed to understand the relationship of emotional intelligence in these population segments.

Measures. The MSCEIT is the only available ability-based measure of the four EI branches. It has been criticized for its consensus scoring method, which determines correct scores based on similarity of responses with a large pool of general population responses (Roberts, Zeidner & Matthews, 2001). Criticisms include questions of whether majority population responses should qualify as correct answers. The developers of the MSCEIT have an additional scoring methodology that may be selected which determines correct responses based on the responses of 21 scholars specializing in emotions (Mayer
et al., 2003). The correlation between these two scoring methods ranged between .96-.98 (Mayer et al., 2004). This high correlation provides support for the validity of consensus scoring.

Norbeck’s Social Support Questionnaire was limited in two ways. First, the dimensions of Social Network were inconsistently weighted. Second, Functional Social Support was highly influenced by the number of support resources a participant listed, which results in a very high correlation with Social Network. To overcome this, Functional Social Support was re-calculated based on average scores of its dimensions. Social Network results, however, may be limited, as the measure may not fully capture the theoretical construct of Social Network. Development of and utilization of improved social support measures are needed to further understanding of relationships included in this study.

An additional limitation regarding the measures used concerns survey fatigue. Measures used in this study were comprehensive, and long. Estimated time to complete Time 1 survey was 45 minutes. Time 2 survey was considerably shorter in length. Attempts to mitigate survey fatigue included providing information about estimated time required to complete the surveys on the recruitment flyer and in the information sheet prior to initiating the on-line survey. Further, the on-line survey was designed to allow participants to complete Time 1 survey at separate times. The Norbeck Social Support Questionnaire, Stressful Life Events, and demographics were collected first. Participants were then given information to connect to a different web address with entry password to complete the emotional intelligence questionnaire. This allowed for a break in survey completion time.
Additional perspectives. As mentioned in Chapter 1, there is an increasing amount of attention devoted to the potential biological causes of PPD. While evidence is inconclusive at this point, further investigation is warranted to have a comprehensive understanding of causal factors of PPD. Emerging research suggests that future interventions to reduce the Symptoms of PPD will be most effective if they consider and address both psychosocial and biological contributors to PPD.

Conclusions

This chapter reviewed the implications of the research findings. Results revealed two important theoretical relationships concerning Emotional Intelligence. First, unanticipated relationships were found for the buffering effects of Emotional Intelligence as it may act as a substitute for the buffering effects of Functional Social Support in the presence of Stressful Life Events. Second, Emotional Intelligence was found to have a relatively strong direct relationship with Symptoms of PPD. These findings strongly support the inclusion of Emotional Intelligence as a factor in understanding Symptoms of PPD.

Practical implications drawn from these findings include recommendations for interventions which are better targeted and include Emotional Intelligence training. Though measure limitations may have limited the findings, the results indicate that interventions to augment Social Network are not likely to have a significant effect of Symptoms of PPD. Functional Social Support interventions may help women with low levels of Emotional Intelligence who are likely to face Stressful Life Events, but are less likely to have a significant impact in women with high levels of emotional intelligence. Emotional Intelligence interventions, however, would likely benefit all women, as it has a
direct effect on Symptoms of PPD. More research is needed to develop efficient and effective Emotional Intelligence interventions.

Future research is needed to replicate these findings with larger and more diverse samples and with alternative measures. Further, it would also be useful to understand whether Emotional Intelligence can substitute for other factors that are considered risk for Symptoms of PPD. With evidence that Emotional Intelligence can be learned and improved, Emotional Intelligence may be an excellent target for interventions seeking to reduce the risk of Symptoms of PPD or depression, in general.

In summary, the purpose of this research was to examine the combined role of Emotional Intelligence and Social Support in decreasing the Symptoms of PPD. Results showed that Emotional Intelligence is a significant factor in preventing Symptoms of PPD. It highlights the necessary inclusion of Emotional Intelligence in future studies to better understand postpartum depression. It also suggests that planning interventions will be better targeted and possibly more effective with attention to mother’s levels of Emotional Intelligence and also with inclusion of Emotional Intelligence training. The impact of Emotional intelligence can no longer be overlooked in research aimed to improve the millions of women affected by postpartum depression.
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*Circulation, 99*, 2192-2217.


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Chinese adolescents with subthreshold depression: A multi-wave longitudinal study. *Journal of Affective Disorders, 127*, 113-121.


THIRD TRIMESTER PREGNANCY VOLUNTEERS NEEDED

For a research study investigating emotions, support resources, and postpartum depression

This study is open to:  
-women in their third trimester of pregnancy,  
-who are 18 and older,  
-who have access to the internet and e-mail.

Participation  
Participation involves 2 internet surveys. The first survey will be completed when women are in their third trimester. The second survey will be completed 10-12 weeks after delivery.  
**Your choice to participate will not affect your pregnancy care.**

Time commitment:  
1\textsuperscript{st} survey will take approximately 45 minutes.  
2\textsuperscript{nd} survey will take approximately 20 minutes.  
You will be reimbursed with a $20.00 Kroger gift card for each survey.

How to get involved:  
You can learn more about the study and access the first survey by going to the following web address:

http://app.fluidsurveys.com/s/pregnant/

For questions regarding the study and participation, please contact the Primary Researcher:  
Jennifer Rode, NP, RN 513-289-8629
Appendix B

Norbeck Social Support Questionnaire

Note: Instructions and questions are listed verbatim below. However, the format will depend on the functionality of the survey software. Attached file, NSSQ_instrument.pdf displays the intended format.

Please list each significant person in your life on the right. Consider all the persons who provide support for you or who are important to you. Use only first names, and then indicate the relationship, as in the following example:

1. Mary T. friend

Use the following list to help you think of the people important to you and list as many people as apply in your case. (Spouse, partner, friend, work associate, neighbor).

For each person you listed, please answer the following questions by writing in the number that applies.

0 = not at all
1 = a little
2 = moderately
3 = quite a bit
4 = a great deal

1. How much does this person make you feel loved?
2. How much does this person make you feel respected or admired?
3. How much can you confide in this person?
4. How much does this person agree with or support your actions or thoughts?
5. If you needed to borrow $10, a ride to the doctor, or some other immediate help, how much could this person usually help?
6. If you were confined to bed for several weeks, how much could this person help you?
7. How long have you known this person?
8. How frequently do you usually have contact with this person? (phone calls, e-mails, visits, or letters)
9. During the past year, have you lost any important relationships due to moving, a job change, divorce or separation, death, or some other reason?
9.a. Please indicate the number of persons from each category who are no longer available to you.
9.b. Overall, how much of your support was provided by these people who are no longer available to you?

0 = none at all
1 = a little
2 = a moderate amount
3 = quite a bit
4 = a great deal
Appendix C

LIFE EVENTS QUESTIONNAIRE

Instructions

Listed below are a number of events, which may bring about changes in the lives of those who experience them.

Circle the events that have occurred in your life during the past year and circle whether these were Good or Bad.

Show how much the event affected your life by circling the appropriate number, which corresponds with the statement (0 = no effect, 1 = some effect, 2 = moderate effect, 3 = great effect).

If you have not experienced a particular event in the past year, leave it blank.

Please go through the entire list before you begin to get an idea of the type of event you will be asked to rate.

<table>
<thead>
<tr>
<th>Event</th>
<th>Type of Effect</th>
<th>Effect of Event on Your Life</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. HEALTH</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. major personal illness or injury</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>2. major change in eating habits</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>3. major change in sleeping habits</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>4. major change in usual type and/or amount of recreation</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>5. major dental work</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>6. (female) pregnancy</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>7. (female) miscarriage or abortion</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>8. (female) started menopause</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>9. major difficulties with birth control pills or devices</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td><strong>B. WORK</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. difficulty finding a job</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>11. beginning work outside the home</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>12. changing to a new type of work</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>13. changing your work hours or conditions</td>
<td>Good</td>
<td>Bad</td>
</tr>
<tr>
<td>14. change in your responsibilities at work</td>
<td>Good</td>
<td>Bad</td>
</tr>
</tbody>
</table>
## DOES EI MATTER?

<table>
<thead>
<tr>
<th>Event</th>
<th>Type of Effect</th>
<th>Effect of Event on Your Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. troubles at work with your employer or co-workers</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>16. major business readjustment</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>17. being fired or laid off from work</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>18. retirement from work</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>19. taking courses by mail or studying at home to help you in your work</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

### C. SCHOOL

<table>
<thead>
<tr>
<th></th>
<th>No effect</th>
<th>Some effect</th>
<th>Moderate effect</th>
<th>Great effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. beginning or ceasing school, college, or training program</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. change of school, college, or training program</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. change in career goal or academic major</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. problem in school, college, or training program</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### D. RESIDENCE

<table>
<thead>
<tr>
<th></th>
<th>No effect</th>
<th>Some effect</th>
<th>Moderate effect</th>
<th>Great effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. difficulty finding housing</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. changing residence within the same town or city</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. moving to a different town, city, state, or country</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. major change in your life conditions (home improvements or a decline in your home or neighborhood)</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### E. LOVE AND MARRIAGE

<table>
<thead>
<tr>
<th></th>
<th>No effect</th>
<th>Some effect</th>
<th>Moderate effect</th>
<th>Great effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>28. began a new, close, personal relationship</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. became engaged</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. girlfriend or boyfriend problems</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### DOES EI MATTER?

<table>
<thead>
<tr>
<th>Event</th>
<th>Type of Effect</th>
<th>Effect of Event on Your Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>31. breaking up with a girlfriend or boyfriend or breaking an engagement</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>32. (male) wife or girlfriend’s pregnancy</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>33. (male) wife or girlfriend having a miscarriage or abortion</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>34. getting married (or beginning to live with someone)</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>35. a change in closeness with your partner</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>36. infidelity</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>37. trouble with in-laws</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>38. separation from spouse or partner due to conflict</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>39. separation from spouse or partner due to work, travel, etc.</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>40. reconciliation with spouse or partner</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>41. divorce</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>42. change in your spouse or partner’s work outside the home (beginning work, ceasing work, changing jobs, retirement, etc.)</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

### F. FAMILY AND CLOSE FRIENDS

<table>
<thead>
<tr>
<th>Event</th>
<th>Type of Effect</th>
<th>Effect of Event on Your Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>43. gain of a new family member (through birth, adoption, relative moving in, etc)</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>44. child or family member leaving home (due to marriage, to attend college, or for some other reason)</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>45. major change in the health or behavior of a family member or close friend (illness, accidents, drug or disciplinary problems, etc.)</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>46. death of spouse or partner</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>47. death of a child</td>
<td>Good Bad</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>

119
<table>
<thead>
<tr>
<th>Event</th>
<th>Type of Effect</th>
<th>Effect of Event on Your Life</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. troubles at work with your employer or co-workers</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>16. major business readjustment</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>17. being fired or laid off from work</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>18. retirement from work</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>19. taking courses by mail or studying at home to help you in your work</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>C. SCHOOL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. beginning or ceasing school, college, or training program</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>21. change of school, college, or training program</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>22. change in career goal or academic major</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>23. problem in school, college, or training program</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>D. RESIDENCE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. difficulty finding housing</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>25. changing residence within the same town or city</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>26. moving to a different town, city, state, or country</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>27. major change in your life conditions (home improvements or a decline in your home or neighborhood)</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>E. LOVE AND MARRIAGE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. began a new, close, personal relationship</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>29. became engaged</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
<tr>
<td>30. girlfriend or boyfriend problems</td>
<td>Good</td>
<td>0 1 2 3</td>
</tr>
</tbody>
</table>
Appendix D
Demographic Questionnaire

1. Name and mailing address (open field)
2. Estimated Date of Delivery
3. Age (open field)
4. Have you ever been diagnosed with depression? (y/n)
5. Are you currently being treated for a psychiatric illness (therapy or medication)?
6. Education level completed: (options will include grades 7,8,…,12, Some College, Assoc Degree, Bachelors Degree, Masters Degree, PhD)
7. Marital Status: (options will include single, in a relationship but not married, married, divorced, widowed)
8. Number of children (not including this pregnancy): (open field)
9. Ethnicity: (options will include American Indian, Asian/Pacific Islander, Black, Hispanic, White, Other______)  
10. Estimated Household Income: (open field)