The Influence of Social Environment Characteristics
on Depressive Symptoms of Low-income Urban Mothers

BY

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THESIS

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This dissertation is dedicated to my beloved husband, Chuck, whose unswerving support and love enabled me to accomplish many life goals, and to my cherished children and grandchildren, as my inspiration to complete this particular professional goal.
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I. INTRODUCTION

A. Background

Pregnancy and the birth of a child are significant events resulting in major life changes for women and their families. Motherhood is a life transition that influences women’s well-being and family functioning. While culturally the transition to motherhood is considered a positive life experience, maternal stress and mental disorder can emerge following the physiologic, psychological, and sociocultural changes associated with pregnancy and childbirth (Cheng & Li, 2008; Gjerdingen, Froberg, & Kochevar, 1991; Tamis-LeMonda & Kahana-Kalman, 2009).

Perinatal depression describes a mood disorder that onsets in some women during pregnancy or following childbirth. Antenatal (prenatal) depression occurs during pregnancy. As defined by the Diagnostic and Statistical Manual-IV-TR, the currently recommended text of the American Psychiatric Association (2000), postpartum depression is an affective disorder with the onset of moderate to severe symptoms within four weeks after childbirth. Symptoms of postpartum depression range from sadness and uncontrolled crying to suicidal ideation. Postpartum depression is differentiated from postpartum blues, a common syndrome of variable maternal emotions, usually occurring within days following delivery with brief duration. Postpartum depression is also differentiated from psychosis with postpartum onset, an
uncommon but serious psychiatric illness characterized by delusional thinking and hallucinations (Austin, 2010).

A growing body of research confirms that psychological distress and psychiatric disorders coinciding with childbirth and childrearing are significant health problems for some women (Austin, 2010; Cutrona, 1984; Griebenow, 2006; Marc et al., 2009).

Among pregnant women, the reported prevalence rates for high levels of depressive symptoms ranged from 7.4% to 29% in community and clinic settings (Bennett, Einarson, Taddio, Gideon, & Einarson, 2004; Marcus, Flynn, Blow & Barry, 2003; Li, Liu, & Odouli, 2009). Following childbirth, approximately one woman in ten developed a postpartum onset of major depression (Gavin et al., 2005; O’Hara, Schlechte, Lewis, & Varner, 1991; Vesga-López et al., 2008). High levels of depressive symptoms were reported by 30 to 40% of low-income, urban mothers (Chung, McCollum, Elo, Lee, Culhane, 2004; Lehrer, Crittenden, & Norr, 2002; Siefert, Finlayson, Williams, Delva, & Ismail, 2007).

Untreated depression, either during pregnancy or postpartum, can have serious consequences for women and their family members, including children. Antenatal or postpartum episodes of depression have been associated with adverse outcomes for women’s infants and siblings, including preterm delivery, lower rates of breastfeeding duration, and development of cognitive and behavioral problems that may extend into adolescence (Dennis, C. & McQueen, K., 2009; Landman-Peeters et al., 2005; Li, Liu, & Odouli, 2009; Logsdon, Wisner, & Pinto-Foltz, 2006; Pinheiro, da Silva, Magahlães, Horta, & Pinheiro, 2008; Pinto-Foltz & Logsdon,
Among postpartum women, high risk for depression predicted increased risk for suicidality (Pinheiro et al., 2008). Globally, maternal depression is considered a major public health problem that affects families and communities with high economic costs and tragic personal suffering worldwide (Almond, 2009; Wachs, Black, & Engle, 2009).

Mothers’ social environments can influence their sense of mental well-being (Cox, Paley, Burchinal, & Payne, 1999; Green, Furrer, & McAllister, 2007; O'Hara, 1986). The concept of social environment refers to a person’s sphere of interactional exchange. Kahn and Antonucci (1980) described a dynamic, ever-changing “convoy,” or network, of groups of people and institutions whose members interact (p. 253). Specific components of the social environment that have been associated with maternal mental health include social integration, social network characteristics, and perceived or received social support (Cutrona & Troutman, 1986; Targosz et al., 2003). In addition, difficult circumstances or stressful events in the social environment increase the risk of a woman’s developing depression during pregnancy or postpartum (Abrams & Curran, 2009; Escribà-Agüír, Gonzales-Galarzo, Barona-Vilar, Artazcoz, 2008; Hung, 2007). To date, however, research has not delineated the mechanisms by which specific components of the social environment may mitigate the effects of stress and influence individuals’ mood states (Cohen, Underwood, & Gottlieb, 2000; Irwin, LaGory, Ritchey, & Fitzpatrick, 2008; Meadows, 2009; Sarason & Sarason, 2009).

One aspect of the social environment needing further investigation to explain women’s depressive symptoms during pregnancy or postpartum is social integration. The concept of
social integration can describe the extent of an individual’s connectedness with others across a range of social sectors, such as employment, education, religion, kin, and community. In a landmark study, Thoits (1982) demonstrated a direct effect on mental health from social integration, measuring participation in a diverse array of social activities. More recently, Dennis and Ross (2006) reported that perceived social integration significantly explained the variance of new mothers’ depressive symptoms at 8 weeks postpartum ($\beta = -0.20, t= -4.09, p<.0001$). However, further longitudinal research is needed to determine the role of social integration on depressive symptoms in the context of complex demographic and psychological factors (Vangelisti, 2009).

A second concept related to the impact of the social environment on maternal mental health is the **social support network**. Gottlieb (1983) conceived the social network as a set of actors forming an individual’s personal group of associates Caplan (1974) described social support networks as a subset of an individual’s overall social network, being limited to those persons perceived as supportive or as providers of specific kinds of assistance. Researchers have theorized that the structure and quality of relationships in social support networks are related to women’s depressive symptoms during pregnancy or postpartum (Cutrona & Troutman, 1986; Reich, Silbert-Mazzarella, Spence, & Siegel, 2005). However, past studies examining the influence of social networks on mental health have often been limited to support network size, which is the number of persons that an individual reported were helpful or supportive to him or her (Brissette, Cohen, & Seeman, 2000; Ertel, Glymour, & Berkman, 2009; Hamill & Gilbert, 2009).
To evaluate the influence of mothers’ social support networks on their depressive symptoms, more detailed analysis of social network characteristics is needed. Investigation of network characteristics should include specific measures, including diversity, reciprocity, and stability. Diversity measures factors such as gender and kinship roles among members of an identified support network, while reciprocity is an indicator of perceived give and take of support activities (Clark-Ibáñez & Felmlee, 2004; Davis, Callahan, Lester, & Haines, 2009; Lu, 1997; Wasserman & Faust, 1994;). Network stability, which is contact with supportive persons over time, also has been theorized to influence mothers’ depressive symptoms (Ertel et al., 2009; Felmlee, 2003; Morgan, Neal, & Carter, 1996; Ross, Reynolds, & Geis, 2000).

Another significant component of the social environment that has been associated with mothers’ mood or affect is social support (O’Hara et al., 1991; Sheng, Le, & Perry, 2010). As a concept, social support has had a long and complex history in research literature (Cobb, 1976; Sarason & Sarason, 2009). However, social support is commonly defined as the perceived or actual assistance provided by persons in an individual’s social network. Studies have differentiated between categories of social support, such as perceived versus received support. 

**Perceived support** refers to an individual’s subjective belief about support felt to be available to them, particularly an overall, global sense of being supported (Coventry et al., 2009; Vaux et al., 1986).

**Received support** describes help that has been enacted by members of a social network on behalf of an individual. The classic types of received support described by Caplan (1974) are affectionate/emotional, material/tangible, or advice/information. Gigliotti (2002) confirmed these
categories in a factor analysis. Some researchers have proposed that the influence of social support on mental health varies by the specific type of support (Henderson, 1992; Heponiemi et al., 2006; Monroe and Johnson, 1992). A recent systematic review of interventions for postpartum depression recommended further testing, particularly for the effects of material aid provided by providers in specific roles (Dennis & Hodnett, 2009).

Difficult life circumstances and stressful life events have been associated with depressive symptoms during pregnancy and postpartum (Abrams & Curran, 2009; Brummelte & Galea, 2010). Investigators have proposed a variety of possible pathways in attempts to explain how social support affects health status under conditions of stress, specifically, direct, indirect, or buffering (i.e., moderating) effects (Cohen & Pressman, 2004; Cohen & Syme, 1986; Gore, 1978, Thoits, 1982). Adding further complexity to the study of social support’s relationship to maternal depression are other demographic and dispositional factors, such as age, parity, ethnicity, income level and self-esteem. These factors may influence both depressive symptoms and specific indicators of social support (G. W. Brown & Moran, 1997; Christensen et al., 1999; Costello et al., 2002; Gurel & Gurel, 2000; Sagrestano, Feldman, Rini. Woo, Dunkel-Schetter, 1999).

The capacity to determine the effects of women’s social environment on perinatal depression has been restricted by inconsistency in conceptual definitions and limitations in measurement methods. Specifically, for groups of women at high risk for perinatal depression, further research is needed to describe the dynamic changes in social environment components
from pregnancy through the postpartum period and the influence of those components on depressive symptoms over time.

**B. Summary of Research Issues**

Few studies have examined precise indicators regarding the impact of pregnancy and childbirth on changes in mothers’ social support environments or the relationship of those changes to maternal depressive symptoms (Surkan, Peterson, Hughes, Gottlieb, 2006). Measures of social network characteristics have been general, and the conceptualization of social support remains inconsistent and abstract (Cohen, Underwood, & Gottlieb, 2000; De Silva, McKenzie, Harpham, & Huttly, 2005; Thoits, 1982 Vangelisti, 2009). As a possible means of preventing or mitigating the onset and effects of maternal depression, nurses and other health professionals have an interest in the provision of intervention or surrogate assistance to mothers who lack adequate social support. However, effective intervention strategies must be refined and tailored to specific processes by which the social environment influences the mothers’ depressive symptoms. Thus, there is a need for longitudinal analysis of specific constructs of mothers’ social support environments and the relationship of these factors to levels of maternal depression (Howe, Reiss, & Yuh, 2002; McQween, Montgomery, Lappan-Gracon, Evans, Hunter, 2008).

**C. Conceptual Framework**

As conceptualized for the current study, childbirth and the transitions associated with motherhood represent significant life events with potential change in mothers’ perceived life difficulties and social relationships. At a time when women’s support needs may be increased, their social relationships may change. The nature of these changes may differentially
influence a mother’s perceived social support and her risk for high levels of depressive symptoms.

The maternal social environment and depressive symptoms (MEDS) model (see Figure 1 below) represents the theoretical approach used in this study to conceptualize the maternal environment and maternal depressive symptoms over time. Pre-existing maternal characteristics, such as demographics and personality traits, were posited to have a direct effect on mothers’ social environment, specifically social integration and social network characteristics. Mothers’ perceptions of overall social support were conceptualized as directly influenced by these features of their social environments. The mothers’ depressive symptoms were hypothesized to have direct effects from social integration. Perceived social support was predicted to moderate the influence of increased life difficulties on postnatal levels of depressive symptoms, predicting a stronger effect of stress on depressive symptoms reported by mothers when perceived social support is low rather than when it is high.
D. Purpose of the Study

This research examined the nature of low-income, urban mothers’ social support environments and their level of depressive symptoms from late pregnancy through the first six months post-childbirth. This was a secondary data analysis using already existing data collected from mothers in Chicago as part of the REACH-Futures Program (Norr et al., 2003). For the current study, the primary aim was to examine the influence of specific components of mothers’ social support environments with their reported levels of depressive symptoms. To accomplish
this aim, a descriptive analysis of mothers’ social support environments was conducted, including their social integration, support network characteristics, perceived availability of social support, and the types of received social network support.

Specifically, this research studied the following questions pertaining to low-income, urban women of African American or Mexican American ethnicity at the third trimester of pregnancy, two-months, and six-months postpartum:

1. Are there differences in depressive symptoms between these three time points?
2. Are there differences in social network characteristics, types of support, and difficult life circumstances between these three time points?
3. What are the demographic, personality, and social environmental characteristics that influence depressive symptoms?
4. Does perceived social support moderate depressive symptoms under conditions of higher levels of difficult life circumstances?

E. Summary of Key Concepts and Theoretical Definition of Terms

1. Social support environment

In this investigation, an individual’s social support environment was conceptualized as a dynamic social sphere. The social support environment was defined as (1) the presence of persons who may be sources of help, (2) the actual or potential contacts among these persons with a structure of linkages, and (3) the actual or perceived nature of interactions that occur through the receipt or reciprocal provision of help.
2. Social support

Social support was conceptualized as the assistance that is perceived or received by individuals regarding their social contacts. For purposes of this study, **perceived social support** was defined as an individual mother’s perception of overall support available to her through her personal social relationships (Note: Surrogate support provided by health and other professionals was not included within this definition). **Received social support** described specific assistive behaviors that were provided by persons whom respondent mothers perceived to be helpful. The specific **types of received social support** were conceptualized and defined in the three following categories:

- **Affective/emotional**—assistance of an affective nature symbolizing care and concern (e.g., sympathetic listening, sharing confidence, intimacy, sending flowers).
- **Material/Instrumental**—tangible aid through actions or materials provided (e.g., child care, financial help, etc.).
- **Advice/Information**—guidance on evaluating self-concept and behavior (e.g., giving validation of symptoms, feedback on mothering behavior, expressions of mutuality) or providing practical facts applicable to decision making or solving problems (e.g., directions to daycare center, guidance on filling out applications).

**Social integration** was conceptualized as the range of engagement in various types of social relationships. In this study, social integration was defined as participation by a mother in a number of different social domains (e.g., work, school, neighborhood, family, friends, and general community).
3. **Social support network**

This concept was defined as the social contacts that each mother identified as sources of help, including the quantitative characteristics and the quality of social relationships as reported by the index person (the mother). Two perspectives were considered, which were structural or interactional. Structural characteristics of social support networks were size (number of members), stability (presence of network members over time), and composition (e.g., type of kin and gender role relationships). Interactional qualities of support networks were reciprocity (mutual help), conflict (dissention), and difficulty for receiving help.

4. **Life difficulties**

In this study, life difficulties were defined as mothers’ overall perceptions about difficult life circumstances.

5. **Depressive symptoms**

The characteristic features of a depressed mood state (e.g., crying, sadness, disinterest in daily life activities, etc.) represent a constellation of symptoms. In this study, depressive symptoms were conceptualized as a continuous range of an existing emotional state. At times, levels of depressive symptoms were categorized to represent, for example, high versus low levels of depressive symptoms.

F. **Significance of the Study**

Globally, mental health problems constitute one of the 10 leading categories for burden of disease. Depression is among the 10 leading causes of disability worldwide, and fewer than 25% of those affected have access to effective treatment (Mathers & Loncar, 2006; World Health Organization [WHO], 1999). In the U.S., where approximately one in ten persons may
experience a depressive episode, the economic cost of the impact of depressive disorders has been estimated to be more than $83 billion per year (Greenberg, Kessler, Birnbaum, Leong, Lowe, Berglund, et al., 2003; Harris Interactive, 2006; National Institute of Mental Health [NIMH], 2008).

Though the reasons remain unclear, women are at greater risk for the onset of depression than men (McGrath & Puzan, 2004 Piccinelli, & Wilkinson, 2000; Seedat et al., 2009). In mothers, during childbearing and childrearing years, prevalence rates of depression range from 10 to 20% (Najman et al., 2000); O’Hara and Zekoski, 1988; Vesga-López et al., 2008). For some mothers, high antenatal levels of depressive symptoms persist after childbirth. For others, a postpartum onset of clinically diagnosed major depression may continue for many months, occasionally developing into a chronic condition. Regardless, maternal depression may detrimentally affect a mother’s well-being and her family relationships, especially if symptoms are not recognized and tailored intervention is not provided. In addition, the potential consequences for children of depressed mothers, including risk of preterm birth and long-term developmental outcomes, provide a compelling rationale to increase avenues for specific preventive approaches.

Researchers have explored the relationship between maternal depression and social support. Yet, research findings are not conclusive and the mechanisms by which social network support influences maternal depression remain unclear. The provision of positive social support for parents with young children may have intrinsic social merit. However, effective intervention requires further investigation into the impact of changes in social network characteristics
following childbirth on mothers’ depressive symptoms. An increased understanding of the nature of mothers’ social environments during the significant life transitions following childbirth will assist nurses and other professionals to develop targeted interventions for mothers with increased risk for problematic social relationships and depressive symptoms (C. T. Beck, 1992; Dennis & Hodnett, 2009; Lovejoy, Graczyk, O’Hare, & Neuman, 2000; Miller, Warner, Wickramaratne, & Weissman, 1999; Wilson et al., 1996).
II. LITERATURE REVIEW: DEPRESSIVE SYMPTOMS DURING THE PERINATAL PERIOD

A. Introduction

Depression in new mothers is a major public health problem, with adverse outcomes for women and their families, including delayed cognitive development of children (Stein et al., 2012; Wisner, Chambers, & Sit, 2006). Reported rates of depressive episodes among pregnant and postpartum women range from 6% to more than 30% (Gaynes et al., 2005; Shonkoff & Phillips, 2000; Wagner, 2006). The rates of depression in new mothers are influenced by the nature of social relationships, including the extent of support from social contacts (Beck, 1996; Heh, Coombes, & Bartlett, 2004; Logsdon, McBride, & Birkimer, 1994). Research is needed to explain the influence of mothers’ social network characteristics on their depressive symptoms, particularly among African American and Mexican American women.

B. Literature Search Methods

This literature review summarizes epidemiologic risks and etiologic theories of depression, with a focus on depression in women during pregnancy and the postpartum period (i.e., perinatal depression). The review is organized into three sections, the first being a brief overview of major depression. The second section summarizes epidemiologic research and theoretical considerations for depression in women. The third section focuses on existing research literature on risk factors and theoretical models predicting perinatal depression. From an extensive body of literature on depression that was published in the CINAHL, MEDLINE,
PsychINFO, Social Sciences Abstracts, and Web of Science databases, relevant research was reviewed from 2002 to 2012. Additional classic and frequently cited studies prior to 2002 were identified through ancestry review of reference lists, citation reports, and Internet links (American Psychological Association, 2001; Cooper & Ribble, 1989).

This literature search included key words, subject terms, or title terms in the following categories:

- Depression (depression, depressive, major depression, unipolar depression, affective disorder, or mood disorder);
- Women (women, females, gender, or sex);
- Mothers (mothers, motherhood, mothering, pregnancy, prenatal, antepartum, before childbirth, postnatal, postpartum, after childbirth, perinatal, or puerperal
- Social environment (social, environment, support, help, assistance, or integration; and
- Social network (social, network, networks, sphere, contact, contacts, relationships, family, kin, non-kin, friends, size, stability, reciprocity, composition, or conflict).

This review excluded research focusing on psychiatric conditions other than depressive symptoms or major depression. Articles were excluded if the focus was on maternal blues or anxiety, bipolar depression, psychosis, or depressive symptoms related to maternal physical complications of pregnancy and postpartum as well as depression in mothers after neonatal and infant morbidity or mortality.
C. Depression in General Population Groups

1. General taxonomy of “depression”

Major depression, sometimes called unipolar depression, is a type of affective disorder based on criteria of the American Psychiatric Association’s Diagnostic Statistical Manual IV-Test Revision (DSM IV- TR, 2000). Per the DSM criteria, symptoms of depression must last over a two-week period and, along with additional symptoms, must include either symptoms of sadness, emptiness, tearfulness, or diminished interest or pleasure in life activities. The array of other symptoms includes weight and sleep changes, restlessness, lack of energy or fatigue, sense of worthlessness or excessive guilt, cognitive difficulties, or a morbid focus on death or suicidal ideation (American Psychiatric Association, 2000). The DSM IV TR criteria for major depressive disorder include “specifiers” such as mild, moderate, or severe. In a similar approach, the World Health Organization in the International Classification of Diseases 10 Version 2010 incorporated depressive episodes (i.e., F32) as a mood (affective) disorder, using specifiers of mild, moderate, severe, and severe with psychotic symptoms.

While postpartum depression is not consistently recognized as a medical diagnosis, postpartum onset is included as a classified feature of depression in the DSM-IV TR (American Psychiatric Association, 2000). In the published health literature, authors often categorize postpartum depressive syndromes as (1) postpartum depression, (2) postpartum blues, which has a shorter duration and lower severity, and (3) postpartum psychosis, a rare but severe and distinct condition.
Besides the categorical diagnoses of depression based on the *DSM* criteria, another research model is the continuous (i.e., dimensional) approach, which refers to the level of symptoms measured continuously with scores on standardized assessment instruments. Examples of assessment instruments include the Center for Epidemiologic Depression Scale (CES-D) and the Edinburgh Postnatal Depression Scale (EPDS) (Cox & Holden, 2003; Radloff, 1977). For research and screening purposes, continuous scores from questionnaires are sometimes categorized as mild/low, moderate, and severe/high.

While the *DSM* categorical approach has been considered the “gold standard” for diagnosis of depression, some researchers have proposed that recent evidence warrants a shift in the conceptual approach to depression, including revisions of the *DSM* criteria (Butler et al., 2003; Goldberg, 2011; Lux and Kendler, 2010; Pignone et al., 2002; Sanchez-Villegas et al., 2008). A criticism of categorical models of depression is that there is a risk of false negative diagnoses so that persons erroneously evaluated as not depressed but who actually are depressed fail to be treated (Beutler & Matlik, 2002; Schmidt, Kotov, & Joiner, 2004; Crocker & Sheppard, 1999). For longitudinal evaluation of changes in levels of depressive symptoms over time, the continuous approach has merit (Cuijpers, de Graff, & van Dorsselaer, 2004).

Thus, controversy persists regarding definitions and concepts to represent the set of symptoms known as depression (Kendler, 1999; Leigh, 2009; Payton, 2009). The applied concept of depression has implications for future research, including epidemiologic and nursing studies (Feely, Sines, & Long, 2007; Munoz et al., 1995; National Institute of Mental Health [NIMH], 2008). Etiological models using continuous measures may identify the mechanisms by
which factors in women’s social environment influence their perinatal depressive (Leigh, 2009; Schatzberg, Scully, Kupfer, & Regier, 2009).

2. **Epidemiology of major depression**

Decades of epidemiologic research have resulted in frequently disparate results (Horwath, Cohen, & Weissman, 2002; Kendler, Myers, & Halberstadt, 2011). For example, incidence and prevalence rates of depression vary by time periods and birth cohorts (Eaton, Kalaydjian, Scharfstein, Mezuk, & Ding, 2007; Paykel, 2000; Rait et al., 2009). NIMH, (2012) reported prevalence rates for major depression among adults ranging from 7.9% in 2004 to 6.4% in 2008. The Centers for Disease Control and Prevention ([CDC]; 2012b) reported a revised estimate of 9.1% for significant depressive symptoms during the two weeks preceding survey completion. Within U.S. general populations, an estimated 17% are predicted to experience a depression episode over the course of a lifetime (Blazer, Kessler, McGonagle, & Swartz, 1994; Kessler et al., 1994; Roberts, 1987). The median duration for an episode of depression ranged from three to four months, with 63% of participants recovering from symptoms after six months (Kessler et al., 2003; Spijker et al., 2002).

Demographic characteristics associated with major depression or higher levels of depressive symptoms include female gender, younger age, lower education, unemployment, and low-income (Blazer et al., 1994; Hudson, 2005; Inaba et al., 2005; Kessler et al., 2005; Kessler et al., 2010; Mirowsky & Ross, 1992; von dem Knesebeck, Pattyn, & Bracke, 2011). Urban city dwellers of minority ethnicity also have reported higher rates of depression and levels of depressive symptoms (CES-D), with low social support predicting higher levels of symptoms (D. K. Miller et al., 2004; Romans, Cohen, & Forte, 2011).
Regarding race and ethnicity as a risk for major depression, large-scale national studies report inconsistent findings (A. T. Beck & Alford, 2009; Gotlib & Hammen, 2009; Tsuang & Tohen, 2002). In a recent analysis of data from the Collaborative Psychiatric Epidemiologic Survey (N=15,762), severity ratings of depression did not differ significantly across racial groups (Gonzales et al., 2010). But minority groups may be at higher risk, in part due to their disproportionate representation among low-income populations (Seaton & Taylor, 2003; Vega et al., 1998). In the National Co-morbidity Survey Replication study, Kessler and colleagues (2003) found that persons of lower income were more than three times as likely to develop major depressive disorder over a 12-month period.

Psychological traits of low self-esteem, negative cognition, and a personal or family history of a previous depressive episode are risk factors for depression (A. T. Beck, 1967; A. T. Beck & Alford, 2009; Hankin, Lakdawalla, Carter, Abela, & Adams, 2007; Keenan, Feng, Hipwell, & Klostermann, 2009; Levinson, 2009). Social risk factors for depression include stressful life events, especially those associated with loss, such as death or job loss, or violence and abuse (Caspi et al., 2003; NIMH, 2012; Rubino, Nanni, Pozzi, & Siracusano, 2009; Zammit & Owen, 2006).

Additional social risk factors include social isolation or decreased social integration and a poor-quality or a lower level of support provided through social networks, includes those persons with whom an individual has contact socially (A. T. Beck & Alford, 2009; Peirce, Frone, Russell, Cooper, & Mudar, 2000). The status of being married has been associated with lower risk for depression, whereas exposure to marital discord or marriage disruption increases the risk
for subsequent onset of major depression (Bulloch, Williams, Lavorato, & Patten, 2009; Duberstein et al., 2004; Gracia and Herrero, 2004; Horwath et al., 2002; Seeman, 1996).

3. **Etiologic theories of unipolar depression.**

The cause of major depression is not known. Theories about the cause of depression fall into three broad categories: biological/genetic, psychological, and sociocultural.

The biologic theories of depression focus on anatomic variation within the brain, neuro-degenerative and neuroendocrine variations, and genetics research, especially the anatomic and physiologic axis involving the hypothalamus, the pituitary gland, and the adrenal gland or hypothalamic-pituitary-adrenal axis (Bao, Meynen, & Swaab, 2007; NIMH, 2010). Neurotransmitters such as dopamine have been implicated in the onset of depressive symptoms. More recently, the “indoleamine hypothesis” suggested that the neurotransmitter serotonin is linked to depressive symptoms (Bao et al., 2007; Vollmayr, Mahlstedt, & Henn, 2007). A series of twin studies has linked genetic vulnerability for expression of severe depressive symptoms with precipitating environmental factors, such as exposure to stressful life events (Caspi et al., 2003; Risch et al., 2009).

Psychological theories can be grouped as psychobiologic vulnerability, cognitive spectrum, or the interpersonal scar models (Sobin & Sackeim, 1997). Pre-existing personality traits, including neuroticism, pessimism and negativity, low self-esteem, or previous depressive episodes are hypothesized to influence depressive symptoms, but more research is needed (Foster & MacQueen, 2008; Hankin et al., 2007; Hirschfeld, 1999; Poropat, 2009; Terracciano et al., 2011). Other psychological theories of depression have focused on cognitive thinking styles.
The learned helplessness model proposed that depressive symptoms are a response to environmental stimuli when there is a perceived lack of control (Abramson, Seligman, & Teasdale, 1978; Pryce et al., 2011). Interpersonal theories of depression include psychodynamic models evolved from classic psychoanalytic theory (Freud, 1961/1923), including the attachment theory, and posits that stressful events occurring later in life can trigger the re-grieving of a childhood loss experience, precipitating a subsequent depressive episode (Bolby & Ainsworth, 1992; Wei, Shaffer, Young, & Zakalik, 2005; Weiner, 1985).

Sociocultural theories of depression focus on the structural organization and the functional quality of relationships among a network of the individual’s personal contacts (Durkheim, 1951; Parsons, 1951). Social and cultural factors can influence the self-assessment of depressive symptoms, the perception of stress, and help-seeking behavior (Caplan, 1981; Brugha et al., 1998; Hammack, 2003; Jacob, 1999; Leong & Kalibatseva, 2011; Rodriguez, Bingham, Paez, & Myers, 2007; Syme, 1986; Triandis, 1989). Theories to explain sociocultural influences on rates of depression have focused on social roles and integration, social adversity and stress, and social network support, as described below.

Social roles, such as the role of parent or provider, are sets of behaviors reinforced by cultural norms (Boyd, 2005; Eagly, 1987; Mead, 1934; Myers, 2005; Thoits, 2005). Role socialization and role ranking, including discrimination, can affect individual styles of response to life stress and interpretation of stressful events for those with depressive symptoms (Barney,
Griffiths, Jorm, & Christensen, 2006; Breslau, Aguilar-Gaxiola, Kendler, Williams, & Kessler, 2006; G. W. Brown, 2002; Nesse, 2011; Nettle 2004; Sachs-Ericsson, 2000).

Social integration, as an indicator of social “embeddedness” with a network of personal contacts, has been posited to give meaning to social roles (Barrera, 1986; Berkman, Glass, Brissette, & Seeman, 2000; Weil, Lee, & Shihadeh, 2011; Saranson & Saranson, 2009; Thoits, 1982, 1995a). Measures of social integration range from simple indicators, such as “having one confidant,” to more complex measures, such as centrality, which describes the linkages within a network of social contacts (Bohnke, 2008; Prudo, Brown, Harris, & Dowland, 1981; Rosenquist, Fowler, & Christakis, 2011). One theoretical model included social engagement as a “downstream” versus “upstream” (i.e., proximal versus distal) predictor of depressive symptoms (Berkman et al., 2000, p. 847). In this model, the set of predictors included social-network size and reciprocity (i.e., mutuality) of relationships.

Two broad types of social adversity are theorized to generate depressive responses (A. T. Beck & Alford, 2009; Selye, 1956, 1974). First, chronic but nonspecific stressful life circumstances, such as social isolation or poverty, are hypothesized to significantly increase levels of depressive symptoms among exposed groups. The other type of social adversity associated with depressive symptoms is stressful life events, especially specific life events resulting in significant perceived loss (Baune, 2009).

Social causation theory links chronic difficult circumstances of the social environment with higher rates of depression among specific population groups, such as those who live in
settings with chronic stress, in high concentrations of poverty or unemployment, or with stigma and discrimination (Hudson, 2005; Rankin & Quane, 2000; Ross, Reynolds, & Geis, 2000). Chronic life stressors have been associated with higher rates of depression across different groups and cultures (Fitzpatrick, Piko, Wright, & LaGory, 2005; Hill & Herman-Stahl, 2002; Melzer, Fryers, Jenkins, Brugha, & McWilliams, 2003; Warren & Lutz, 2007. A recent meta-analysis with over three million subjects found that the odds of depression more than doubled when there was a history of sexual abuse by a personal contact (Chen et al., 2010).

The stress-diathesis theory postulates that an individual’s diathesis, or genetic profile, does not by itself cause the expression of a depressive symptom; it must interact with precipitating environmental factors, including biologic, psychological, or social-life stress. Each individual’s predetermined vulnerabilities vary, along with their perceptions and responses to specific types of life events, resulting in a unique impact of stress on the development of depressive symptoms (Beach, Jones, & Franklin, 2009; Caspi et al., 2003; Nemeroff & Vale, 2005; Paykel et al., 1969; Sarason, Johnson, & Siegel, 1978; Tennant, 2002; Thoits, 1995a, 1995b, 1995c; Zammit & Owen, 2006).

Theories have been proposed to explain the role of social support with depressive symptoms. Social support can be conceptualized as a perceived sense of being supported overall or having received specific types of support, such as material, affection, or advice support, from a network of personal relationships (Cassell, 1974; Cobb, 1976; Dean & Lin, 1977; Jacobson, 1986; Norbeck, Lindsey, & Carrieri, 1981). Social support has been viewed as a meta-construct with a structural component of social network characteristics and a functional component of
types of social support received (Vaux, et al., 1986). Warren and Lutz (2007) reported that the “sense of belonging and social support” were factors contributing to the development of depression.

The mechanisms by which social support influences depressive symptoms remain unclear, to some extent because paths of influence may vary by specific type of support and population groups (Lincoln, Chatters, & Taylor, 2005; Parrack & Preyde, 2009). There are three primary models of the pathways by which social support influences health outcomes, including depressive symptoms: the main or direct effects model, the mediator model (i.e., indirect effects), and the stress buffering hypothesis (i.e., moderating effects) (Cohen & Syme, 1985; Cranford, 2004; Dunkel-Schetter & Bennet, 1990; Eckenrode & Gore, 1990; Ensel & Lin, 1991; Lin, Woelfel, & Light, 1985; Martins, Peterson, Almeida, & Costa, 2011; Pilisuk, 1982; Thoits, 1982; Tilden & Weinert, 1987). The evidence for a buffering effect of social support and depression has been inconsistent, in part due to varying conceptualization and measurement of both stress and social support. Previous landmark studies had demonstrated support for the buffering effect of social support on depressive disorders (Brown & Harris, 1978; Cohen & Wills, 1985; Cutrona & Russell, 1990; Thoits, 1986; Vilhjalmsson, 1993). Later research did not support the stress buffering hypothesis for depression; instead, evidence was found for direct effects of social support (Lakey & Cronin, 2008; Wade & Kendler, 2000).

4. **Summary of depression in general populations**

Rates of depression in general populations are comparable to many common physical illnesses. Risks for depression include demographic factors, such as gender, younger age, and lower education. Ethnicity of minority group status in the U.S. can be a risk factor, especially
under conditions of poverty and poor support or abuse among social relationships, which significantly influence depressive symptoms. Psychological traits demonstrated previously to have increased risk for depression include low self-esteem and previous episodes of severe depressive symptoms, but existing psychological models for depression are limited in application for pragmatic preventive interventions (Lakdawalla, Hankin, & Mermelstein, 2007).

Research by Uher (2008) and others supports the theory that depression is affected by genetic factors in combination with both early and later life experiences of the social environment, such as the quality of support in personal relationships. An extensive body of research has found that higher levels of social support are associated with lower levels of depressive symptoms, while conflict in social relationships and marital discord are related to higher levels of depressive symptoms across a broad range of population and cultural groups (A. T. Beck & Alford, 2009; Kim & Ross, 2009). Findings regarding the specific mechanisms by which social resources and relationships affect a person’s depressive symptoms remain unclear, and evidence for the buffering effect of social support has been inconsistent (Stewart, 1993; Lakey & Orchek, 2011).

D. Depression in Women

Wizemann and Pardue (2001) defined gender as the personal representation as male or female with social response “shaped by environment and experience” (Box 1-1). Results from epidemiologic research about depression in women reflect risks related to differences in social experience and environmental exposure by gender as well as variation related to sexual biology (McGrath & Puzan, 2004).
1. Epidemiology of depression in women

Among individuals diagnosed with unipolar depression, females are disproportionately represented. In a multi-sight survey conducted in 23 European countries, women reported higher levels of depressive symptoms (CES-D) than men in all participating countries (Van de Velde, Bracke, & Levecque, 2010). Differences in rates of depression between boys and girls begin to emerge in childhood and subsequently increase across pubertal stages of development, with depression among adult women being two to three times as likely as among men (Kessler, et al., 2003; Miller, Girgis, & Grupta, 2009; Wittchen, 2010). For adult women in the general populations of the U.S. and Australia, lifetime prevalence of depression ranged from 21% to 24% for women, compared to 13% for men (Williams et al., 2010; Zender & Olshansky, 2009). Women’s depressive disorders accounted for 42% of the estimated disability burden from all neuropsychiatric disorders, versus 29.3% for males (Wittchen, 2010). The greater number of first onsets of depressive episodes among women versus men contributes toward the greater prevalence rates (Kessler, 2006; Nolen-Hoeksema & Hilt, 2009).

Symptoms of depression are similar for women and men, though there are some differences by gender. Women’s symptoms are more often seasonal and “atypical,” including overeating and sensitivity to rejection associated with neuroticism. Gender differences have been reported for comorbidities, with women more likely to be diagnosed with associated anxiety, which often originated during childhood (Blehar, 2006; Zender & Olshansky, 2009).

Thus, research demonstrating gender disparities in depression has also linked women’s depressive symptoms to their family histories and periods of life with transitional changes of
reproductive function and roles (Blehar, 2006; Ferreiro, Seoane, & Senra, 2012; Keyes & Goodman, 2006). There are specific demographic risks for depression among women. Gender differences in rates of depression begin to emerge in the age range of 11 to 14 years, with girls developing higher levels of depressive symptoms than boys of similar age. Based on an analysis of U.S. national data from 2007 to 2010 for persons 12 years or older, the proportional difference by gender increased for age groups through 59 years of age, when the differences by gender decreased (CDC, 2012b; Kessler, 2006).

A lower education level has been associated with higher rates of specific types of depressive disorders in women (Ross & Mirowsky, 2006; Somerset, Newport, Ragan, & Stowe, 2006). However, a recent national study found that African American mothers with higher education were more likely to have a lifetime mood disorder than less educated African American women (Boyd, Joe, Michalopoulos, Davis, & Jackson, 2011).

Relevant findings about ethnicity and depression in women are inconsistent, in part due to diversity within ethnic groups and also because results may be confounded by factors such as income level, marital status, and cultural variations in reporting or help-seeking behavior (Arsenio, Sesin, & Siegel, 2004; Barbee, 1992; Bromberger, Harlow, Avis, Kravitz, & Cordal, 2004; J. S. L. Brown, 2010; Varner & Mandura, 2009). In the National Survey of American Life, lifetime prevalence for white mothers was 21.67% compared to African American mothers’ prevalence of 16.77% (Boyd et al., 2011). Yet, researchers frequently identify African American and Mexican American women as being at high risk for depression, which is related to their disproportionate representation in low-income or other risk groups (Castillo, Archuleta, & Van
Landingham, 2006; Jones & Ford, 2008). Thus, fiscal or cultural status indicators, such as access for financial and treatment resources or social support for seeking help, may account for discrepant rates of women’s depressive symptoms by ethnicity. Further research in this area is needed (Boyd et al., 2011; National Alliance for the Mentally Ill, 2009a, 2009b).

Women of low-income status are at increased risk for onset of depression (Agency for Healthcare Research and Quality, 2005; Heneghan, Silver, Bauman, Westbrook, & Stein, 1998; Lennon, 2006; Levy & O’Hara, 2010; Samuels-Dennis, 2007). In a national stratified random sample, Kahn, Wise, Kennedy, and Kawachi (2000) found that a significantly greater percentage of low-income women reported depressive symptoms than women of higher income levels (33% vs. 9%). In a national Australian sample using clinical interviews, women in the lower socio-economic group had twice the risk of a current mood disorder than women of middle-income range after adjustment for factors such as physical activity and co-existing anxiety (Williams et al., 2011). Life stress, social stigma, isolation, and perceived social support partially explained high-depressive symptoms among low-income women in urban settings (Hill & Herman-Stahl, 2002; Schulz et al., 2006; Shattel, Smith, Quinlan-Colwell, & Villalba, 2008). It also is notable that persistent depression among urban, minority women is associated with a greater risk for subsequent poverty status (Lehrer, Crittenden, & Norr, 2002).

Psychological risk factors for women include a previous history of depression, with a likelihood of a future depressive episode being five times greater than those without a previous history (Zender & Olshansky, 2009). A number of studies have linked gender differences in self-esteem to depression in women, with inconsistent findings of lower self-esteem in women
Depressive symptoms may develop in conjunction with hypersensitivity to loss or rejection (Girgus & Nolen-Hoeksema, 2006; Nolen-Hoeksema & Hilt, 2009; Widiger & Anderson, 2003; Widiger, Mullins-Sweatt, & Anderson, 2006). However, one study found that although women with major depression had higher levels of self-criticism compared to men, depressed men had higher levels of dependency than women (Luyten, et al., 2007). Negative cognitions are related to depressive symptoms in women, yet Carter and Garber (2011) noted varying results, including no differences between men and women, more negativity in women than men, and greater negativity in boys versus girls. Rumination is the reiterative focus on negative cognition with labile emotion and behavior that is maladaptive (Girgis & Nolen-Hoeksema, 2006; Marecek, 2006). In one study, cognitive rumination as a response style was the only indicator showing unique contribution to the variation in depressive symptoms (Young, LaMontagne, Dietrich, & Wells, 2012). Nolen-Hoeksema and Jackson (2001) came to the controversial conclusion that women may be more likely than men to respond to different stressful situations with particular types of rumination, partially accounting for gender difference in rates of depressive symptoms. Other personality traits linked to depressive symptoms in women included hopelessness and powerlessness (Stone, Gibb, & Coles, 2010). But Widiger, Mullins-Sweatt, and Anderson (2006) noted that personality traits may not have stability and may reflect an adaptive response to the current reality of women’s lived experiences, such as abusive relationships.

Sociocultural factors associated with women’s depression include stressful life events, chronic life difficulties, and stressful relationships or lack of support in the social environment. A strong body of evidence has linked depression in women with the experience of stressful life
events, especially situations involving loss, conflict, or major life transitions (Kendler & Gardner, 2011; Kendler, Gardner, & Prescott, 2006; Kessler, 1997; Post, 1992). Studies of female twin pairs have demonstrated that the association with recent stressful life events decreases with each subsequent episode (Kendler, Thornton, & Gardner, 2001), supporting a sensitization hypothesis. In a recent study of 5,692 participants of the National Comorbidity Survey, gender differences in depression were explained in part by a higher likelihood of exposure for females to events involving interpersonal violence (OR = 1.28 for sexual assault and 1.32 for rape). For adult women with a childhood history of life adversities, increased likelihood of a subsequent depressive episode was found following a stressful event occurring later in life (Honkalampi et al., 2005).

Chronic life difficulties and conflicted relationships have been related to depression in diverse groups of women, including increased risk from ongoing abuse during childhood (Kendler & Gardner, 2011; Leach, Christensen, Mackinnon, Windsor, & Butterworth, 2008; Matthews, Hughes, Johnson, Razzano, & Cassidy, 2002). Similar to stressful life events, the influence of chronic abuse during childhood on gender-based differences in depression may be due to higher rates of exposure to maltreatment for girls. While domestic and other forms of violence occur across all ethnic and income groups, low-income African American and Hispanic women in specific settings have disproportionate rates for exposure to violence, with subsequent vulnerability to depression (McKnight-Eily et al., 2009; Schultz, Roditti, & Gilette, 2009).

A history of recent conflict or stress in relationships with an intimate partner, spouse, or other social relationship is related to the onset or increased severity of depressive symptoms
more often in women than in men (Febres, Rossi, Gaudiano, & Miller, 2011; Gee & Rhodes, 2007; Kendler & Gardner, 2011; Orr, James, Burns, & Thompson, 1989). In general populations, a recent study analyzed social network determinants for depression that had been assessed at three time points between 1983 and 2001 in the Framingham Heart Study (Rosenquist et al., 2011). The probability for an individual network member to become depressed increased by 142% (95% CI, 18-331%) when a female friend in the social network became depressed. This association persisted to “one’s friends’ friends’ friends (i.e., three degrees of separation)” (p. 273).

Social isolation and lack of social support are risks for depression in women and men, but the risk for depression related to social isolation increases for women in specific circumstances (Kendler, Myers, & Perscott, 2005; Vonneilich, et al., 2011). Compared to mothers with identified supportive relationships, single mothers who were socially isolated and without support had increased risk for depression. (G. W. Brown & Moran, 1997; Targosz et al., 2003). For African American women and Latinas of Mexican origin residing in the U.S., indicators of social integration such as community engagement or access to transportation had a protective effect for depressive symptoms (Fothergill et al., 2011; Siefert, Finlayson, Williams, Delva, & Ismail, 2007; Shattell et al., 2008). Though the mechanisms of effect remain unclear, higher levels of social support from family and friends also have a protective effect for depressive symptoms of diverse groups of women in varied settings (Conway, Rancourt, Adelman, Burk, & Prinstein, 2011; Kendler et al., 2005; Mitchell & Ronzio, 2011; Nadeem, Whaley, & Anthony, 2006; Schultz et al., 2009). Social support may moderate the effects of high stress levels on women’s mental health (Skomorovsky, Matheson, & Anisman, 2006).
2. **Etiologic theories on gender differences in rates of depression**

In applying the epidemiologic evidence to explain and predict depressive symptoms in women, past theorists have focused biological, psychological, and sociocultural theories. In recent years, researchers increasingly have developed integrated models, which incorporate evidence across all of these areas.

Biological theories for depression in women are based primarily on gender differences in genetic vulnerability, particularly response to the neuroendocrine role of gonadal steroids. Recent research has supported theories of a direct genetic role on sex differentiation of biologic functioning, rather than being limited to the indirect effect via sex hormones (Sánchez & Vilain, 2010). In some individuals with a familial history of recurrent, early onset of major depression, there may be a genetic vulnerability that varies in molecular physiology by gender.

Based on neural imaging studies, some researchers have theorized that depression may be related to differences in regional brain activity for men and women. In particular, evidence points to variation by sex in stress regulation by the HPA axis. Women’s reactivity of the HPA axis to stress also has been linked to maternal behavior (Brunton & Meddle, 2011; Figueira & Ouakinin, 2010; Laurent, Stevens, & Ablow, 2011; Li et al., 2009; Pruessner et al., 2010).

Compared to the fight or flight response to stress observed in men, Taylor and colleagues (2000) have formulated a neuroendocrine model to explain women’s response to stress using supportive behaviors, such as “tending and befriending” (p. 411). In this theory, the authors proposed that in females hormones such as oxytocin and estrogen affect HPA response to stress,
with preference for “tending and befriending” patterns. The supportive behaviors of tending and befriending have been linked to remission of depression in women and to socially and culturally defined gender roles (H. T. Brown & Robinson, 1999; NIMH, 2001; Klein, Corwin, & Ceballos, 2006; Peveler, 1999; Taylor, et al., 2000). Consistent with the “tend-befriend” theory, depressive symptoms were buffered by social support more for females than males under conditions of stress (Landman-Peeters et al., 2005).

Blehar (2006) reviewed “transitional” theories of depression, which posit that females have increased risk during periods of reproductive development in response to fluctuating levels of hormones during puberty (i.e., menarche), pregnancy, postpartum, and perimenopause (Segebladh, Borgstrom, Odlind, Bixo, & Sundstrom-Poromaa, 2009). These fluctuations and the consequent expression of depressive symptoms may be genetically linked to interactions of stress and support in women’s social environment (Blehar, 2006; DeRose, Wright, & Brook-Gunn, 2006; Harsh, Meltzer-Brody, Rubinow, & Schmidt, 2008). These theories are challenged by women’s diverse response to exogenous estrogen, such as oral contraceptives, which in some women precipitate depressive symptoms, while for others treatment effects have been reported (Jarva & Oinonen, 2007; Payne, Palmer, & Joffe, 2009; Segebladh et al., 2009; Saxena, & Sharan, 2006; Toffol, Heikinheimo, Koponen, Luoto, & Partonen, 2011).

Psychological theories on interpersonal orientation are relevant to the study of depression in women. Researchers have reported that women compared to men were more likely to develop a sense of self based on the quality of relationships in their social networks (Feingold, 1994; Olshansky, 2003). Gilligan (1982) posited that women’s lived experience focused on the ethic of
care, with self-talk that centers on a network of connections with others. Jean Baker Miller (1976) described women’s experience of depression as “related to one’s sense of the loss of connection with another” (p. 83). Research evidence demonstrated that high scores on social evaluation and approval seeking predicted higher risk for depressive symptoms (Little & Garber, 2005; Rudolph & Conley, 2005). At the same time, Nolen-Hoeksema and Hilt (2009) stated that “an interpersonal orientation leads women to develop strong social support networks that can buffer them against adversity” (p. 392). Thus, controversy persists about interpersonal orientation and women’s depression.

Nolen-Hoeksema, Larson, and Grayson (1999) proposed a cognitive-rumination theory to explain gender differences based on individual’s patterns of dwelling on life stress with a passive rather than problem-solving approach. Rumination may precipitate a transition from mild depressive symptoms to major depression, accounting for some of the gender variation in onset rather than duration of depression (Nolen-Hoeksema & Hilt, 2009; Nolen-Hoeksema et al., 1999). Rumination was reported to be a risk for depression and suicide (McLaughlin, Borkovec, & Sibrava, 2007; Morrison & O’Connor, 2008). However, other research did not demonstrate a predictive effect of rumination for increased severity of symptoms (Kessler, 2006) or occurrence of women’s depression (Lara, Klein, & Kasch, 2000). Ruminating behavior is a multidimensional construct with multiple types that need to be distinguished in research and differentiated from measures of worry and neuroticism (Smith & Alloy, 2009).

Another set of explanations about the gender differences in depression are known as artifact theories. Though lacking consistent support of research evidence, artifact theories
attribute gender differences to a greater likelihood of women to acknowledge depressive
symptoms with subsequent increased risk for being labeled as depressed (Blehar, 2006; Deslisle,
Beck, Dobson, Dozois, & Thombs, 2012). Cultural values and ethnicity may differentially affect
women’s reports of symptom type or their willingness to report symptoms and to seek help
(Berger, Addis, Reilly, Syzdek, & Green, 2012; Jackson & Williams, 2006). Compared to British
white women, Black African women perceived depression to have less serious consequences (J.
F. L. Brown et al., 2010).

Sociocultural theories of depression in women focus on culturally defined gender roles,
differential social challenges, and stress-kindling theory, and overlap to some extent with the
psychological concepts about interpersonal relationships and social learning. Gender role theory
posits that sex-differentiated attitudes, behavior, and emotions, including symptoms of
depression, become expressed in response to social structure (K. Williams & Kurina, 2002). As
male and female children are socialized, beliefs about gender-based roles become reinforced by
the patterns of sex-typed labor within a hierarchy of social status. In one study, the socialization
effect for depressive symptoms is stronger for adolescent girls (Conway et al., 2011). Women’s
membership in a devalued group, as indicated by social rewards and status, may increase risk for
women’s emotional distress and negatively affect their mental health (Katz, Joiner, Jr., & Kwon,
2002).

The theory of differential social challenge, summarized by DeRose and colleagues
(2006), posited that gender differences in stress from the social environment are amplified by
underlying vulnerability from biologic mechanisms, especially at times of developmental
transition in females. First, females may be likely to experience greater exposure to social challenges than boys or men, such as child abuse. Females also may react differently to the social challenges experienced (Lund, Sejbaek, Christensen, & Schmidt, 2009). For example, Goodman (2007) summarized evidence pointing to social transference effects in which girls are more susceptible than boys to the stressful context of living with a depressed mother.

The stress-kindling theory integrated the concept of inherent vulnerability to depressive symptoms that become expressed only following exposure to stress from the social environment. Individuals with genetic or other vulnerability become sensitized after sequential life events perceived as stressful. This theory claims to account for the development of depression in some, but not all, individuals following exposures to similar social stress (Garber, Gallerani, & Frankel, 2009; Monroe, Bromet, Connell, Steiner, 1986; Post 1992, 2007). In a sample consisting of female twin pairs, the relationship of stressful life events as a predictor of women’s depressive episodes decreased steadily through a history of nine prior episodes of depression, and after more than nine episodes of depression, the relationship of a recent life event prior to the episode of depression was no longer significant (Kendler, Thornton, & Gardner, 2000). These findings supported the kindling concept of increasing sensitivity to stress, with a decreasing association of a recent stressful event as a precursor to an episode of depression. Besides frequency of occurrence, other factors affect the relationship of stressful events with depression, including the specific type of event by gender and the level of social support, which also varies by gender (Kendler et al., 1995; Kendler & Gardner, 2011; Kendler et al., 2005; Monroe & Harkness, 2005).
In summary, women of childbearing age have a greater likelihood than men of reporting depressive symptoms, especially women living under conditions of low-income and stressful life circumstances. In particular, women with a previous history of depression and conflict or abuse among their social relationship, are at higher risk for later episodes of depression. Theoretical explanations based on biological transitions during periods of reproductive development are challenged by culturally specific gender roles and risks associated with reproductive transitions, such as self-esteem related to body image. The level of social support that women perceive from their social contacts may have direct effects, or may interact with life stress, in relation to their depressive symptoms.

E. Depression in Women During Pregnancy and Postpartum.

According to the criteria of the current *DSM IV*, there is no official diagnosis of “prenatal” or “postpartum” or “perinatal” depression. This diagnostic manual of the American Psychiatric Association (2000) includes a specifier for postpartum onset of symptoms of major or minor depression occurring within four weeks after childbirth. For the forthcoming *DSM V*, a proposed change is being considered to extend consideration of symptoms within six months after childbirth (Jones, 2010). The specification of a postpartum onset of depression is distinct from other perinatal syndromes, such as postpartum psychosis or the syndrome commonly experienced by newly delivered mothers called “baby blues” (Austin, 2010; Onunaku, 2005; Williamson & McCutcheon, 2004).

Ongoing public, scientific and legal debate contrasts the perspective that perinatal depression represents a distinct form of mood disorder with a unique set of symptoms versus the
viewpoint that women sometimes have an episode of major depression that coincidentally onsets during pregnancy or after childbirth (Brockington, 2004; Meltzer & Kumar, 1985; Sharma & Burt, 2011; Shelton, Corey, Donaldson, & Dennison, 2011). For example, some researchers have investigated the postpartum onset of major depression among new fathers and adoptive mothers (Clare & Yeh, 2012; Leathers, Kelley, & Richman, 1997; Mott, Schiller, Richards, O’Hara, & Stuart, 2011; Veskrna, 2010). To some extent, the controversies about depression during pregnancy and postpartum have resulted from problematic comparisons of research findings based on different definitions and measures, including comparisons of major depression diagnosed through clinical interviews versus depressive symptoms based on structured questionnaires (Ertel, Rich-Edwards, & Koenen, 2011; Matthey & Ross-Hamid, 2011).

Regardless of theories about the phenomenon or etiology, an increasing body of research findings has demonstrated that women’s depression during pregnancy or postpartum has serious consequences for the fetus, children, and families, as well as for women themselves. For example, suicide linked to depression was found to be a major cause of maternal mortality despite prior conclusions that pregnancy provided a protective effect on suicide rates for women (AHRQ, 2012; Boath, Pryce, & Cox, 1998; Dell & O’Brian, 2003; Lindahl, Pearson, & Colpe, 2005; Wachs, Black, & Engle, 2009). The concern among researchers and clinicians about such adverse outcomes has increased the study of maternal depression in general and has specifically advanced research on women’s mental health during pregnancy and the postpartum period. With a focus on major depression or depressive symptoms of women during pregnancy and postpartum, evidence from recent and classic research as relevant to this current study is summarized below.
1. Epidemiology of perinatal depression.

Fisher and colleagues (2011) reviewed studies of perinatal mental disorders in women from low and lower-middle-income countries and found a weighted mean prevalence of 15.6% (95% CI, 15.4-15.9) during the antenatal period, and 19.8% (95% CI, 19.5-20.0) postnatally. National studies from Sweden, Italy, and Canada reported prevalence rates of depressive symptoms from 5.8 to 12.4% during pregnancy and 6.5 to 9.6% postpartum. (Lanes, Kuk, & Tamim, 2011; Rubertsson, Waldenstrom, Wickberg, Radestad, & Hildingsson, 2005).

In U.S. national samples, 1 in 10 mothers reported an episode of depression within a period of 12 months (Ertel et al., 2011). Among pregnant women, one national survey found that 7.5% reported poor mental health (Witt et al., 2010). Other prospective studies and reviews of U.S. data reported a prevalence of minor or major depression during pregnancy ranging from 8.5 to 11% (Gavin et al., 2005; O’Hara, Neunaber, & Zekoski, 1984. Among women from delivery to three-months postpartum, incidence rates for major depression were reported as 6.5%, but the rate for major or minor postpartum depression reached 19%, with prevalence rates of diagnosed postpartum depression at 12% (AHRQ, 2012; C. T. Beck, Gable, Sakala, & Declercq, 2011; Segre, O’Hara, Arndt, & Stuart, 2007). Rates of elevated depressive symptoms after childbirth ranged from 15.7% to 63% in national samples (Beck et al., 2011; Sorenson & Tschetter, 2010).

Regarding the course of depression during pregnancy, researchers reported that prevalence rates were higher during the first trimester compared to the second or third trimesters of pregnancy (Gavin et al., 2005). After a previous postpartum onset of depression, 43% of women suffered relapse with a subsequent pregnancy (Cohen et al., 2006). Among women with
a previous postpartum onset of depression, 90% of subsequent episodes associated with pregnancy occurred by the first 28 weeks postpartum (Wisner, Perel, Peindl, & Hanusa, 2004).

In a review of literature for the course of postpartum depression, Goodman (2004) reported that the onset of postpartum depressive symptoms for most women was within the first four weeks after childbirth. However, more than 5% of women did not have onset of symptoms until three months postpartum. If symptoms persisted past four months, symptoms were more likely to extend past one year (McMahon, Trapolini, & Barnett, 2008). As many as 10% of women affected with postpartum onset may remain symptomatic at two-year follow-up, and the duration of maternal depression is related to adverse child outcomes (Goodman, 2004; Foster et al., 2008).

Researchers from epidemiology, nursing, and other fields have investigated risk factors related to perinatal depression. Multiple meta-analyses and longitudinal studies have identified specific factors in women’s lives with increased risk for depression during pregnancy. These factors include difficult life circumstances and stressful life events, low level of social support, and family or personal history of depression (Fisher et al., 2011; Witt et al., 2010). Other factors related to depressive symptoms among pregnant women are age, education, employment, income, and the nature of social relationships (Kitamura, Shima, Sugawara, & Toda, 1996; Koleva, Stuart, O’Hara, & Bowman-Reif, 2011; Lancaster et al., 2010; Vega-Lopez et al., 2008; Witt et al., 2010).
There are also specific prenatal factors that influence women’s depressive symptoms after childbirth, and these are similar to the risk factors for prenatal depression. Multiple meta-analyses have demonstrated that a history of depression either before or during pregnancy strongly predicts postpartum levels of depression. Other prenatal factors reported consistently to be related to postpartum depressive symptoms include a lack of social support from family and friends, social isolation, or the experience of a loss or other stress during pregnancy (Forman, Videbech, Hedegaard, Salvig, & Secher, 2000; Milgrom et al., 2008; Robertson, Grace, Wallington, & Stewart, 2004; Verkerk, Pop, Van Son, & Van Heck, 2003; Wilson et al., 1996).

Meta-analyses and longitudinal research also provide information about postpartum factors related to onset of depression after childbirth. These factors include the woman’s parity (i.e., the number of births prior to a current pregnancy), level of self-esteem, and support from friends and family during the postpartum period. Low-income status following the birth of the baby also predicts onset of depressive symptoms in postpartum mothers (AHRQ, 2012; C. T. Beck, 1996; C. T. Beck, 2001; Robertson et al., 2004). Epidemiologic studies have investigated the influence on perinatal depressive symptoms from other demographic characteristics, such as age, education, employment, and ethnicity.

Included in the demographic risks, adolescent mothers and women of younger age may be at increased risk for perinatal depressive symptoms (Mayberry, Horowitz, & Declercq, 2007). However, this finding has not been consistent and may be confounded by cognitive development in young teens, marital status, ethnicity, and parity (Deal & Holt, 1998; Ji et al., 2011; Logsdon, Birkimer, Simpson, & Looney, 2005; Luke et al., 2009; Matsumoto et al., 2011; Reid &
Meadows-Oliver, 2007; Spinelli, 1998). Recent analysis of data from a US national survey and other studies have indicated that postpartum women with “grandmultiparity” (greater than five births) or those with two (2) or more children reported higher levels of depressive symptoms than the comparison group (Beck et al., 2011; Gavin, Lindhorst, & Lohr, 2011; Gurel & Gurel, 2000; Segre et al., 2007; also see Figueiredo & Conde, 2011).

Education level was not identified as a predictor of postpartum depressive symptoms in C. T. Beck’s (1996, 2001) meta-analyses. However, among women in low- and lower middle-income countries, a systematic review found that higher education level had a protective effect (Fisher et al., 2011). In recent national U.S. and Australian samples, women with lower educational level and low literacy had higher depressive symptoms than comparison groups, and they concluded that education should be included in future studies (Mayberry et al., 2007; Quinlivan, Tan, Steele, & Black, 2004; Weiss, Sheehan, & Gushwa, 2009).

Evidence is inconsistent regarding the protective effect of full or permanent employment on perinatal depressive symptoms. The influence of employment on the mental health of postpartum mothers may be specific to working conditions, such as a sense of control and flexibility (Cooklin, Canterford, Strazdins, & Nicholson, 2011; Fisher et al., 2011; Mayberry et al., 2007; Miyake, Tanaka, Sasaki, & Hirotta, 2011). Employment also may indirectly influence depressive symptoms of new mothers through effects on social engagement and income level (Abrams & Curran, 2011; Baker, & North, 1999; Dearing, Taylor, & McCartney, 2004; Klein, Hyde, & Essex, 1998; Mayberry et al., 2007).
Income status also may affect risk for depressive symptoms during pregnancy and postpartum (AHRQ, 2012; Koleva et al., 2011; Robertson et al., 2004). In a controlled analysis of the prevalence of major depressive episodes among postpartum women, income was reported to be the strongest predictor (Segre et al., 2007). For another study of 1,351 women over a period of three years after childbirth, Dearing and colleagues (2004) found that as family income increased, women’s depressive symptoms decreased, with a significant likelihood of severe symptom levels related to poverty status.

Women’s ethnicity adds complexity to the interpretation of findings about income status and depressive symptoms during pregnancy and postpartum. African American and Hispanic women may be at higher risk of perinatal depressive symptoms due to their higher rates of low-income status, also associated with less access to, or help seeking, mental health services (Heilmann, Frutos, Lee & Kury, 2004; Kozhimannil, Trinacty, Busch, Huskamp, & Adams, 2011; Leis, Mendleson, Perry, & Tandon, 2011; Levy & O’Hara, 2010; Zayas, Cunningham, McKee, & Jankowski, 2002; Zittel-Palamara, Rockmaker, Schwabel, Weinstein, & Thompson, 2008).

During pregnancy, a large community sample found increased risk for pregnant Black women compared to non-Hispanic whites (Gavin, Melville, et al., 2011). Other studies of prenatal depressive symptoms reported inconsistent or limited findings about different rates by ethnicity (Pollard & Jarosinski, 2012; Sleath et al., 2005). Similar inconsistencies in research findings exist regarding ethnicity and postpartum depressive symptoms (Howell, Mora,
Horowitz, & Leventhal, 2005; Huttoo, Kim-Godwin, Pollard, & Kemppainen, 2011; Mayberry et al., 2007).

Thus, upon systematic review of research findings, meta-analysts have not included race or ethnic status as risk factors in published reports on perinatal depression (AHQR, 2012; C. T. Beck, 2001; O’Hara, 2009; Robertson et al., 2004). Yet, results from both U.S. and cross-national studies support the significance of cultural beliefs and influences, such as acculturation and immigration, in development of perinatal depressive symptoms for women in specific settings and groups, including lesbian or bisexual women (Beck, 2006; Callister, Beckstrand, & Corbett, 2011; Clare & Yeh, 2012; Fisher et al., 2011; Fung & Dennis, 2010; Martinez-Schallmoser, Telleen, & Macmullen, 2003; Oates et al., 2004; Ross, Steele, Goldfinger, & Strike, 2007).

There are specific psychological risks for perinatal depression. Research on psychological factors for perinatal depressive symptoms has focused on self-esteem and other personality traits, such as neuroticism or perfectionism. During pregnancy, low self-esteem or negative self-schema have been implicated as risks for depressive symptoms in some studies but have not been consistent predictors of depressive symptoms (Evans, Heron, Lewis, Araya, & Wolke, 2005; Liabsuetrakul, Vittayanont, & Pitanupong, 2007; Ritter, Hobfall, Lavin, Cameron, & Hulsizer, 2000). One study found neuroticism had a direct negative effect on the mental health of pregnant women (Puente, Monge, Abellan, & Morales, 2011).
In the postpartum period, self-esteem was found to be a predictor of depressive symptoms in Beck’s (2001) meta-analyses and was identified as a risk for depressive symptoms in postpartum adolescent mothers (Logsdon et al., 2005). While findings are inconsistent, self-esteem may have a reciprocal relationship with perceived stress among women with high levels of depressive symptoms during the postpartum period (Hall, Kotch, Browne, & Rayens, 1996; Y. K. Kim, Hur, Kim, Oh, & Shin, 2008). Regarding other psychological factors, a recent comparison of depressed versus non-depressed postpartum women found that women who reported a high concern over mistakes (i.e., perfectionism trait) had four times the likelihood of being depressed (Gelabert et al., 2012).

A history of depressive episode is a strong risk for prenatal and postnatal depression (Boyd & Amsterdam, 2004; Yonkers, Vigod, & Ross, 2011; O’Hara et al., 1984), with as many as 25% of women experiencing a recurrence of major depression during pregnancy (Boyd & Amsterdam, 2004). A majority of women experiencing an episode of prenatal depression also had depression during the postpartum period (Hutto et al., 2011; Witt et al., 2011). A study of 11 different cohort panels surveying pregnant and postpartum women found that prenatal depression at different time points of pregnancy predicted postnatal depressive symptoms at multiple time points up to eight-months postpartum (Heron, et al., 2004). Women with any history of depression were more likely to experience postpartum depression (Chojenta, Loxton, & Lucke, 2012).

Researchers have investigated the sociocultural factors that influence women’s perinatal depressive symptoms. Specific factors in pregnant and postpartum women’s social environment
examined in relation to depressive symptoms and major depression have included chronic life stressors and specific stressful life events, social isolation compared to social integration, characteristics of relationships with members of social networks, and support from contacts with members of social network.

Chronic life difficulties predict depression among national samples of mothers (Ertel et al., 2011; Orr et al., 1989). A review of findings from animal models concluded that chronic “stress can alter the behavioral repertoire of the mother, with increased anxiety and depression-related behavior” (Hillerer, Neumann, and Slattery, 2012, p. 32). Vulnerability and response to psychosocial stress varies among pregnant women; high community-level stress or stress from social relationships for pregnant women have serious consequences, including prenatal depression (C. T. Beck, 2011; Committee on Health Care for Underserved Women, 2006; Dunkle-Schetter & Tanner, 2012; Lanes et al., 2011; Seguin, Potvin, St-Denis, & Loiselle, 1995). Women’s stress levels during pregnancy and postpartum also are related to postpartum onset of depression (Melville, Gavin, Guo, Fan, & Katon, 2010; Stowe, Hostetter, & Newport, 2005).

A review of the risk from specific types of social stress for postpartum depression among special populations included immigrant women, adolescents, and women living in urban settings (Clare & Yeh, 2012). The authors reported that the type of stressful circumstances may vary by specific population group, and stress exposure also may vary within different subsets of these groups of women. Among women of special populations, the potential sources of social stress include social isolation, childcare stress, lack of transportation, inadequate housing, income
inequality, and conflict stemming from culturally bound beliefs and gender roles (C. T. Beck, 2001; Clare & Yeh, 2012; Heneghan et al., 1998; Kozinsky et al., 2011; Seguin et al., 1995).

Beside chronic life stress, a past or recent experience of a stressful life event is associated with perinatal depression. The history of negative life events during pregnancy, such as loss of a significant relationship, was associated with antenatal depressive symptoms (Seguin et al., 1995; Zayas et al., 2002). Reported stressful life events during pregnancy or early in the postpartum period strongly predicted postpartum depression in two major meta-analyses (Robertson et al., 2004).

Cutrona (1984) concluded that “one stressful live event that may lead to symptoms of depression is childbirth” (p. 378). Evidence consistently has demonstrated that the history of past negative life events, including miscarriage, is related to development of postpartum symptoms of depression (AHRQ, 2012; Beck, 2001; Koleva et al., 2011; O’Hara, 1986). In particular, violence from intimate partners was positively and significantly associated with perinatal depression, although other researchers suggest caution about differentiating the diagnosis of depression from posttraumatic stress disorder (Beck et al., 2011; Gavin et al., 2011; Martin et al., 2006).

Higher levels of social integration by women may have beneficial influence on levels of depressive symptoms. Social engagement across various types of community organizations, such as school or church, may limit women’s feelings of social isolation, which is a risk for depressive symptoms (Dennis & Ross, 2006; Hatmaker, 1993; Mauthner, 1995; Raymond, 2009). In a
classic study, Cutrona (1984) reported that deficient social integration predicted postpartum depression. More recently, in a large community-based, prospective study, perceived isolation during pregnancy increased the likelihood of postpartum depression (Forman et al., 2000). Immigrant women and mothers without partners, especially if they also are low-income or young, are at risk of depression related to social isolation during pregnancy and postpartum (Murray, Woolgar, Murray, & Cooper, 2003; O’Mahoney, & Donnelly, 2010; Stowe et al., 2005).

Women’s depressive symptoms during pregnancy and the postpartum period may be related to the quantitative and qualitative aspects of social-network relationships and social-network support from intimate partners, family, or friends. A limited number of studies of social-network characteristics and perinatal depressive symptoms have had inconsistent results about network size or the number of persons in perinatal women’s social networks (Brugha et al., 1998; Callister, Beckstrand, & Corbett, 2011; Mercer & Ferketich, 1988; O’Hara, Rehm, & Campbell, 1983; Reich, Silbert-Mazzarella, Spence, & Siegel, 2005). Only a few studies have examined diversity of composition of women’s social support networks, describing different types of supportive relationships (family, neighbors, friends, or other community members). Ross and colleagues (2011) reported that urban women had significantly lower scores on measures of social diversity than contrast groups (Ross et al., 2011). The level of reported attachment to female network members with children was a factor that differentiated between women with depressive symptoms versus the contrast group (Dennis & Letourneau, 2007). One investigation of the transition to parenting reported that the social-network membership of new mothers and fathers had stability from pregnancy through the postpartum period (Bost, Cox,
Burchinal, & Payne, 2002). Another author suggested that the extent of connectedness among the members of new mothers’ and fathers’ social networks may be a factor in their level of received or perceived support (Cornwell, 2012).

A characteristic of the women’s social networks that has been linked to antenatal and postnatal depressive symptoms is the presence of women’s own mothers or their male partners. Existing studies have varied findings about the inclusion of women’s mothers and other family members in their social support networks, but conflict among these family members increased women’s risk of perinatal depressive symptoms (Antonucci, & Akiyama, 1987; Beck, 2008; J. D. Brown, Harris, Woods, Buman, & Cox, 2012; Caldwell, Antonucci & Jackson, 1998; Fisher et al., 2011; Gee & Rhodes, 1999; Lau, Yin, & Wang, 2011).

Marital relationship status is a predictor of perinatal depressive symptoms. Status as married versus never married or divorced has been demonstrated consistently to have a protective effect for perinatal depression (C. T, Beck, 2001; Koleva, et al., 2011; Segre et al., 2007). The Centers for Disease Control and Prevention ([CDC], 2008) reported that postpartum mothers who were married compared to others had significantly lower prevalence rates of postpartum depressive symptoms in 17 different states in the U.S. Reported dissatisfaction with the new mother’s marital relationship also was found to be a risk factor for depressive symptomatology (C. T, Beck, 1996; McMahon, Barnett, Kowalenko, & Tennant, 2005; O’Hara, 2009).
The lack of support from a pregnant women’s partner presented risk for depressed mood in early pregnancy (Rubertsson & Waldenström, & Wickberg, 2003). For the postpartum period, international and U.S. national studies consistently reported that the presence of a mother’s partner as a supportive member of her social network had a protective effect on a woman’s depressed mood (Dennis & Ross, 2006; Fisher, et al., 2011; Kozinszky et al., 2011; Surkan, Peterson, Hughes, & Gottlieb, 2006).

In studies using various psychometrically tested instruments to measure a global sense of feeling supported, the lack of overall perceived social support was consistently identified as a risk for depression during pregnancy and postpartum and as a prenatal risk for postpartum depression (AHRQ, 2012; C. T. Beck, 1996, 2001; Dunkel-Schetter, Sagrestano, Feldman, & Killingsworth, 1996; Orr, 2004; Rubertsson et al., 2005; Seguin et al., 1995). The specific type of received support, as reported or observed, may be correlated with perinatal depressive symptoms (Callister, Beckstrand, & Corbett, 2011). Further study is needed to clarify the mechanisms of influence for received types of support on maternal depressive symptoms and variations in specific support needs among special population groups (Horowitz, Damato, Duffy, & Solon, 2005; O’Hara, 1986; Spotts, 2002; Zittel-Palamara et al., 2008).

Following the classic work of Thoits (1982), some researchers have investigated the “buffering” effect of social support, which tests for a significant moderating/interaction effect of social support on perinatal depressive symptoms under conditions of high stress (M. Brown, 1986; Dennis & Moloney, 2009; Nuckolls, Cassel, & Kaplan, 1972). Researchers’ tests for the buffering effect of social support on depressive symptoms of mothers have had inconsistent
results. For example, the classic work by Cutrona (1984) with postpartum women did not find a buffering effect from social support (as measured by the Social Provisions Scale) for depressive symptoms (Beck Depression Inventory) in conditions of high stress (measured by the Childcare Stress Inventory). However, social support had a direct effect on postpartum mothers’ depressive symptoms in this study. More recently, studies with pregnant women and with young couples who experienced stressful life events demonstrated results consistent with a buffering effect from the availability of social support and satisfaction with the supportive relationship. In contrast, dissatisfaction with partner relationship was found to be a predictor of emotional distress or depressive symptoms during pregnancy (Divney et al., 2012; Rosand, Slinning, Eberhard-Gran, Roysamb, & Tambs, 2011).

2. Etiologic theories of perinatal depression

Currently, no specific cause has been identified for depressive symptoms in pregnant and postpartum women (Klein et al., 2006). Etiologic theories have been proposed that attempt to explain the onset of women’s depressive symptoms associated with periods of reproductive transition, including pregnancy and the postpartum period. When developing predictive models for perinatal depression, researchers often integrate findings from epidemiologic analyses with results from basic science research and from social or health science investigations. The array of theoretical approaches to perinatal depression is primarily focused on biologic, psychological, or sociocultural aspects. Some etiologic theories of perinatal onset of depressive symptoms integrate concepts of pre-existing biologic vulnerabilities interacting with the social environment.
Biological theories of postpartum depression incorporate environmental stress as an important factor in perinatal (Barrett & Fleming, 2011; Hillerer et al., 2012). In biologic theories, postpartum depression is viewed as a variation of mothering behavior based on mechanisms of genetic, neuroendocrine, and adaptive functioning that is responsive to different environmental context (Atzil, Hendler, & Feldman, 2011; Hagen, 1999;).

Some biologic theorists have focused on the anatomic aspect of the brain’s limbic system and cortex (Barret and Fleming, 2011). As applicable in stress diathesis theory based on the classic work of Selye (1956, 1974), the dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis is hypothesized for pregnancy and postpartum depression (Jolley, Elmore, Barnard, & Carr, 2007). The HPA axis theories for risk of postpartum depressive symptoms implicate the role of specific biochemical hormones, including adrenocorticotropic (ACTH) and cortisol (Brunton & Meddle, 2011; Meltzer-Brody, 2011; Yim et al., 2009).

Since postpartum depressive disorders have a familial trend, with cases clustering in some, but not all, families with a history of major depressive disorder, research has focused on genetic causation with alteration in gene expression of biochemical neurotransmitters, primarily serotonin. These theorists posit that the stages of pregnancy and postpartum present specific stress to the body’s serotonergic system, resulting in expression of depressive symptoms (Mitchell et al., 2011; Nemeroff, 2008; Payne et al., 2009). With the advent of biological markers for oxytocin, there has been renewed interest in the link for this hormone and its role with genetic expression for attachment behavior among women experiencing perinatal
Payne and colleagues (2009) conducted a systematic synthesis of research findings on the characteristics of depression among women experiencing periods of reproductive transitions. Based on their synthesis, they theorized that prenatal and postpartum depression are syndromes within a constellation of depression subtypes resulting from biological response to hormonal fluctuations, particularly changes in the gonadal steroid hormone of estrogen. Estrogen, and its companion gonadal steroid of progesterone, has been suspect as a causative factor for mood disorders among women (Keyes & Goodman, 2006; L. J. Miller et al., 2009; O’Hara, Schlechte, Lewis, & Varner, 1991; Sichel, Cohen, Robertson, Ruttenberg, & Rosenbaum, 1995).

Theories applying psychological concepts to explain perinatal depression are categorized as personality characteristics, cognitive style, and perceived control. Psychological theories explore personality traits with comorbid risk for depressive symptoms. A conceptual premise is women’s cascading risk, in which the onset of depression precipitates subsequent depression, both for familial trends and individual prediction. The history of a previous onset of depression, either prior to pregnancy or during a pregnancy, is one of the strongest and most consistent predictors of depressive symptoms during the postpartum period. A past history of a depressive episode prior to becoming pregnant or a previous history during a prior pregnancy also increased risk for depressive symptoms during pregnancy (AHRQ, 2012; Boyd & Amsterdam, 2004; Hutto et al., 2011; O’Hara, 1984; Wit, et al., 2011; Yonkers, 2011).
Recent research has shown that anxiety coincides with depression in perinatal women (Grigoriadis et al., 2011; Quao, Wang, Li, & Wang, 2012). Neurotic personality and perfectionism are hypothesized to increase risk for new mothers’ depressive symptoms in the context of isolation and social expectations (Cutrona, 1983; Gelabert et al., 2012; Jones et al., 2010; Verkerk, Denollet, van Heack, van Son, & Pop, 2005).

Other psychological theories of perinatal depression posit changes in cognitive functioning in response to coinciding biologic changes, including alterations in components of neurons, during pregnancy and postpartum (Workman, Barha, & Galea, 2011). It is hypothesized that these cognitive alterations may persist past the postpartum period, including potentially lower levels of cognitive reasoning observed in some women with postnatal depression (Milgrom & Beatrice, 2003). Negative cognition regarding self-schema and less adaptive coping styles associated with perceived stress also are theorized to be components of the postpartum depression experience (Evans et al., 2005; Milgrom & Beatrice, 2003; Workman et al., 2011).

Another approach to understanding the depression that women experience during pregnancy or postpartum has been to apply qualitative research methods. Some qualitative studies with postpartum participants who were experiencing depressive symptoms explored women’s meaning of self in relation to others as applicable to postpartum depression (C. T. Beck, 1992, 1993; Green, 2004; Keeton, Perry-Jenkins, & Sayer, 2008; Mason, Rice, & Records, 2005; Mauthner, 1999; Paris & Dubus, 2005; Ugarriza, 2002). The analysis by Beck (1993) titled “Teetering on the Edge” used a qualitative approach to identify themes of women’s perceived “lived” experiences of perinatal depression, including a lost sense of control, unmet expectations,
and the loss of a sense of self (Some findings of qualitative studies with women experiencing postpartum depression overlap with reported concerns of first-time mothers in the general population (Darvill, Skirton, & Farrand, 2010; Emmanuel & St. John, 2010; Kanotra, et al., 2007; Koniak-Griffin, 1993; Maternity Center Association, 2004; Nelson, 2003). However, Mauthner (1999) theorized that postpartum depression developed “when women are unable to experience, express and validate their feelings and needs within a supportive, accepting, and non-judgmental” social environment (p. 143).

In addition to the theorized roles for biological and psychological mechanisms in mothering behavior, theories positing fundamental sociocultural influences on the concepts of motherhood and mothering were identified in the classic works of Chodorow and Conratto (1982) and Barnard and Martell (1995) and in recent writings of Barrett and Fleming, (2011). Individual women may have varied experiences of their mothering role across different transitions of childbearing and child rearing (Daly, 2003; Koniak-Griffin, 1993; Mercer, Nichols, & Doyle, 1988;). Women also report varied experiences of the transition to the biological and social status as a new mother, within and across cultures and social groups (C. T. Beck, 2006; Merritt, Kuppin, & Wolper, 2001).

Though universal diagnostic criteria applied in international studies have documented the prevalence of perinatal depression across multiple countries, variation across cultures may also exist for social labeling and medicalization or “geneticization” of women’s depressive symptoms related to pregnancy or postpartum (Fisher et al., 2011; McGrath & Puzan, 2004; Metzl & Angel, 2004; Oates et al., 2004). Theories of the maternal role collapse, social construction, and social
exchange with support deterioration have been proposed to explain the influence of social environmental factors on rates and onset of perinatal depressive symptoms in women.

From the perspective of maternal role theory, the social role of mother can be idealized to be a “labor of love,” as congruent with common sociocultural expectations. The reality of new motherhood may involve mothers’ perceptions of the maternal role as strain and stress, especially in the context of social disadvantages of poverty or lack of social support (Abrams & Curran, 2009; Claire & Yeh, 2012; Keating-Lefler & Wilson, 2004; Mulsow & Murry, 1996; Rosenberg, 1987; Tammentie, Paavilainen, Astedt-Kurki, & Tarkka, 2004).

Intrapersonal conflict in role identity for new mothers regarding work and family life was linked to depressive symptoms during the first three years after childbirth. In the U.S. and elsewhere, the role conflict of new mothers can occur amidst publicly debated “mommy wars” and less overt perspectives of antinatalism, which highlight existing sociocultural conflict about traditional maternal versus alternative gender roles (Dearing et al., 2004; Jackson & Mannix, 2004). Amankwaa (2005) used grounded theory in a study with postpartum participants, finding that emergent themes centered on women’s experiences of “role collapse” following childbirth.

Another group of authors applied gender-role theory to compare postpartum depressive symptoms of men and women, concluding that lack of social support had greater influence on depressive symptoms of socially isolated women. Instead of women’s bonding behaviors creating stress in their social relationship, resulting in a “cost of caring” in terms of depressive
symptoms, these authors reported benefits for women’s depressive symptoms related to their bonding behavior (Richman et al., 1991, p.139).

Social constructionism theorizes that specific phenomena are developed within a social context, and, thus, these phenomena reflect our interpretations of self. If a phenomenon, such as perinatal depression, is socially constructed, its existence depends on the perceived social context. Taking an evolutionary approach in the article “The Functions of Postpartum Depression,” Hagen (1999) reframed postpartum depressive symptoms as a biologic adaptive response to the lack of social support from social network members. Hagen posited that postpartum depressive symptoms may have evolved as an adaptive response by signaling contacts in the social environment about stress perceived as sufficiently high for role conflict or collapse.

In contrast to past critiques that labeled mothers as deviants due to social construction of postpartum depression, Nicholson (1998) had applied social construction theory to explain women’s own accounts of their postnatal experience. These participants’ discourse resulted in a deconstruction of their previously developed concepts of postpartum depression. This reconstructed discourse normalized postpartum mothers’ experiences of emotional liability as adaptive to the stress of significant role changes during pregnancy and the transition to motherhood. In Sichel and Driscoll’s (1999) model for assessment of women’s mental health, the analogy for stressful life events as an emotional “earthquake” also reflected a reconstruction of the concept of depression (Driscoll, 2005).
Another sociocultural perspective was adapted to explain perinatal depressive symptoms: social energy exchange theory. Claiming an existing gap in theoretical approaches for the study of postpartum depression, Posmontier and Waite (2011) identified the need for inclusion of both micro (inner experiences) and macro (sociocultural) contexts for research investigations. Conceptually, the theory of social-energy exchange for postpartum depression (SEED) hypothesized that postpartum women exist in “dynamic interaction” with their social-network relationships. Postpartum women with depressive symptoms seek improved balance of the micro- and macro-components of their lives through exchange of social energy. A key premise of this theory is that depressed postpartum women withdraw socially and become isolated from members of their social networks. The SEED concept of “free energy flow” is consistent with the characteristic describing social-support networks of reciprocity. Living conditions of neighborhood deprivation can limit low-income individuals’ capacity to participate and to reciprocate in mutual helping activities and, thus, experience less enacted social support (Phan, Blumer, & Demaiter, 2009).

F. Final Summary of Literature Review

In summary, research evidence is conflicting regarding rates of depression during pregnancy versus postpartum. These inconsistent findings may be explained by specific factors influencing depressive symptoms at different time points among specific population groups, including characteristics of women’s social environment. These environmental factors, including perceived social support and received types of support, may vary from pregnancy to postpartum, with potential influence on women’s depressive symptoms. In addition, existing research has
implicated both acute and chronic stress, such as difficulty of life circumstances in women’s lives, as related to higher levels of depressive symptoms.

Research findings warrant inclusion of demographic factors in predictive models for perinatal depressive symptoms. Specifically, low income has been demonstrated to be related to higher rates of depression. Younger age and less education also can be risk factors for severe depressive symptoms. Parity has been a less consistent predictor of depressive symptoms at pregnancy and postpartum, but findings of higher rates of depressive symptoms for multipara women merit further investigation of this potential risk factor. While reported results vary regarding ethnicity as a risk factor for depression in women, including during pregnancy and postpartum, the findings of different rates of depression according to ethnicity in some settings warrant inclusion of ethnicity as a variable in predictive models. In particular, the disproportionate representation of women of specific ethnic groups to settings of high concentrations of poverty, with combined risks of discrimination and exposure to violence, places women of specific ethnic groups, such as Mexican American and African American, at higher risk for depressive symptoms. This is particularly so during potentially vulnerable life transition periods of pregnancy and postpartum (Shonkoff, Garner, the Committee on Psychosocial Aspects of Child and Family Health, the Committee on Early Childhood, Adoption, and Dependent Care, and the Section on Developmental and Behavioral Pediatrics, 2012).

Theories of personality traits as precursors for perinatal depression are supported by findings of increased risk among pregnant and postpartum women. Psychological variables such as self-esteem, negative thinking and pessimism, or perfectionism warrant inclusion in predictive
models for depression. A consistent finding in research on depression is the risk of depression following prior episodes of severe depressive symptoms, including risk during pregnancy and postpartum (C. T. Beck, 1996, 2001). When possible, research methods that control for pre-existing depressive symptoms are important in evaluating the unique contribution of specific predictive factors without spurious findings from confounding by previous levels of depressive symptoms.

Despite emerging evidence supporting biological risks for perinatal depression, the exact mechanisms of influence remain unknown (Bloch, Daly, & Rubinov, 2003). Across multiple sources of genetic studies, findings indicate that pre-existing biologic vulnerabilities must interact with social environmental factors to precipitate the expression and onset of depressive symptoms in vulnerable women, including pregnant and postpartum women (Bloch et al., 2003; Meltzer-Brody, 2011; Payne, 2009). Socio-cultural theories, especially theories integrating vulnerabilities of demographic and psychological factors, can be expected to predict perinatal depression by examining specific characteristics of the social environment. As social isolation is an identified risk factor, investigation of the level of women’s social integration may help to explain variance in women’s perinatal depressive symptoms. Social support has consistently been demonstrated to influence depressive symptoms, but the mechanisms of effect vary, with some studies finding direct effect while others’ research reported mediating and moderating effects. There have been limited but promising findings regarding the influence on depressive symptoms from specific characteristics of the social support network, such as network size, composition, and stability. Finding from the limited existing research, as well as theoretical concepts about social causation, support further examination of the specific nature of the social
support environment during pregnancy and postpartum and inclusion of specific characteristics of the social support network as predictors in models for women’s depressive symptoms.
III. METHODOLOGY

A. Research Design

This study employed a secondary analysis of longitudinal data collected previously in a clinical trial of a community-based intervention program for low-income mothers (Norr et al., 2003). The current investigation described urban low-income African American and Mexican American mothers’ depression and social support environments from the prenatal to the two-month and six-month postnatal periods. Then a series of multiple regression analyses modeled the relationship of mothers’ levels of social integration, life difficulties, perceived overall social support, and social-network characteristics with their levels of depressive symptoms. An initial cross-sectional analysis was completed for data collected at the third trimester of pregnancy. Longitudinal analyses were conducted for two months and six months postpartum.

Eligibility for the original study included a low-income level as defined below in Table 1. Control variables assessed during pregnancy included intervention group assignment, the mothers’ race/ethnicity, parity, age, education, and level of self-esteem. A measure of social integration was created based on items assessed during pregnancy only. Other predictors were measured at all three time points. These predictor variables were perceived social support, difficult life circumstances, and social support network characteristics, which included network size, presence of the mother figure, and presence of the father of the baby. Two different
measures of the support network stability were created to represent the presence in the support network across all time points for a mother figure and the father of the baby. The prenatal level of depressive symptoms was included as a control variable for prediction of two-month and six-month levels of depressive symptoms. The two-month level of depression was included as a control variable for the analysis of the six-month level of a mother’s depressive symptoms (See Table I).

B. Research Setting

As a secondary analysis, this investigation was limited to use of data collected as part of a larger, six-year study, which was a randomized clinical trial evaluating the impact of the REACH-Futures Program (Resources, Education, and Care in the Home for Healthy Futures) (Norr et al., 1998). The project served low-income families living in disadvantaged neighborhoods of the near west side of Chicago. Study activities, such as recruitment and data collection, occurred at the University of Illinois at Chicago (UIC) and at two clinics staffed by University of Illinois Medical Center personnel. Interviews for data collection were also conducted in the subjects’ homes.

C. Sample Selection and Inclusion Criteria

Subjects recruited for the original study included women receiving prenatal and postnatal services at two local health clinics. The women who participated in the study were randomly assigned to receive a home visit intervention by a community-based health team or to the control group. Eligibility criteria for the original study cohort included:
• Documented low-income status at time of enrollment (e.g., medical record documented eligibility for Medicaid or sliding fee for services based on household income, which required an income level at or below 150% of the federal poverty threshold) (U.S. Department of Health and Human Services, 2012),
• Self-identification as African American or Mexican American ethnicity,
• Residence per medical record in low-income neighborhoods of the inner city,
• Self-report of no substance abuse and absence of contrary evidence from medical record at time of recruitment,
• Documentation as medically low-risk pregnancy in the medical record.

Of the 588 women recruited for the original study, retention rates were 80.4% at six months, as reported elsewhere (See Norr et al., 2003). The currently reported analysis used data collected for 279 women who completed the Center for Epidemiologic Studies Depression Scale (CES-D) at pregnancy and at six-months postpartum.

The sample for this study excluded (1) those women who self-identified as Latina ethnicity other than Mexican American, (2) women who did not reside with their babies after delivery due to custody issues, and (3) women who did not complete the six-month assessment of depressive symptoms. Analysis demonstrated that women included in the current study did not different significantly from those not included in the original sample based on age, education, ethnicity, parity, prenatal level of self-esteem, and prenatal level of depressive symptoms.
D. Data Collection, Intervention Procedures, and Human Subject Protection

1. Data collection

Data were collected as part of the previous randomized trial. The current study used a de-identified data set of self-reported information that had been collected in the original study during intake interviews with women during the third trimester of pregnancy and at approximately two-months and six-months postpartum. The two-month and six-month assessments of depressive symptoms were added after the first months of the original study because the level of depressive symptoms in late pregnancy was so high.

2. Intervention procedures

Recruitment methods included use of posted signs and educational presentations at the UIC or clinic recruitment settings as described above. Those women who expressed interest and met eligibility criteria were provided further information prior to obtaining informed consent. Subjects were randomly assigned to either the control group, receiving standard health services, or the intervention group, which received additional services provided by a home visit team. This intervention applied the theoretical model of Primary Health Care from the World Health Organization (1978, 2008). As described elsewhere, the REACH-Futures Program provided collaborative teams of professional nurses and local, unlicensed but trained community health workers to implement the home visit intervention (See Norr et al., 2003).

Participants completed self-report questionnaires and interviews in home and university settings with trained staff members. Bilingual/bicultural staff interviewers were available for participants as needed. All data collection instruments were translated into Spanish using the
consensus approach with expert consultation from an academic professional and the bilingual interview team.

3. **Human subjects’ protection**

For the original study, all research protocols and procedures, including recruitment and informed consent procedures, were reviewed and approved by the UIC Office for the Protection of Research Subjects (OPRS) (UIC Research Protocol # 1998-0004). Protocols included provision of a small monetary incentive to subjects for their continued participation in the evaluation. Participants did not receive any other payment for being in the intervention. The current study used existing data without identifiers and received Institutional Review Board approval by the UIC OPRS (See Appendix A: UIC Research Protocol 2010-1071).

**E. Instrumentation and Operationalization of Variables**

Multiple data collection instruments were included to gather information on key sets of variables in the original study. For the current analysis, research measures were limited to a subset of demographic, psychological, social-network characteristics, and social support characteristics. Included variables with corresponding operational measures are listed in Table 1, and the data collection instruments are listed in Appendix B.

1. **Demographic and background variables**

All demographic variables were measured at pregnancy. Maternal age was a summary score based on date of birth at the time of delivery. Parity, ethnicity, education, and intervention group were assessed as dichotomous variables. Eligibility criteria controlled for income. Self-reported information on school involvement (i.e., in school or not) and employment (i.e., working or not) were included in a created index of social integration as described below.
Intervention group assignment was based on original assignment of subjects to the intervention or control group was randomized. For the current study, a dichotomous control variable was created to reflect subjects’ status by group assignment.

2. **Psychological/dispositional factors**

The study model used a measure of **self-esteem** by the Rosenberg Self-Esteem Scale (RS-E). Participants’ self-esteem was measured during pregnancy.

The RS-E is a global measure of self-esteem, or sense of self, and was developed originally as a 10-item questionnaire with an ordinal four-point scale (Rosenberg, 1965/1989). In a study of the RS-E with 16,988 subjects, Schmitt and Allik (2005) reported a high mean reliability ($\alpha = .81$) across respondents in 53 countries and among the U.S. participants ($\alpha = .88$). With two samples of low-income mothers, the RS-E had reliability coefficients from .82 to .86 (Lutenbacher & Hall, 1998; Peden et al., 2000). Among sample groups of Latino heritage, Bámaca, Umaña, Shin, and Alfaro (2005) reported alpha coefficients ranging from .71 to .87 for the RS-E.
**TABLE I**
OPERATIONAL MEASURES AND DESCRIPTION OF VARIABLES

<table>
<thead>
<tr>
<th>Variable and time of assessment</th>
<th>Operational definitions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic/Pre-dispositional factors (measured at third trimester of pregnancy)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternal age</td>
<td>Age at date of delivery</td>
<td>Based on mother’s date of birth and infant’s birth date</td>
</tr>
<tr>
<td>Parity</td>
<td>Number of previous live births</td>
<td>Dichotomous: None = Nulliparous; 1 or more = Multipara</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>African American or Mexican American</td>
<td>Self-reported</td>
</tr>
<tr>
<td>Income</td>
<td>At or below federal poverty threshold by eligibility for Medicaid or sliding fee service</td>
<td>Medical record–documented eligibility for Medicaid/sliding fee service</td>
</tr>
<tr>
<td>Education</td>
<td>Number of years of school completed</td>
<td>Self-reported</td>
</tr>
<tr>
<td><strong>Psychological factors (measured at pregnancy only unless otherwise noted)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem</td>
<td>Score on Rosenberg Self– Esteem Scale</td>
<td>10 items assessing self-attitude</td>
</tr>
<tr>
<td>Depressive symptoms (measured at all three time points: pregnancy, and two-months and six-months postpartum)</td>
<td>Score on the Center for Epidemiological Studies Depression Scale (CES-D)</td>
<td>20 items recording frequency of self-reported symptoms in prior two weeks</td>
</tr>
<tr>
<td><strong>Social structure: Social integration Index (SII), Maximum score = 7, self-reported (All 7 items included were dichotomous. The SII was assessed at pregnancy only)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment status</td>
<td>If working</td>
<td>Full or part-time; No work at all</td>
</tr>
<tr>
<td>School status</td>
<td>If in school</td>
<td>Full or part-time; No classes at all</td>
</tr>
<tr>
<td>Transportation use</td>
<td>Uses regular transportation</td>
<td>Question 1, Community Life Skills Survey</td>
</tr>
<tr>
<td>Contact with neighbors</td>
<td>Knows neighbors’ last names</td>
<td>Question 11, Community Life Skills Survey</td>
</tr>
<tr>
<td>Social contacts</td>
<td>Invited a friend or was invited by a friend for visit or meal during last two weeks.</td>
<td>Question 16, 17, Community Life Skills Survey</td>
</tr>
<tr>
<td>Contact with family not in household</td>
<td>Contact in last two weeks with nonresident family member</td>
<td>Question 18 Community Life Skills Survey</td>
</tr>
<tr>
<td>Living with another adult</td>
<td>Adult in household</td>
<td>Self-reported: if one or more adults (18 or older) were listed as a members of the household</td>
</tr>
</tbody>
</table>
### TABLE I
OPERATIONAL MEASURES AND DESCRIPTION OF VARIABLES (continued)

<table>
<thead>
<tr>
<th>Variable and time of assessment</th>
<th>Operational definitions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social structure: support network characteristics (measured at pregnancy, and at two-months and six-months postpartum)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network size</td>
<td>Number of persons named as helpful</td>
<td>Network Survey: Number of all persons listed on Network Survey</td>
</tr>
<tr>
<td>Composition*</td>
<td></td>
<td>Network Survey:</td>
</tr>
<tr>
<td>Gender</td>
<td>Percentage females per total</td>
<td>All female, no female, or both genders were listed.</td>
</tr>
<tr>
<td>Kinship</td>
<td>Percentage kin per total</td>
<td>All kin, all non-kin, or both were listed as supportive.</td>
</tr>
<tr>
<td><strong>Stability:</strong></td>
<td></td>
<td>Network Survey</td>
</tr>
<tr>
<td>Father of baby (FOB)</td>
<td>Father of baby is person in support network at all three assessment points.</td>
<td></td>
</tr>
<tr>
<td>Mother figure</td>
<td>At least one mother figure listed in support network is present at all three assessment points.</td>
<td></td>
</tr>
<tr>
<td><strong>Quality of relationships</strong></td>
<td></td>
<td>Network Survey</td>
</tr>
<tr>
<td>Perceived difficulty</td>
<td>Respondent perceived limited time or distant residence of any support provider</td>
<td></td>
</tr>
<tr>
<td>Non-reciprocity</td>
<td>There was presence of non-mutual aid between respondent and any support provider.</td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td>Male &amp; female: there was presence of both males and females; both kin &amp; non-kin: there was presence of kin and non-kin</td>
<td></td>
</tr>
</tbody>
</table>
Strong convergent-discriminant validity was established for the RS-E scale (Silber & Tippett, 1965). Construct validity of the RS-E was supported by evidence correlating a low score with high levels of depressive symptoms and stress (Miller, Warner, Wickramaratne, & Weissman, 1999). In a sample of 98 African American single mothers, the RS-E measure of self-esteem had a strong negative relationship with both depressive symptoms and negative thinking ($r = -.67, p < .01$, and $r = -.79, p < .01$ respectively), which supported the construct validity of the scale (Hatcher & Hall, 2009).

The current study assessed self-esteem using the items from the RS-E (See Appendix B). Scale level of measurement for RS-E as a continuous variable was used for all analyses. For the sample of the current study ($n = 279$), Cronbach’s coefficient equaled .80 for the adapted RS-E.
**Depressive symptoms** were assessed using the Center for Epidemiologic Studies Depression Scale (CES-D) (See Appendix B). The CES-D is a 20-item, self-report scale that includes questions assessing the frequency of symptoms, such as hopelessness, loss of appetite, and sleep changes. The total CES-D score categorizes three possible levels of depressive symptoms: not depressed/low, mild, or severe (CES-D scores: <16, 16 to 21, equal or more than 22, respectively) (Radloff, 1977; Sharp & Lipsky, 2002).

Previously reported alpha coefficients for the CES-D range from .85 to .90 (Radloff, 1991; Makambi et al., 2009). Lutenbacher and Hall (1998) reported a Cronbach’s alpha of .86 on the CES-D in a sample of low income, single mothers. Hill and Herman-Stahl (2002) reported the internal reliability of the CES-D for measurement of depressive symptoms in African American mothers ($\alpha = .90$) and Euro-American mothers ($\alpha = .88$).

In community samples, the CES-D has proven useful in distinguishing from those respondents needing emotional help from those who did not. Weissman, Sholomskas, Pottenger, Prusoff, and Locke (1977) demonstrated the concurrent validity of the CES-D, showing a high correlation with clinically diagnosed depression. The scale is frequently used for screening and for studying the relationship of depressive symptoms with other factors (Li, Liu, & Odouli, 2009; Sharp & Lipsky, 2002).

In the current study, the CES-D measured depressive symptoms as a continuous variable at each of three time points: pregnancy, two-months postpartum, and six-months postpartum. The score for the CES-D was a continuous variable for all regression analyses. For descriptive
purposes, the CES-D scores were categorized based on previously established levels for three categories (no symptoms = CES-D <16; mild, CES-D = 16 to 21; severe, CES-D ≥ 22). The score on CES-D was dichotomized (i.e., no symptoms [<16] and mild or severe symptoms [16 or higher]) for some comparisons.

The score for the two-month CES-D was interpolated for cases with missing CES-D data since measurement of the CES-D at two months was added following the start of the original study (Crittenden, Kim, Watanabe, & Norr, 2002). For the current study, the Cronbach’s alpha reliability coefficient was .85 at intake and .88 at six months. The CES-D was the dependent variable in regression analysis at each of the study’s time points. In addition, the CES-D assessed mothers’ prenatal levels of depressive symptoms during pregnancy as a control when predicting two-month and six-month levels. The two-month CES-D score also was included as a control variable when predicting six-month levels of depressive symptoms (CES-D).

3. **Social integration**

Social integration was measured using the Social Integration Index (SII), which was created to reflect participants’ engagement in their communities. For creation of the SSI, two demographic factors and items from the Community Life Skills (CLS) survey were selected based on concepts from House and Kahn (1985) and Brissette, Cohen, and Seeman (2000).

The CLS is a 33-item questionnaire on the subject’s household and general social contacts (See Appendix B). Based on prior study, the questionnaire assesses a mother’s capacity to negotiate for her own interests and her family’s interests within her community (Peterson, Bair, & Sullivan, 2004). The correlation of lower CLS scores with less social support, more
difficult life circumstances, and higher levels of depression supported the validity of this measure (Barnard, 1991; Booth, Mitchell, Barnard, & Spieker, 1989). For the current sample, an internal reliability with a Cronbach’s alpha of .66 was determined for the composite of the CLS score during pregnancy.

In total, seven factors were included as a composite score for the SSI, with a possible range of 0 to 7 points. Each of the factors from the CLS was dichotomous. Response values were coded positively to indicate participation in the specific community sector. Thus, the index score was the total sum indicating the number of positive responses for each of the seven questions (See Table I). The SSI score was assessed at only one time point, the third trimester of pregnancy. The social integration factors are listed in Table I above.

4. **Characteristics of the social support network**

The various social support network characteristics were measured using the Network Survey (NS) from the Nursing Child Assessment Satellite Training (NCAST) program. This widely used survey assessed both structural and relational (i.e., interactional) properties of social networks for parents, including types of received support (Brandt, 1989; FRIENDS National Resource Center for Community-based Child Abuse Prevention, 2006). On the NS, respondents list social contacts that they can “count on” and then provide information about the nature of the relationships with listed persons (e.g., mother) and the specific activities that those persons do (e.g., child care) (See Appendix B).
Based on concepts from Gottlieb (1983), the Network Survey ([NS] Brandt, 1989) was designed to determine the specific qualities about respondents’ social support networks. Network characteristics abstracted from the NS for this study are defined in Table I.

The NS was inspected and coded for each characteristic of subjects’ social support networks. The principal investigator and trained research staff assessed the coding agreement for the NS with an initial agreement level of 85%. Discrepancies were reviewed and resolved, and subsequent agreement for NS coding was 95%. Cases with a network size of zero (0) were excluded from analysis of qualitative network characteristics since relationships that did not exist could not be described. Dichotomous variables were created to indicate difficulty, non-reciprocity and conflict in one or more relationships in the mother’s support network. Thus, for example, a positive value for “perceived difficulty” represented a subject’s self-report of difficulty in at least one of her social support network relationships.

Two additional variables were created to represent the stability for two different support network relationships over time: mother figure (mother, grandmother, aunt) and father of the baby. These stability variables were operationalized as the presence of that network member at each of the three time points of the study (i.e., pregnancy, two-months postpartum, and at six-months postpartum). A variable labeled “mother figure listed all three times” indicated that the person identified as a “mother figure” was listed as present for each of the three time points. The same procedure was used to create a stability indicator for the presence of the father of the baby across all three time points (See Appendix B)
5. **Received social support: The type of reported help or assistance**

Respondents described the nature of help received from support providers using the Network Survey. This survey applies Kahn and Antonucci’s (1980) concepts related to the content of supportive relationships, including affect, affirmation, and material aid (Brandt, 1989; Kahn & Antonucci, 1980). Examples of sample responses include kindness and understanding (i.e., affective support), information or opinions (i.e., advice/affirmation support), or tangible aid such as childcare (i.e., material support) (See Appendix B).

6. **Perceived social support: The overall sense that help is available**

Mothers’ perceived support was measured using the Personal Resource Questionnaire (PRQ85). Part II of the Personal Resource Questionnaire (PRQ85) is a Likert-style questionnaire that has 25 items with seven points possible for each item (See Appendix B). Based on R. Weiss’s (1974) model of social support, the PRQ85-Part II is a global measure of the “relational functions” of perceived social support (p. 278) (Brandt & Weinert, 1981; Weinert, 1985). The internal reliability of the PRQ with low-income mothers was established initially by Brandt (1984; $\alpha = 85$). More recently, in a study of the health behaviors of 106 low-income, minority, pregnant women, the internal reliability for the PRQ85-Part II was high ($\alpha = .90$) (Esperat, Feng, Zhang, & Owen, 2007).

Researchers have established construct, content, and predictive validity of the PRQ-Part II (Brandt & Weinert, 1981; Weinert & Tilden, 1990). Construct validity was also supported in a study by Yarcheski, Mahon, and Yarcheski (1992) through significant correlations of the PRQ85-Part II with perceived health status and symptom patterns ($r = -.27$, $r = -.25$ respectively;...
In the current sample of mothers, the Cronbach’s alpha for the 25-item PRQ-Part II was .86, .91, and .91 at pregnancy, two-months, and six-months postpartum, respectively.

The Personal Resource Questionnaire (PRQ) was measured as a continuous variable at each time point of the study. For descriptive purposes, and in the three regression analyses, to test for the presence of a moderating effect of social support in the presence of high-difficulty life circumstances on the mother’s level of depressive symptoms, the PRQ score was dichotomized using Weinert and Brandt’s (1987) categorization of a total PRQ score of less than 139 on the PRQ as a lower level of social support.

7. **Life difficulties**

Stressful circumstances reported by the study subjects were measured by Barnard’s (1991) Difficult Life Circumstances (DLC) interview form, which included 28 items that assess chronic and current life stressors (See Appendix B). The questions on the Difficult Life Circumstances form addressed life situations that are appropriate to urban, low-income mothers, including housing and environment, partner relationships, and violence. Johnson, Booth, Bee, and Barnard (1989) suggested a cut off score of 6 and above to indicate a higher level of difficult life circumstances (LeCuyer-Maus, 2003).

Concurrent and predictive validity for the DLC have also been reported, describing high correlations with higher levels of maternal depression (Barnard et al., 1988; Booth et al., 1989; FRIENDS National Resource Center of Community-based Child Abuse Prevention, 2006). Subsequent to the development of the DLC with prenatal and postpartum women, the DLC has been used extensively with new mothers (LeCuyer-Maus, 2003). For the current study, the DLC
was measured at each of the three time points as a continuous variable and the Cronbach’s alpha ranged from .60 to .64 over the three time points. Because of the risk and seriousness of difficult life circumstance for the low-income participants in the current study, a conservative cutoff score of less than 5 on the DLC was used to categorize this variable for descriptive purposes (American Psychological Association, 2012). In addition, the DLC cutoff score of less than 5 was used to test for the moderating effect of social support on women’s depressive symptoms under conditions of higher levels of life circumstances.

F. Data Analysis Procedures

The software used for this analysis was SPSS 14 (SPSS, 2008). The statistical methods for this study included the following:

1. descriptive statistics for all variables and tests of significance for change in social environment measures and depressive symptoms (CES-D) over time,
2. zero order (bivariate) correlation analysis of predictor and dependent (CES-D) variables,
3. multivariate regression analysis to test the moderating (interaction) effect of social support (PRQ) for stress (DLC) on depressive symptoms, at each time point, and
4. multiple regression analysis of the predictor variables with maternal depressive symptoms (CES-D) at each time point to account for the previous level(s) of depressive symptoms.

1. Descriptive analysis and tests of significance for change

This study used summary descriptive statistics to describe the participants’ demographic characteristics of ethnicity, education, parity, and maternal age, which the mothers reported at
pregnancy. Measures of self-esteem (RS-E [8]) and social integration (SSI) were described at pregnancy, since data collection was limited to that time point. Descriptive statistics were completed for all other continuous data. Categorical frequencies described nominal data.

Appropriate summary statistics were computed at each time point for network size, presence of mother figure and father of the baby, and network support qualities of conflict and non-reciprocity. Descriptive statistics were also completed at each time point for types of received support, the overall perceived support (PRQ), difficult life circumstances (DLC), and the outcome measure of depressive symptoms (CES-D). For the presence of the mother figure and of the father of the baby in the support network across all three of the time points, the two measures of network stability were described.

Analysis of repeated measures included comparisons of social-network characteristics, social support, difficult life circumstances, and depressive symptoms by the following time points: third trimester of pregnancy to two-months postpartum, two-months to six-months postpartum, and third trimester of pregnancy to six-months postpartum. For interval level variables, paired t-tests were completed to test comparisons of repeated measures. For dichotomous variables, the McNemar test was used to evaluate significance of change in repeated measures.

2. Correlation and regression analysis

To examine inter-relationships of variables, bivariate correlations were completed for measures at each time point. The results of the correlation analysis were evaluated to assess
inter-correlation among independent variables and significance of bivariate correlation with the dependent variable (CES-D).

An exploratory approach tested the direct effects of independent variables for maternal depressive symptoms at each of three time points: pregnancy, two-months postpartum, and six-months postpartum. Using multiple regression analysis, preliminary analysis tested direct effects for predictor variables in five categories: background/demographic, psychological (i.e., self-esteem), social integration, support network characteristics, and life situation (perceived social support and difficult life circumstances. Pre-existing levels of depressive symptoms (CES-D) at pregnancy were added to control for prediction of two-month depressive symptoms. For prediction of six-months depressive symptoms, pre-existing symptoms at pregnancy and two-months postpartum were added as control variables to the psychological category. In addition, in the predictive model for CES-D at six-months postpartum, two measures of network stability were added, the presence of a mother figure and the presence of the father of the baby, as listed in the social support network across all three time points.

To test for the buffering model (i.e., moderating effect of perceived social support on maternal depressive symptoms under conditions of difficult life circumstances), a multiplicative interaction term was created for PRQ and DLC (i.e., PRQ * DLC). Further regression analyses included the appropriate interaction term respective to each time point. For mothers with higher scores on the DLC, these tests of the moderating effect examined if those mothers with higher PRQ scores had lower CES-D levels than those with lower PRQ scores.
Following preliminary analysis for each time point, variables within each of the theoretical categories were excluded if they did not contribute to the explained variance of the mother’s depressive symptoms. Following these preliminary regression analyses, the final predictive models for the mother’s depressive symptoms at each time point were determined based on the *a priori* theoretical approach.
IV. RESULTS

A. Descriptive Analyses

1. Demographic characteristics of the sample group

Among the 279 low-income, urban women included in this analysis, the most common profile was an African American woman with a high school education, typically about 22 years of age, having her first pregnancy and postpartum experience. About 65% \( n = 180 \) of the women were African American, with the remaining group (35%) reporting Mexican American ethnicity. The oldest participant was a woman who was 43 years of age, and the youngest was 14 years. Only 14% \( n = 39 \) of the group consisted of teens less than 18 years of age. Just less than half (48%) of the women had not completed high school. A slight majority of the women (56%) were expecting their first child at the time of the first interview (i.e., nulliparous at Time 1, the third trimester of pregnancy) (see Table II).

2. Women’s psychological traits of self-esteem and depressive symptoms

Did the level of self-esteem and depressive symptoms differ significantly across the time points of pregnancy, two-months, and six-months postpartum?

A single measure of self-esteem was also obtained at the third trimester of pregnancy as a background indicator of personality trait. Using the modified Rosenberg scale, the mother’s self-esteem scores ranged from 16 to 32, with 25.8 as the mean score.
Regarding the women’s **depressive symptoms**, the 279 participants in this sample reported wide-ranging levels according to the CES-D questionnaire. As shown in Table III, their scores ranged from 0 (i.e. no symptoms) to 54 (severe level of symptoms) across the three interview points from pregnancy, 2 months postpartum, to six- months postpartum. At all three times, over two-thirds of the women reported CES-D scores below a critical threshold for severe depressive symptoms (i.e., CES-D = 21 or less). However, the percentage of women who did report severe levels of depressive symptoms remained substantial, ranging from 31.5% ($n = 133$) during pregnancy to 21.5% at both two-months and six-months postpartum (see Table III).
TABLE III
PERCEIVED DEPRESSIVE SYMPTOMS, SOCIAL SUPPORT, AND DIFFICULT LIFE CIRCUMSTANCES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage of lower levels</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depressive symptoms (CES-D)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy</td>
<td>68.5</td>
<td>1-48</td>
<td>17.3</td>
<td>10.5</td>
</tr>
<tr>
<td>2 months</td>
<td>78.5</td>
<td>0-54</td>
<td>15.1</td>
<td>10.1</td>
</tr>
<tr>
<td>6 months</td>
<td>78.5</td>
<td>0-50</td>
<td>14.1</td>
<td>10.1</td>
</tr>
<tr>
<td><strong>Social support (PRQ)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy</td>
<td>49.1</td>
<td>71-175</td>
<td>136.4</td>
<td>19.5</td>
</tr>
<tr>
<td>2 months</td>
<td>47.0</td>
<td>56-175</td>
<td>138.1</td>
<td>22.4</td>
</tr>
<tr>
<td>6 months</td>
<td>47.0</td>
<td>61-175</td>
<td>137.3</td>
<td>22.5</td>
</tr>
<tr>
<td><strong>Difficult life circumstances (DLC)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy</td>
<td>64.4</td>
<td>0-14</td>
<td>3.9</td>
<td>2.7</td>
</tr>
<tr>
<td>2 months</td>
<td>67.7</td>
<td>0-13</td>
<td>3.7</td>
<td>2.6</td>
</tr>
<tr>
<td>6 months</td>
<td>69.2</td>
<td>0-12</td>
<td>3.6</td>
<td>2.5</td>
</tr>
</tbody>
</table>

*CES-D < 22 score represents no or moderate depressive symptoms (> 22 = severe levels);
PRQ < 139 score is lower levels of social support;
DLC < 5 score is lower levels of difficult life circumstances.

The results of comparisons across time points are shown in Table IV, with the average level of depressive symptoms among this sample of mothers being higher during pregnancy than the levels reported at two-months or six-months postpartum. This decrease in the average level of the mothers’ depressive symptoms was significant from intake to two-months and from intake to six-months postpartum, based on comparisons of repeated paired measures of the mothers’ responses on the CES-D (p < .001, two-tailed). However, the slight decrease in the average level of the mother’s depressive symptoms from two-months to six-months postpartum was not significant (see Table IV).
Figure 2 illustrates the patterns of change in the 279 mothers’ depressive symptoms for groups categorized by symptom intensity (i.e., low, moderate, severe) across pregnancy, two-months postpartum, and six-months postpartum. The summary includes cases (n = 53) for which imputation procedures were used to estimate CES-D scores at two-months postpartum. Among the total sample of women, 52% (i.e., 146 of 270) reported no or low levels of depressive symptoms (i.e., CES-D < 16) during pregnancy. Among this subset with low-level symptoms at pregnancy, 8% (i.e., 12 of 146) had reported new onset of severe depressive symptoms at two-months postpartum (CES-D ≥ 22). By 6 months, 12% (i.e., 17 of 45) of those initially reporting low symptoms had experienced severe symptoms at postpartum time points.
Among the total sample of 279, 16% \( (n = 45) \) reported moderate levels of depressive symptoms at pregnancy \((\text{CES-D} = 16 \text{ to } 21)\). Among these 45 women, 38% \( (n = 17) \) had reported experiencing severe levels of depressive symptoms at either two-months or six-months postpartum.

Of the 31% \( (n = 88) \) of the total sample group who reported severe levels of depressive symptoms during pregnancy, over 63% \( (i.e., 55 \text{ of } 88) \) also experienced severe symptoms either at two-months or six-months postpartum. Nearly 50% \( (i.e., 42 \text{ of } 88) \) of mothers with severe depressive symptoms at pregnancy later reported persistent or recurrent severe symptoms at six-months postpartum. Notably, 25% \( (n = 22 \text{ of } 88) \) of the group with severe depressive symptoms at pregnancy reported persistent severe symptoms across all time points.

Of the women with either low or moderate symptoms at pregnancy, 18% \( (i.e., 35 \text{ of } 191) \) experienced severe levels of symptoms at two-months or at six-months postpartum. Of the total sample of 279 women, 32% \( (n = 90) \) reported severe depressive symptoms at two-months or six-months postpartum \((\text{See Figure 2})\). However, though proportions with severe levels of depressive symptoms were substantial across all time points, the proportion of women with severe levels of depressive symptoms was significantly higher during pregnancy than at two-months \( (p < .01) \) or at six-months postpartum \( (p < .001) \).
Figure 2. Patterns of change in women’s category of depressive symptom levels over time.

<table>
<thead>
<tr>
<th>Percentage*(Number) of Cases by Progression of CES-D Categories Over Time (n=279)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnancy</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>52.0 (146)</td>
</tr>
<tr>
<td>41.5 (116)</td>
</tr>
<tr>
<td>16.0 (45)</td>
</tr>
<tr>
<td>5.0 (13)</td>
</tr>
<tr>
<td>9.0 (25)</td>
</tr>
<tr>
<td>32.0 (88)</td>
</tr>
<tr>
<td>13.0 (35)</td>
</tr>
</tbody>
</table>

- ➠ ➠ = no or low depressive symptoms (CES-D ≤ 15)
- - - - = mild depressive symptoms (CES-D = 16 to 21)
- ------ = severe depressive symptoms (CES-D ≥ 22)

*Some percentages are approximate due to rounding.
3. **Difficult life circumstances (DLC)**

*Are there differences in the level of difficult life circumstances across pregnancy to two-months or to six-months postpartum?*

The level of women’s difficult life circumstances was measured at each of the three time points using the Difficult Life Circumstances (DLC) questionnaire; descriptive data are reported in Table III. The range of scores for the 2-item DLC questionnaire was widest at pregnancy, with scores from 0 to 14 equaling the range across all three interviews. Over a third of the women reported higher levels (i.e., 5 or greater) on the DLC at pregnancy, two-months, and six-months postpartum (35.6%, 32.3%, and 30.8 % respectively). There was a decreasing trend in the proportion of women who, from pregnancy to postpartum, reported higher levels of difficult life circumstances (see Table III). There were 15 women at pregnancy, 9 at two-months postpartum, and 5 at six-months postpartum with reported DLC scores of 10 or higher.

However, the mean scores on the DLC among this group of women at pregnancy, two-months postpartum, and six-months postpartum showed a slight decreasing trend (means = 3.9, 3.7, and 3.6, respectively). As noted in Table IV, data demonstrated that the small decreases in the average DLC for this group of women, based on repeated measures from pregnancy to two-months and from pregnancy to six-months, were significant ($p < .05$, two tailed). The slight decrease in the mean DLC from two-months to six-months postpartum (i.e., 3.65 to 3.60) was not clinically significant.
4. **Overall perceived social support** (The Personal Resource Questionnaire: PRQ).

_Are there differences in the level of women’s perceived sense of overall support across pregnancy to two-months or to six-months postpartum?_

The PRQ was used to measure an overall (i.e., global) level of women’s perceived social support at the three time points. Descriptive results for the PRQ are shown in Table III. This group of women reported a wide range in levels of social support, with an overall range of 56 to 175 across pregnancy through six-months postpartum. The distribution of PRQ scores was slightly skewed toward higher levels of social support at all time points. However, the proportion of women reporting low levels of support (i.e., PRQ<139) decreased little from pregnancy to two-months (49% to 47%, respectively) and were still at 47% by six-months postpartum. The average level of social support also varied slightly, with the highest level occurring at two-months postpartum with mean = 138.1, a low level of support. None of the comparisons for difference of PRQ means across time using paired t-tests were significant (see Table IV). These data indicate that this group of women reported a slight, but not significant, increase in support levels at two-months postpartum, with the proportion of women reporting low levels of support remaining high across all time points.

To assess the proportion of women who had higher levels of life difficulties, but also had lower levels of social support, the scores on the DLC and PRQ were categorized by lower and higher levels (<5, and 5 or more; less than 139 and 139 or more, respectively). While 23.7% of women reported high difficulty but low support levels during pregnancy, this group decreased to 17.9% by two-months and to 16.8% by six-months postpartum.
The distributions of PRQ scores for this sample of women were skewed toward higher social support, as shown in Table III. However, the mean PRQ hovered near lower levels at each of the three assessment points, as did the median (i.e., 139 at pregnancy, 140 at two-months, and at 6-months postpartum). In addition, almost one fourth of the group reported having high difficulty but low support during pregnancy, but the proportion of women in this group decreased over each of the postpartum assessment points.

5. Types of received social support (Network Survey).

Did the type of support for women from members of the support network change from pregnancy to two-months or six-months?

The summary in Table V describes the type of received support that women reported as provided by at least one member of their social networks by each of the three time points. Over all three time points of this study, a large majority of women reported receiving support of a tangible nature (i.e., material support). Ranging from a minimum of 92% at pregnancy to around 95% at both postpartum time points, this group of women perceived that network members provided them with some type of material assistance.

Of the specific types of support analyzed, a large percentage of women reported that network members provided childcare and financial help at each time point, while much smaller percentages of this group reported the receipt of housing assistance during pregnancy, at two-months, or at six-months postpartum (i.e., 17.9%, 11.8%, and 12.2%, respectively).
TABLE V
PROPORTION OF WOMEN RECEIVING TYPES OF SUPPORT FROM ANY MEMBER OF THE SOCIAL SUPPORT NETWORK AT PREGNANCY, TWO-MONTHS AND SIX-MONTHS POSTPARTUM (n = 279)

<table>
<thead>
<tr>
<th>Type of support</th>
<th>Third trimester</th>
<th>Two-months postpartum</th>
<th>Six-months postpartum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affection</td>
<td>59.1</td>
<td>39.4</td>
<td>41</td>
</tr>
<tr>
<td>Listens</td>
<td>58.8</td>
<td>39.1</td>
<td>41.2</td>
</tr>
<tr>
<td>Fathering(^a)</td>
<td>11.5</td>
<td>9.0</td>
<td>10.8</td>
</tr>
<tr>
<td>Material</td>
<td>91.4</td>
<td>94.3</td>
<td>95.3</td>
</tr>
<tr>
<td>Babysitting</td>
<td>55.2</td>
<td>78.9</td>
<td>82.4</td>
</tr>
<tr>
<td>Financial</td>
<td>73.1</td>
<td>75.3</td>
<td>78.9</td>
</tr>
<tr>
<td>Housing</td>
<td>17.9</td>
<td>11.8</td>
<td>12.2</td>
</tr>
<tr>
<td>Advice</td>
<td>45.5</td>
<td>34.4</td>
<td>33.3</td>
</tr>
<tr>
<td>Everything(^b)</td>
<td>45.9</td>
<td>30.8</td>
<td>34.1</td>
</tr>
</tbody>
</table>

\(^a\)Fathering: sample statements include “father’s the baby,” “protective father to baby,” “is a good father.”

\(^b\) Respondent described at least one support network member listed as doing “everything” in help and assistance

Regarding the number of network members providing any of a combined array of material support (i.e., total material support), the difference of means levels did not change significantly across time points of this study. As expected, of those persons that women listed as support network members, the mean number of network members who provided babysitting increased significantly from intake to two-months and six-months postpartum, but the change between two-months and six-months for babysitting assistance was not significant. The proportion of women reporting receipt of affection support was lowest at two-months postpartum (40%), a decrease from 59% from the group that listed at least one network member had provided affection during pregnancy. The average number of network members providing affection support continued to decrease across time points, with a significant decrease from
pregnancy to two-months ($p < .001$) and from pregnancy to six-months ($p < .001$) postpartum. The change from two months to six months was not significant (see Table VI).

This trend was similar for advice support, with only 34% of women reporting receipt of advice from support network members at two months, a decrease from 46% during pregnancy. There was a significant change in the average level of advice support from pregnancy to two-months postpartum and pregnancy to six-months postpartum ($p < .001$ and $p < .05$, respectively). Some women reported that at least one network member provided “everything” for them. At the time of pregnancy, almost half of the sample group reported a network member who did “everything.” In later postpartum, only about one third of the women described any support person as doing “everything” for them (see Table VI).

For this sample of women, specific types of received support were provided by a small average number of persons. The only type of support provided by greater than an average of one person per support network was affection during pregnancy (Mean = 1.23). Material support during pregnancy approached, but did not reach, an average of one person per network (Mean = 0.94). The lowest average number of persons providing a specific type of support was advice support at six-months postpartum (Mean = 0.37).
While most of the women in this group received tangible assistance, there was an increase in babysitting/childcare during the traditional postpartum period, when other tangible assistance decreased. Receipt of advice and affection from support network members was reported by less than half of this group at all time points, except affection during pregnancy. Further analysis showed that affection during pregnancy was the only type of support that women reported was provided on average by more than one member of their support network.
6. **Social integration**

At pregnancy, what was this group of women’s level of integration across different spheres of their social contacts as measured by the Social Integration Index (SSI)?

The Social Integration Index was measured once for this study, at the third trimester of pregnancy. As a measure of the women’s overall level of social integration, a summary score of the SII was calculated by combining seven indicators (e.g., yes = 1) to reflect a variety of social sectors. The SII scores during pregnancy for the study sample were normally distributed, with more than three quarters of the women reporting a moderate overall level of social integration. Descriptive results of mothers’ social integration are shown in Table VII. A majority (i.e., 86%) of the women reported living with at least one other adult. Over one third of the women remained employed, but less than 13% of the sample group was in school, either full or part time at pregnancy. Almost two thirds of the women kept in touch with distant family members and more than three quarters had contact with friends and with neighbors. Barring a few exceptions, women reported having access to transportation in this urban sample.
**TABLE VII**  
SOCIAL INTEGRATION CHARACTERISTICS AT THE  
THIRD TRIMESTER OF PREGNANCY  
(*n* = 279)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage</th>
<th>Range</th>
<th><em>M</em> (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Social Integration Variables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School or Training</td>
<td>Part or full time participation</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>Employment (<em>n</em> = 278)</td>
<td>Working part or full time</td>
<td>36.8</td>
<td></td>
</tr>
<tr>
<td>Adults in Household <em>a</em></td>
<td>One or more other adult present</td>
<td>86.0</td>
<td></td>
</tr>
<tr>
<td>Transportation</td>
<td>Had regular access</td>
<td>99.0</td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>In touch with distant members</td>
<td>62.6</td>
<td></td>
</tr>
<tr>
<td>Close Friends</td>
<td>Has</td>
<td>83.0</td>
<td></td>
</tr>
<tr>
<td>Neighbors</td>
<td>Familiar with near neighbor</td>
<td>86.0</td>
<td></td>
</tr>
<tr>
<td>Social Integration Total Score (SSI)</td>
<td></td>
<td>1 to 7</td>
<td>4.3 (1.2)</td>
</tr>
</tbody>
</table>

*Low (range = 1 to 2) | 7.1  
Moderate (range = 3 to 5) | 77.4  
High (range = 6 to 7) | 15.5  

*Median = 1.0*
7. **Network size (Network Survey).**

*Did the network size change from pregnancy across two-months to six-months postpartum?*

For this sample, the number of persons listed as supportive members of women’s support networks (i.e., network size) ranged from 0 to 11 support persons at pregnancy and two-months postpartum, and from 0 to 10 persons at six-months postpartum. The mean size of the support network (i.e., the average number of persons that mothers listed as supportive to them) increased very slightly from pregnancy to two-months postpartum, but the change was not significant. The decrease in mean network size from two-months to six-months postpartum was significant (3.1 vs. 2.8, respectively; \( p < .05 \)). The overall change in average network size from pregnancy to six-months postpartum was not significant (see Table VII).

The majority of women reported 1 to 4 supportive persons in their network groups across pregnancy, two-months, and six-months postpartum (66%, 72%, and 74% respectively). Forty percent of the women reported an increase in network size between pregnancy and two-months postpartum, and 40% reported a decrease in support network size from two-months to six-months postpartum. Between pregnancy and six-months postpartum, a similar percentage of women reported an increase (40%) versus decrease (39%) in the size of their support network.

On average, mothers in this group reported about 3 supportive persons in their social network. However, there was a wide range in the total number of different persons that women reported as supporters across the months from pregnancy to six-months postpartum. Of particular
concern was the finding that as many as 8 of the 279 women in this group had nobody that they perceived as supportive across all three time points (i.e., network size = 0). In contrast, about 12% of the women perceived their support network to be as large as 9 to 15 persons across all time points.

8. **Support network characteristics.**

*What were the characteristics of women’s social support networks at pregnancy, two-months postpartum and six-months postpartum?*

The composition of the women’s support networks was assessed by gender, kinship, and adult status. A combination of female and male network members were reported by most (78%) of the women over all time points. Only 2% of the group reported all male networks overall, and 20% listed all female networks.

Kin-only support networks were most common overall, with 71% of the group identifying only family members/relatives as support persons. Very few (3%) of the women listed all non-kin networks. Just over a quarter of the women reported a combination of kin and non-kin supporters during pregnancy and at two-months and at six-months postpartum. In their overall support networks across all time points, only 3% of women listed any children under 18 years of age as members of their support networks.

Table VIII indicates the composition for women’s social support networks. These data reflect the percentage of women whose support networks included a member with the composition characteristic of adult versus child, kin or non-kin, and male or female. The social network composition was determined for each time point of assessment and across all time points. Most participants (95.3%) included at least one adult female in their overall social
networks for at least one of the three assessment points. Support networks including an adult female member were reported by large percentages of the mothers at each time point, specifically 84.6% (pregnancy), 88.2% (2-months postpartum), and 83.9% (6-months postpartum). Adult kin were represented in over 80% of the women’s support networks at each time point. Adult non-kin, excluding father of the baby, were included in the support network by 24% of the women during pregnancy, with small but not significant decreases postpartum.

TABLE VIII
PERCENTAGE OF SUPPORT NETWORKS THAT INCLUDE MEMBERS BY COMPOSITION CHARACTERISTICS\( (n = 279)\)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Intake</th>
<th>Two months</th>
<th>Six months</th>
<th>Across all time points(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult kin</td>
<td>81.4</td>
<td>85.3</td>
<td>83.9</td>
<td>93.5</td>
</tr>
<tr>
<td>Mother figure(^b)</td>
<td>66.7</td>
<td>68.5</td>
<td>69.2</td>
<td>81.7</td>
</tr>
<tr>
<td>Child (&lt;18 years)</td>
<td>1.4</td>
<td>14</td>
<td>1.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Adult non-kin(^c)</td>
<td>24.4</td>
<td>23.3</td>
<td>22.9</td>
<td>41.9</td>
</tr>
<tr>
<td>Father of baby</td>
<td>37.6</td>
<td>47.7</td>
<td>41.6</td>
<td>61.6</td>
</tr>
<tr>
<td>Adult female(^d)</td>
<td>84.6</td>
<td>88.2</td>
<td>85.3</td>
<td>95.3</td>
</tr>
</tbody>
</table>

\(^a\) Includes a network member with the composition characteristic at any of three points: Pregnancy, 2 months postpartum, or six-months postpartum. Percentages do not total to 100 since all groups are not mutually exclusive.
\(^b\) Includes respondent’s mother, grandmother, or the father of the baby’s mother or grandmother
\(^c\) Not father of the baby
\(^d\) Kin or non-kin females at least 18 years of age.

Supporters who were mother figures were also represented in social networks for a large group of participants. For this sample, 82% of the participants listed a mother figure in the support network during pregnancy, at two-months postpartum, or six-months postpartum. There
was a significant change in the average number of mother figures reported in the social networks from pregnancy to two-months postpartum, a slight increase ($p < .05$) (see Table VI).

The father of the baby was included as a support network member at least once across the three time points by 62% of the women. Almost 23% of the fathers were reported to be less than 18 years of age. The McNemar test of repeated measures was significant ($p = .001$) for the change from 38% of women listing fathers of the baby's supporters during pregnancy to 48% including them by two-months postpartum. The decrease to 42% of women including fathers of the baby by six-months postpartum was not significant. There were no other statistically significant changes in the composition categories across time points.

As a measure of diversity versus nondiversity, the mothers’ networks were assessed for the quality of membership with combinations of gender and kin. Networks with members of both male and female gender were compared with networks of all female members. Networks with a combination of kin and non-kin members were compared with networks of all kin members. The percentage of mothers with all-female/all-kin networks is as follows: 26% during pregnancy, 26% at two-months postpartum, and 29% at six-months postpartum. The McNemar test was not significant for any paired comparisons.
### TABLE IX.
PERCENTAGE OF SUPPORT NETWORKS WITH QUALITATIVE RELATIONSHIP CHARACTERISTICS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intake 249</th>
<th>Two months 258</th>
<th>Six months 251</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level of Difficulty</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some difficulty</td>
<td>33.3 (83)</td>
<td>34.9 (90)</td>
<td>31.9 (80)</td>
</tr>
<tr>
<td><strong>Non-reciprocity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least one non-reciprocal</td>
<td>15.7 (39)</td>
<td>17.4 (45)</td>
<td>14.3 (36)</td>
</tr>
<tr>
<td><strong>Conflict</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some conflict</td>
<td>11.2 (28)</td>
<td>14.7 (38)</td>
<td>14.3 (36)</td>
</tr>
</tbody>
</table>

* One or more support network relationship described as difficult.
* Parentheses indicate the number of women with the quality indicated; total samples sizes differ because cases with support networks of size = 0 for each time point were not included.
* One or more support network relationship described with conflict.

Three qualities of relationships were measure by the Social Network Survey: **difficulty**, **reciprocity**, and **conflict**. Of those women responding about the quality of their relationships, about a third of the mothers at each time point indicated difficulty with the availability or access to at least one person in their support networks. The highest level of non-reciprocity (17.4%) and conflict (14.7%) was reported at two-months postpartum (see Table IX). Analysis (i.e., t-tests and McNemar’s) for differences in repeated measures of these qualities of network relationships were nonsignificant.

**Stability of the women’s social support networks** was analyzed. Among the 279 women, about 68% reported at least one individual network member who was present in the social support network across pregnancy, at two-months postpartum, and at six-months.
postpartum (see Table X). Either no support network member was available (8 mothers), or each
listed member was available at only one time point for 12% of the total sample. There were 59
women (29%) who reported that the father of the baby was a supportive network member during
all three time points. In contrast, 135 (48%) women listed a mother figure as present in the
support network at all three time points.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage (number)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Degree of support network stability</strong></td>
<td></td>
</tr>
<tr>
<td>No support member listed across all three time</td>
<td>2.9% (8)</td>
</tr>
<tr>
<td>points (i.e., total netsize = 0)</td>
<td></td>
</tr>
<tr>
<td>All support members listed at only one or two</td>
<td>30.5% (85)</td>
</tr>
<tr>
<td>of three time points</td>
<td></td>
</tr>
<tr>
<td>At least one or more support person(s) present</td>
<td>66.7% (186)</td>
</tr>
<tr>
<td>at all three time points</td>
<td></td>
</tr>
</tbody>
</table>

After descriptive analyses were completed, bivariate correlation analyses were conducted
for all predictor variables and for depressive symptoms (CES-D) at pregnancy, two-months
postpartum, and six-months postpartum. Subsequently, hierarchical linear multiple regression
analyses of data at each time point were conducted based on the theoretical model for the study
(Figure 1). These results are described below.
B. Bivariate Correlations

Bivariate correlation analyses were completed for predictor variables and depressive symptoms (CES-D) at pregnancy, two-months postpartum, and six-months postpartum. The purpose of these analyses was to identify which variables were most closely related to each other. Constructs of the theoretical model guided evaluation of findings from the correlation analysis (see Figure 1). These constructs included demographic factors and psychological traits, social integration and social network characteristics, types of social support (received and perceived), and difficult life circumstances. Within the model, the level of depressive symptoms was conceptualized as the dependent variable and as a control variable of pre-existing depressive symptoms.

Bivariate relationships were evaluated for later prediction of the dependent variable (CES-D) using hierarchical linear multiple regression analysis. In examining the bivariate correlations of the variables, classic definitions provided guidance to categorize the strength of correlation for this study, which were categorized as $r < .4 =$ small, $r$ of .4 to .6 = moderate, and $r > .6 =$ strong) (Center for Substance Abuse Prevention, 2003). Results are reported below.

1. **Bivariate correlations at pregnancy**

*Did a relationship (i.e., correlation) exist among the predictor variables, or between the predictor variables and mothers’ depressive symptoms (CES-D) at pregnancy?*

The results of bivariate correlations among variables at pregnancy are presented in Appendix C. During pregnancy, some strong positive correlations existed among predictor variables, including network size with material support and self-esteem with the PRQ. There also
were significant though modest correlations among the three types of received support (affection, advice, and material). Each of these types of support as reported by mothers in the Network Survey correlated significantly with the measure of overall, perceived support, that is, the PRQ. Affection support correlated moderately and positively with network size, as did material support with the number of mother figures. Difficult availability and conflict among mothers’ network relationships at pregnancy also correlated positively, as expected.

Regarding the relationship with mothers’ prenatal levels of depressive symptoms (CES-D), there were moderate and significant correlations with perceived support (PRQ), self-esteem (RS-8), and mothers’ difficult life circumstances (DLC) with negative relationships except for the DLC. Low, but significant, correlations with prenatal depressive symptoms were found for social integration, the number of mother figures, the presence of the father of the baby, and conflict in the network relationships. Except for the presence of conflict, these correlations were negatively related to mothers’ depressive symptoms at pregnancy.

2. **Bivariate correlations at two-months postpartum**

Did a relationship (i.e., correlation) exist among the predictor variables or between the predictor variables and mothers’ depressive symptoms (CES-D) at two-months postpartum?

Similar patterns emerged for correlations among demographic factors and self-esteem at pregnancy with mothers’ depressive symptoms at two-months postpartum (See Appendix D). Along with the other factors measured at pregnancy, depressive symptoms at pregnancy also were included in this correlation analysis. As expected, there were significant positive
relationships with mothers’ two-month CES-D scores for the DLC at two months and the CES-D at pregnancy, which were moderate in strength.

The prenatal level of self-esteem, along with the PRQ scores and reported number of mother figures at two-months postpartum were also correlated with the CES-D at two-months postpartum. Among the relationships of the background variables at pregnancy and the predictor variables measured at two months, a single high and significant correlation was material support with network size, as expected because of the definitions of these two variables.

3. **Bivariate correlations at six-months postpartum**

Did a relationship (i.e., correlation) exist among the predictor variables or between the predictor variables and mothers’ depressive symptoms (CES-D) at six-months postpartum?

Appendix E shows the results of Pearson’s correlations for background variables measured at pregnancy with other theoretical predictors measured at six months and mothers’ depressive symptoms (CES-D) at six months postpartum. The CES-D scores at pregnancy and two-months also were included in this analysis.

For six-month postpartum levels of depressive symptoms, there was an expected high positive correlation with depressive symptoms during pregnancy. The two-month and six-month levels of the CES-D were also positively correlated. The DLC and CES-D scores at six months were also positively correlated, but the relationship strength was small.
Other predictor variables that were significantly but negatively correlated with the CES-D at six-months postpartum included maternal education, self-esteem, social integration, material support, PRQ, and presence of the father of the baby. In addition, the measure of stability of the father of the baby listed in the support network across time points was negatively correlated with the six-month CES-D score. Self-esteem at pregnancy had a positive and robust relationship with the six-month PRQ. As expected per variable definition, the six-month levels of total material support and network size had high correlations, as did presence of the baby in the six-month network with stability of father figure across all time points.

The measures of depressive symptoms had a moderate, positive relationship as measured by the CES-D across time points. Perceived social support, as measured by the PRQ, had a consistent and negative relationship with the CES-D at all the assessment points. However, self-esteem was correlated with both the PRQ and the CES-D, providing evidence for caution in the interpretation of this relationship. Self-esteem was inversely related to depressive symptoms, while being positively correlated with perceived social support (PRQ).

Correlation analysis showed a consistent, positive relationship of mothers’ depressive symptoms (CES-D) and their reports about difficult life circumstances (DLC) for each of the three times assessed. The DLC was also negatively related to the PRQ across time points. Low to moderate strength of relationships was indicated by the results of the analysis.

Collinearity between independent variables can limit the determination of the unique contribution of each variable when included in an overall regression model. Thus, in light of the
theoretical basis for conceptual modeling of depressive symptoms, the correlations results were
applied for interpretation of coefficients in determining the final prediction models. Discussion
of the preliminary multiple regression analyses is found in the next section.

C. Preliminary Regression Analyses

After the descriptive and bivariate correlation analyses had been carried out, preliminary
analyses of data were conducted using multiple regression analyses for prediction of women’s
depressive symptoms (CES-D) at three time points: third trimester of pregnancy, two-months
postpartum, and six-months postpartum. Analyses were based on the proposed theoretical model
for the study (Figure 1). After review of results from the correlation and preliminary regression
analyses, specific indicator variables within the five prediction categories were eliminated from
the model based on theoretical significance, collinearity, conceptual redundancy with impact on
sample size, or research significance of contribution to the explained variance (see Table XI).
The final predictor variables by theoretically determined categories are as follows:

1. Demographic factors (ethnicity, parity, age, education)
2. Psychological traits (self-esteem and pre-existing depressive symptoms)
3. Social integration (SII),
4. Network characteristics (size, number of mother figures, presence of father of the baby)
5. Life situation (perceived overall support, PRQ; difficult life circumstance, DLC).

For the analysis at six-months postpartum, three predictor variables were added to the
final model as measures of social network stability over time, as discussed further below.
All data were examined for normality of distribution, homoscedasticity, and linear relationship with the dependent variable (CES-D). Frequency distributions and histograms of standardized residuals were examined. Scatterplots of residuals with predicted values and scatterplots of the dependent variable against independent predictor variables had been completed. Examination of data demonstrated that the assumptions of multiple regression analysis had been met.
TABLE XI

VARIABLES ELIMINATED FOLLOWING CORRELATION AND PRELIMINARY REGRESSION ANALYSES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Rationale for elimination for the prediction models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention group</td>
<td>• Nonsignificant correlations with dependent variable</td>
</tr>
<tr>
<td></td>
<td>• Actual “dose” of intervention insufficient for efficacy</td>
</tr>
<tr>
<td></td>
<td>• No significant contribution to explained variance of CES-D</td>
</tr>
<tr>
<td></td>
<td>• Not essential to theoretical model</td>
</tr>
<tr>
<td>All female-kin network</td>
<td>• Decreased total sample size</td>
</tr>
<tr>
<td></td>
<td>• Only correlation with CES-D was weak, at pregnancy</td>
</tr>
<tr>
<td></td>
<td>• Did not contribute significantly to explained variance of CES-D</td>
</tr>
<tr>
<td></td>
<td>• Some conceptual redundancy for gender/kin: “mother figure” variable</td>
</tr>
<tr>
<td>Negative relationship (non-reciprocity, difficulty in access, conflict)</td>
<td>• Intercorrelation with difficult life circumstances (DLC)</td>
</tr>
<tr>
<td></td>
<td>• Some theoretical redundancy with DLC</td>
</tr>
<tr>
<td></td>
<td>• Did not contribute significantly to explained variance of CES-D</td>
</tr>
<tr>
<td></td>
<td>• Decreased total sample size</td>
</tr>
<tr>
<td>Types of received support (Affection, Advice, Material)</td>
<td>• Intercorrelation of all three types of support indicators with the Personal Resource Questionnaire (PRQ)</td>
</tr>
<tr>
<td></td>
<td>• None of the three types of support had significant correlation with CES-D</td>
</tr>
<tr>
<td></td>
<td>• These indicators did not contribute to explained variance of CES-D</td>
</tr>
</tbody>
</table>

D. Tests of Moderating (Buffering) Effects.

Did perceived social support have a moderating effect on depressive symptoms under conditions of higher difficult life circumstances at pregnancy, two-months postpartum, or six-months postpartum?

Categorized levels of social support (PRQ < 139 or PRQ = 139 or more) and of difficult life circumstances (DLC < 5 or DLC 5 or more) were used to test for moderating effects. A multiplicative term was created for the PRQ and DLC (i.e., PRQ X DLC) at each time point and then was included in the preliminary regression analysis for prediction of depressive symptoms.
There was no significant moderating (interaction) effect at pregnancy, two-months postpartum, or six-months postpartum ($p < .05$). Therefore, the interaction term was excluded from further analysis.

**E. Final Regression Models for Prediction of Women’s Depressive Symptoms**

What are the demographic, psychological, and social environment characteristics that influenced depressive symptoms among this sample of women at pregnancy, two-months postpartum, and six-months postpartum?

Table XII shows the final prediction model for depressive symptoms at pregnancy ($n = 265$). Among the 10 included variables in the final model, the two strongest predictors at pregnancy were self-esteem and difficult life circumstances ($\beta = .35, p < .01$, & $\beta = -.33, p < .01$, respectively), with a significant positive relationship for DLC contrasting with a negative relationship for self-esteem with women’s reported depressive symptoms. Age, social integration, and the number of mother figures listed among the network support group had significant inverse relationships with approximately equal strength in predicting maternal depressive symptoms during pregnancy ($\beta = -.12$ to $.13; p < .05$). Notably, ethnicity was not found to have significant influence in this predictive model for depressive symptoms at pregnancy among these African American and Mexican American women. Also, neither parity, education, network size, inclusion of father of the baby (FOB) in the network, nor overall perceived support had any unique significant contribution to predicting the level of women’s CES-D scores at pregnancy. Yet, over all, the final prediction model explained 36% of the variance in maternal depressive symptoms at pregnancy.
Similar to the prediction model at pregnancy, the regression model at two-months postpartum explained 38% of the total variance in maternal depressive symptoms, with 4 significant predictors out of 11 variables in the final two-month model (See Table 13). Based on theoretical considerations and preliminary analysis, variables were included in the regression model to account for variation in two-month CES-D scores from measures obtained during pregnancy only. These prenatal measures were ethnicity, parity, age, education, self-esteem, the prenatal CES-D score, and social integration. Other predictors of social network characteristics and life situation were measured at two-months postpartum.

Regression analysis demonstrated that the prenatal CES-D was the strongest predictor of depression levels at two-months postpartum relative to the other 10 variables ($\beta = .32; p < .01$). As expected, higher levels of depressive symptoms were associated with increased symptom levels at two-months postpartum ($r = .5, p < .01$). Addition of the prenatal CES-D score in the final two-month model increased the explained variance for maternal depressive symptoms by 7% ($p < .01$). Social integration was the other prenatal measure with a significant, although relatively small, contribution to the explained variation in two-month CES-D scores ($\beta = .11, p < .05$).

Consistent with results of the prenatal regression model, levels of difficult life circumstances at two-months postpartum had a relatively strong positive relationship with two-month postpartum levels of depressive symptoms ($\beta = .27, p < .05$). In contrast to regression analysis at pregnancy, the level of overall perceived support (PRQ) reported by mothers at two-
months postpartum had a significant inverse relationship with the two-month CES-D scores ($\beta = -.21, p < .01$), with higher PRQ scores associated with lower levels of depressive symptoms.

Table XIV shows the results of multiple regression analysis, including the five blocked categories of predictors for mother’s depressive symptoms at six-months postpartum. Control variables added for this analysis were the pre-existing levels of depressive symptoms at pregnancy and at two-months postpartum. Also, to represent presence of a mother figure and the presence of the father of the baby in mothers’ social support networks, the six-month regression analysis included two measures of support network stability (i.e., mother figure included across all time points; father of the baby included across all time points).

Among the independent variables in the six-month regression model, three predictors accounted for 49% of the variance in mother’s CES-D scores at six-months postpartum. Two variables were the levels of depressive symptoms at pregnancy and the levels at two months, reflecting positive relationships with the dependent variable. Social integration had a significant inverse and relatively lower standardized regression coefficient ($\beta = .09$) than the pre-existing CES-D scores. The final six-month regression model explained 57% of the variance in mothers’ symptoms.

Consistent with the results at two-months postpartum, the prenatal CES-D score is the strongest predictor of mothers’ six-month depressive symptoms in the final predictive model ($\beta = .34, p < .001$). Other significant predictors were the PRQ and DLC ($\beta = -.32$ and .09,
respectively), showing a relatively strong, inverse contribution of overall perceived support for prediction of depressive symptoms at six-months postpartum.

A summary of the results of regression analysis with the final models for each time point are shown in Table XV. Of the demographic variables, only maternal age at pregnancy contributed significantly to the variance of mothers’ depressive symptoms at pregnancy. No other demographic control variable measured at pregnancy was a significant at any of the three time points. It is notable that among this sample of Mexican American and African American women, ethnicity was not a significant influence.
### TABLE XII
MULTIPLE REGRESSION PREDICTING MOTHERS’ DEPRESSIVE SYMPTOMS AT THE THIRD TRIMESTER OF PREGNANCY (N=265)\(^a\)

<table>
<thead>
<tr>
<th>Predictor variables:</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measured at third trimester of pregnancy</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
</tr>
<tr>
<td><strong>Background</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>-.014 (1.412)</td>
<td>.098 (1.303)</td>
<td>.103 (1.292)</td>
<td>.122* (1.306)</td>
<td>.057 (1.223)</td>
</tr>
<tr>
<td>Parity</td>
<td>.117 (1.431)</td>
<td>.091 (1.285)</td>
<td>.070 (1.288)</td>
<td>.072 (1.287)</td>
<td>.024 (1.200)</td>
</tr>
<tr>
<td>Maternal age</td>
<td>-.083 (.157)</td>
<td>-.114 (.141)</td>
<td>-.121* (.140)</td>
<td>-.144* (.143)</td>
<td>-.129* (.132)</td>
</tr>
<tr>
<td>Education</td>
<td>-.080 (1.364)</td>
<td>.055 (1.273)</td>
<td>.043 (1.266)</td>
<td>.052 (1.264)</td>
<td>.070 (1.172)</td>
</tr>
<tr>
<td><strong>Psychological</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self esteem</td>
<td>-.482 ** (.169)</td>
<td>-.458 ** (.170)</td>
<td>-.450 ** (.173)</td>
<td>-.353** (.186)</td>
<td></td>
</tr>
<tr>
<td><strong>Social Integration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social integration</td>
<td></td>
<td>-.135* (.517)</td>
<td>-.124* (.523)</td>
<td>-.124* (.495)</td>
<td></td>
</tr>
<tr>
<td><strong>Social support network characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network size</td>
<td></td>
<td></td>
<td>.074 (.321)</td>
<td>.116 (.304)</td>
<td></td>
</tr>
<tr>
<td>Number of mother figures</td>
<td></td>
<td></td>
<td></td>
<td>-.127 (.981)</td>
<td>-.134* (.905)</td>
</tr>
<tr>
<td>FOB(^b) listed</td>
<td></td>
<td></td>
<td></td>
<td>-.075 (1.267)</td>
<td>-.060 (1.173)</td>
</tr>
<tr>
<td><strong>Life situation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult life circumstances</td>
<td></td>
<td></td>
<td></td>
<td>.331** (.207)</td>
<td></td>
</tr>
<tr>
<td>Perceived social support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-.084 (.039)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td>21.459</td>
<td>55.022</td>
<td>59.162</td>
<td>60.021</td>
<td>54.109</td>
</tr>
<tr>
<td><strong>R(^2)</strong></td>
<td>.023</td>
<td>.217</td>
<td>.234</td>
<td>.249</td>
<td>.366</td>
</tr>
<tr>
<td><strong>R(^2) Change</strong></td>
<td>.023</td>
<td>.194**</td>
<td>.017*</td>
<td>.016</td>
<td>.116**</td>
</tr>
<tr>
<td><strong>F Change</strong></td>
<td>1.536</td>
<td>64.081**</td>
<td>5.676*</td>
<td>1.787</td>
<td>23.221**</td>
</tr>
<tr>
<td>(df)</td>
<td>(4, 260)</td>
<td>(1, 259)</td>
<td>(1, 259)</td>
<td>(3, 255)</td>
<td>(2, 253)</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>1.536</td>
<td>14.343**</td>
<td>13.114**</td>
<td>9.418**</td>
<td>13.271**</td>
</tr>
<tr>
<td>(df) [Regression/Residual]</td>
<td>(4, 260)</td>
<td>(5, 259)</td>
<td>(6, 258)</td>
<td>(9, 255)</td>
<td>(11, 253)</td>
</tr>
</tbody>
</table>

\(^a\) Dependent variable is depressive symptoms at third trimester of pregnancy as measured by the total CES-D score.

\(^b\) Father of the baby.

* \(p<.05\)

** \(p<.01\)
### TABLE XIII
MULTIPLE REGRESSION PREDICTING MOTHERS’ DEPRESSIVE SYMPTOMS AT TWO MONTHS POSTPARTUM\(^A\),
CONTROLLING FOR DEPRESSIVE SYMPTOMS AT PREGNANCY

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
<td>Standardized regression coefficient (Standard error)</td>
</tr>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.083 (1.341)</td>
<td>.100 (1.204)</td>
<td>.093 (1.202)</td>
<td>.130 (1.300)</td>
<td>.080 (1.235)</td>
</tr>
<tr>
<td>Parity</td>
<td>.111 (1.370)</td>
<td>.052 (1.198)</td>
<td>.064 (1.203)</td>
<td>.076 (1.212)</td>
<td>.046 (1.148)</td>
</tr>
<tr>
<td>Maternal age at delivery</td>
<td>-.007 (.150)</td>
<td>.027 (.131)</td>
<td>.034 (.131)</td>
<td>.024 (.137)</td>
<td>.018 (.129)</td>
</tr>
<tr>
<td>Education</td>
<td>-.132* (1.299)</td>
<td>-.078 (1.175)</td>
<td>-.071 (1.173)</td>
<td>-.067 (1.175)</td>
<td>-.031 (1.111)</td>
</tr>
<tr>
<td>Psychological</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem at pregnancy</td>
<td>-.066 (.174)</td>
<td>-.075 (.174)</td>
<td>-.068 (.177)</td>
<td>.014 (.180)</td>
<td></td>
</tr>
<tr>
<td>CES-D at pregnancy</td>
<td>.467 (.057)**</td>
<td>.482 (.058)**</td>
<td>.472 (.060)**</td>
<td>.319** (.061)</td>
<td></td>
</tr>
<tr>
<td>Social integration</td>
<td>Social integration, at pregnancy</td>
<td>.096 (.481)</td>
<td>.105 (.484)</td>
<td>.113* (.461)</td>
<td></td>
</tr>
<tr>
<td>Social support network characteristics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network size at 2 mo.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of mother figures at 2 mo.</td>
<td>-.010 (.331)</td>
<td>.037 (.321)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOB listed at 2 mo.</td>
<td>-.036 (.869)</td>
<td>-.042 (.818)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life situation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult life circumstances at 2 mo.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived social support at 2 mo.</td>
<td>.272* (.214)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>14.526</td>
<td>9.532</td>
<td>5.941</td>
<td>6.518</td>
<td>12.289</td>
</tr>
<tr>
<td>(R^2)</td>
<td>.031</td>
<td>.274</td>
<td>.282</td>
<td>.291</td>
<td>.379</td>
</tr>
<tr>
<td>(R^2) Change</td>
<td>.031</td>
<td>.243**</td>
<td>.008</td>
<td>.009</td>
<td>.087**</td>
</tr>
<tr>
<td>(F) Change</td>
<td>2.065</td>
<td>42.912**</td>
<td>2.944</td>
<td>1.124</td>
<td>17.668**</td>
</tr>
<tr>
<td>(df)</td>
<td>(4, 259)</td>
<td>(2, 257)</td>
<td>(1, 256)</td>
<td>(3, 253)</td>
<td>(2, 251)</td>
</tr>
<tr>
<td>(F)</td>
<td>2.065</td>
<td>16.126**</td>
<td>14.348**</td>
<td>10.395**</td>
<td>12.749**</td>
</tr>
<tr>
<td>(df) regression, (df) residual</td>
<td>(4, 259)</td>
<td>(6, 257)</td>
<td>(7, 256)</td>
<td>(10, 253)</td>
<td>(12, 251)</td>
</tr>
</tbody>
</table>

\(^A\) Dependent variable is depressive symptoms at two (2) months postpartum as measured by the total CES-D score.

\* \(p<.01\)

\** \(p<.000\)
Self-esteem at pregnancy had a relatively strong and significant inverse relationship with depressive symptoms at pregnancy, but it had a positive, though not significant, relationship in the two-month or six-month models when accounting for depressive symptoms at pregnancy (i.e., for two-month CES-D) or at pregnancy and two months (i.e., for six-month CES-D). As expected, the pre-existing CES-D scores included as psychological control variables were significant contributors to the explained variance of CES-D as a dependent variable.

Mothers’ scores on their Social Integration Index had a relatively low, but significant, contribution across all time points, with a negative relationship with depressive symptoms at pregnancy and six-months postpartum. Similar to self-esteem, the standardized regression coefficient for social integration was positive in the two-month prediction model when accounting for the pre-existing CES-D scores at pregnancy. Among the support network variables, network size was significant only for the six-month CES-D, with a larger network size reported at six-months related to higher levels of CES-D scores when accounting for the prenatal level of mother’s social integration.

The mother figure variable contributed to the explained variance in CES-D only at pregnancy, with the two-month measure and the six-month stability measure being non-significant. For the presence of the father of the baby, only the stability variable, measuring the father of the baby’s presence in the support network across all time points, was a significant predictor in the final model for six-month levels of CES-D scores, showing an inverse relationship as expected. The DLC, as a measure of difficult life circumstances, was a significant predictor in each of the final regression models, with a trend toward a decreasing level of unique
contribution to the explained variance in mothers’ CES-D scores across time when accounting for other included variables.
TABLE XIV
MULTIPLE REGRESSION PREDICTING MOTHERS’ DEPRESSIVE SYMPTOMS AT SIX- MONTHS POSTPARTUM\(^a\), CONTROLLING FOR DEPRESSIVE SYMPTOMS AT PREGNANCY AND AT TWO- MONTHS POSTPARTUM.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized Regression Coefficient (Standard Error)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Background</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.049 (.1363)</td>
<td>.042 (.1052)</td>
<td>.048 (.1041)</td>
<td>.064 (.1074)</td>
<td>.012 (.1045)</td>
</tr>
<tr>
<td>Parity</td>
<td>.094 (.1392)</td>
<td>.005 (.1042)</td>
<td>-.013 (.1039)</td>
<td>-.005 (.1033)</td>
<td>-.019 (.985)</td>
</tr>
<tr>
<td>Maternal age</td>
<td>-.099 (.153)</td>
<td>-.067 (.114)</td>
<td>-.077 (.113)</td>
<td>-.079 (.113)</td>
<td>-.071 (.108)</td>
</tr>
<tr>
<td>Education</td>
<td>-.150* (.1320)</td>
<td>-.057 (.1024)</td>
<td>-.064 (.1014)</td>
<td>-.059 (.1009)</td>
<td>-.053 (.963)</td>
</tr>
<tr>
<td><strong>Psychological</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem at pregnancy</td>
<td>-.076 (.152)</td>
<td>-.063 (.150)</td>
<td>-.060 (.150)</td>
<td>.035 (.156)</td>
<td></td>
</tr>
<tr>
<td>CES-D at pregnancy</td>
<td>.415** (.055)</td>
<td>.388** (.056)</td>
<td>.378** (.055)</td>
<td>.343** (.053)</td>
<td></td>
</tr>
<tr>
<td>CES-D at 2 mo. postpartum</td>
<td>.317** (.054)</td>
<td>.332** (.054)</td>
<td>.319** (.054)</td>
<td>.251** (.053)</td>
<td></td>
</tr>
<tr>
<td><strong>Social Integration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social integration at pregnancy</td>
<td>-.125* (.417)</td>
<td>-.121* (.416)</td>
<td>-.090* (.399)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social Support Network Characteristics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network size: 6 mo.</td>
<td></td>
<td></td>
<td></td>
<td>.047* (.271)</td>
<td>.109* (.270)</td>
</tr>
<tr>
<td>At least one mother figure across all time points</td>
<td></td>
<td></td>
<td>.004 (1.009)</td>
<td>.017 (9.62)</td>
<td></td>
</tr>
<tr>
<td>FOB(^b) across all time points</td>
<td></td>
<td></td>
<td>-.131* (1.161)</td>
<td>-.097* (1.118)</td>
<td></td>
</tr>
<tr>
<td><strong>Life situation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult life circumstances</td>
<td></td>
<td></td>
<td></td>
<td>.094* (.198)</td>
<td></td>
</tr>
<tr>
<td>Perceived social support</td>
<td></td>
<td></td>
<td></td>
<td>-.259** (.026)</td>
<td></td>
</tr>
</tbody>
</table>
TABLE XIV (continued)

MULTIPLE REGRESSION PREDICTING MOTHERS’ DEPRESSIVE SYMPTOMS AT SIX- MONTHS POSTPARTUM\(^a\),
CONTROLLING FOR DEPRESSIVE SYMPTOMS AT PREGNANCY AND AT TWO- MONTHS POSTPARTUM (N=264)
(continued)

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>19.090</td>
<td>11.012</td>
<td>15.679</td>
<td>15.325</td>
<td>23.369</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>.042</td>
<td>.477</td>
<td>.491</td>
<td>.507</td>
<td>.557</td>
</tr>
<tr>
<td>( R^2 ) change</td>
<td>.042</td>
<td>.435**</td>
<td>.014*</td>
<td>.016*</td>
<td>.050**</td>
</tr>
<tr>
<td>F change</td>
<td>2.825</td>
<td>71.087**</td>
<td>7.033*</td>
<td>2.728*</td>
<td>14.073**</td>
</tr>
<tr>
<td>(df)</td>
<td>(4, 259)</td>
<td>(3, 256)</td>
<td>(1, 255)</td>
<td>(3, 252)</td>
<td>(2, 250)</td>
</tr>
<tr>
<td>F</td>
<td>2.825*</td>
<td>33.391**</td>
<td>30.785**</td>
<td>23.588**</td>
<td>24.195**</td>
</tr>
<tr>
<td>(df)</td>
<td>(4, 259)</td>
<td>(7, 256)</td>
<td>(8, 255)</td>
<td>(11, 252)</td>
<td>(13, 250)</td>
</tr>
</tbody>
</table>

\( a \) Dependent variable is depressive symptoms at 6-months postpartum measured by total CES-D score \((n = 264)\).

\(^b\) Father of the baby was included in support network at all three time points.

* \( p < .05 \)

** \( p < .01 \)
Mothers’ overall level of perceived social support (PRQ) did not contribute significantly in the final regression model at pregnancy. However, the PRQ was a significant and relatively strong predictor of mothers’ CES-D scores, with an inverse relationship as theoretically predicted.

Table XV also shows the total variance explained by the final prediction models for mothers’ depressive symptoms at each time point. The level of explained variance increased for the final prediction models at pregnancy, two-months postpartum, and six-months postpartum ($R^2 = 37$, 38, and 56, respectively). Thus, the final prediction model at six-months postpartum explained more than half of the variance in mothers’ depressive symptoms.
### TABLE XV

**FINAL MODELS OF MULTIPLE REGRESSION ANALYSIS FOR PREDICTION OF MOTHERS’ DEPRESSIVE SYMPTOMS**¹ **AT THREE TIME POINTS: PREGNANCY**² **A, 2 MONTHS**² **B, AND SIX-MONTHS POSTPARTUM**²

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Pregnancy ¹</th>
<th>Two-months postpartum ²</th>
<th>Six-months postpartum ²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Standardized regression coefficient (Standard error)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Background</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.057 (1.223)</td>
<td>.080 (1.235)</td>
<td>.012 (1.045)</td>
</tr>
<tr>
<td>Parity</td>
<td>.024 (1.200)</td>
<td>.046 (1.148)</td>
<td>-.019 (.985)</td>
</tr>
<tr>
<td>Maternal age at delivery</td>
<td>-.129 *(.132)</td>
<td>.018 (.129)</td>
<td>-.071 (.108)</td>
</tr>
<tr>
<td>Education</td>
<td>.070 (1.172)</td>
<td>-.031 (1.111)</td>
<td>-.053 (.963)</td>
</tr>
<tr>
<td><strong>Psychological</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-esteem at pregnancy</td>
<td>-.353** (.186)</td>
<td>.014 (.180)</td>
<td>.035 (.156)</td>
</tr>
<tr>
<td>CES-D at pregnancy</td>
<td>.319** (.061)</td>
<td>.343** (.053)</td>
<td></td>
</tr>
<tr>
<td>CES-D at 2 mo.</td>
<td>.251** (.053)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social integration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social integration at pregnancy</td>
<td>-.124* (.495)</td>
<td>.113 * (.461)</td>
<td>-.090* (.399)</td>
</tr>
<tr>
<td>Network size at respective time point³</td>
<td>.110 (.304)</td>
<td>.037 (.321)</td>
<td>.109* (.270)</td>
</tr>
<tr>
<td>Number of mother figures at respective time point</td>
<td>-.134* (.905)</td>
<td>-.042 (.818)</td>
<td></td>
</tr>
<tr>
<td>Mother figures across three time points (6 months)</td>
<td>.017 (.962)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FOB² listed at respective time point</td>
<td>-.060 (1.173)</td>
<td>-.057 (1.122)</td>
<td>-.097* (1.118)</td>
</tr>
<tr>
<td>FOB included across three time points (six months)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social support network characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficult life circumstances at respective time point</td>
<td>.331* (.207)</td>
<td>.272* (.214)</td>
<td>.094* (.198)</td>
</tr>
<tr>
<td>Perceived social support at respective time point</td>
<td>-.084 (.039)</td>
<td>-.206* (.031)</td>
<td>-.259** (.026)</td>
</tr>
<tr>
<td><strong>Life situation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>54.109</td>
<td>12.289</td>
<td>23.369</td>
</tr>
<tr>
<td>R²</td>
<td>.366</td>
<td>.379</td>
<td>.557</td>
</tr>
<tr>
<td>Standard error estimate</td>
<td>8.534</td>
<td>8.067</td>
<td>6.976</td>
</tr>
<tr>
<td>(df)</td>
<td>(2, 253)</td>
<td>(2, 251)</td>
<td>(2, 250)</td>
</tr>
<tr>
<td>F</td>
<td>13.271**</td>
<td>12.749**</td>
<td>24.195**</td>
</tr>
<tr>
<td>(df)</td>
<td>(11, 253)</td>
<td>(12, 251)</td>
<td>(13, 250)</td>
</tr>
</tbody>
</table>

¹Dependent variable is depressive symptoms as measured by the total CES-D score:

²CESD score at pregnancy

³CES-D score at 2 months

⁴CES-D score at 6 months

³Predictor variable was measured at the same time point as the dependent variable.

* p < .05

**p < .01
V. DISCUSSION

A. Discussion of Key Study Findings and Conclusions

1. Overall summary of research findings

The findings of this study demonstrated significantly higher levels of depressive symptoms during pregnancy than at two-months or six-months postpartum among this group of low-income, Mexican American and African American women. A third of the women reported severe levels of depressive symptoms at pregnancy, while 22% reported severe symptom levels at two-months and six-months postpartum. A substantial proportion (44%) of the women reported severe levels of depressive symptoms at one or more of the three time points, and 8% experienced persistently severe levels of depressive symptoms at all three time points. Among the women who experienced severe levels of depressive symptoms at pregnancy, about two thirds also reported severe levels at either two-months or six-months postpartum.

This study found that more than three quarters of the participants had moderate levels of social integration at pregnancy. But it is notable that 3% of the women had a total network size across all time points equal to zero, which indicated that the women had identified no supportive person among their social contacts at any assessment point during pregnancy or postpartum. The new mothers’ average network size decreased significantly from two-months to six-months postpartum. Of the total group, over two thirds identified at least one support person who remained stable in their support network across all time points. About half of the women included one mother figure as a stable support person across all time points, but only 29%
reported stability of the father of the baby in their support network at pregnancy through two-months and six-months postpartum.

About half of this group reported lower levels of overall perceived social support at each time point. Overall perceived support was highly correlated with each of the specific types of received support (i.e., affection, advice, and material assistance). From pregnancy through both of the postpartum periods, almost all of the women reported consistent receipt of material assistance, which included childcare, housing, and specific financial help. While childcare assistance increased from pregnancy to both periods postpartum, this group of mothers reported a significant decrease in affection support received from pregnancy to each postpartum period.

Across assessment points, about a third of the women reported at least one or more relationships in their support network as having some difficulty, and a similar proportion of women reported higher levels of difficult life circumstances. There was a modest but significant decrease in the average level of difficult life circumstances that the women reported from pregnancy to each of the postpartum assessments.

Based on the Maternal Social Environment and Depression model (see Figure 1), multiple regression analysis for the prediction of women’s depressive symptoms at pregnancy demonstrated that women’s self-esteem was inversely related as a strong and significant predictor. The women’s age, social integration, and number of mother figures in the support network had a modest but significant inverse influence on women’s prenatal level of depressive symptoms. Overall, perceived support at pregnancy was not a significant predictor at pregnancy.
The level of difficult life circumstances was a strong and significant positive influence on pregnant women’s depressive symptoms.

At two-months postpartum, with the inclusion of prenatal depressive symptoms in the predictive model, age and self-esteem did not significantly influence women’s postpartum depressive symptoms. As expected, the prenatal level of depressive symptoms was a strong positive predictor of the symptom level at two-months postpartum, as was the two-month level of difficult life circumstances. Social integration at pregnancy was a significant predictor with a positive but relatively moderate influence demonstrated for the two-month postpartum symptoms. The overall perceived support that women reported at two-months postpartum had significant protective effect on their depressive symptoms at this time point.

The regression model reflected similar patterns for prediction of women’s depressive symptoms at six-months postpartum as findings for the two-month postpartum model. Prior depressive symptoms at pregnancy and at two-months postpartum significantly predicted six-month postpartum symptom levels, with a positive direction of influence. Difficult life circumstances at six months remained a significant predictor of women’s depressive symptoms at that time point, but explained less unique variance than in the models at pregnancy or at two-months postpartum. Women’s perceived social support at six-months postpartum had a significant and strong inverse influence on their depressive symptoms. The stability of the father of the baby in the women’s support network across all time points demonstrated a modest but significant inverse effect on women’s depressive symptoms at six-months postpartum.
Thus, women’s overall sense of perceived support at two-months and six-months postpartum had a significant direct and protective effect on their level of depressive symptoms, but no tests for a buffering (i.e., moderating) effect from perceived social support, in the presence of higher levels of difficult life circumstances, were significant. The final models explained 37%, 38%, and 56% of the variance in women’s depressive symptoms at pregnancy and at two-months and six-months postpartum, respectively.

2. Differences in women’s depressive symptoms from pregnancy to two-months, pregnancy to six-months, or two-months to six-months postpartum

The current study demonstrated high rates for severe depressive symptoms, particularly during pregnancy, among this group of low-income, urban women of African American or Mexican American ethnicity. We would expect to find higher levels of depressive symptoms compared to prevalence of a diagnosed major depression. However, these findings contrast with national studies that reported severe depressive symptoms ranging from 5.8 to 12.4% during pregnancy and 6.5 to 9.6% postpartum. (Lanes, Kuk, & Tamim, 2011; Rubertsson, Waldenström, Wickberg, Radestad, & Hildingsson, 2005). The higher rates of depressive symptoms among the current sample of lower income women are consistent with evidence from meta-analyses identifying income status as a risk factor for perinatal depression (Agency for Healthcare Research and Quality [AHRQ], 2012; C. T. Beck, 2001; Centers for Disease Control and Prevention, 2008).

The current findings of higher levels of depressive symptoms during pregnancy compared to postpartum do not support the theory of a protective effect during pregnancy for women’s depressive symptoms, which was challenged previously by Oates (2003). Similar to the
current study findings, Banti and colleagues reported a higher period prevalence of depression during pregnancy (12.4%) than during postpartum (9.6%) during postpartum (Banti, et al., 2011). Milgrom and colleagues (2008) reported that 8.9% of antenatal women reported high-depressive symptoms compared to 7.5% postnatally (Edinburgh Postnatal Depression Scale > 12) (Milgrom et al., 2008). However, findings comparing antenatal and postpartum rates of depression have not been consistent. For example, Fischer and colleagues (2011) reported lower rates of antenatal depression than postnatal (15.6 versus 19.8%). Among women with a history of unipolar depression, 4.6% had episodes during pregnancy, and 30% during the postpartum period (Viguera et al., 2011). The inconsistencies in rates of depressive symptoms and major depression during pregnancy compared to postpartum support theoretical proposals that depressive symptoms represent a syndrome with multiple causative factors that differentially affect diverse groups of women at various time points of their lives (Blehar, 2006; Payne, Palmer, & Joffe, 2009).

3. **Differences in social environment characteristics, types of support, and difficult life circumstances**

Using a newly created measure of social integration (SII), this study demonstrated that over three quarters of the participants reported a moderate level of social integration at pregnancy. These findings contrast with some previous findings that women were at risk for social isolation during the perinatal period (Cutrona, 1984; Forman, Videbech, Hedegaard, Salvig, & Secher, 2000; Targosz et al., 2003). The current finding of moderate social integration may vary from previously reported results due to the assessment in this study at pregnancy only versus postpartum, and the use of an index with multiple indicators for social engagement across a variety of different community sectors. Among this group of women, the change of network
size was limited to a decrease from two-months to six-months postpartum, which contrasted with an earlier research report of a significant decrease in network size from pregnancy to postpartum (Bost, Cox, Burchinal, & Payne, 2002). The contrast in findings could be related to difference in time points of postpartum assessment or participant characteristics.

While indicators for the quality (i.e., difficulty, conflict, non-reciprocity) of support network relationships did not vary from pregnancy to postpartum, the proportion of women who received affection support decreased significantly from pregnancy to the postpartum periods of assessment. This finding contrasts with results of a previous study in which women reported less support from family members during pregnancy (Murata, Nadaoka, Morioka, Oiji, & Saito, 1998).

In the current study, the finding of decreased affection support from pregnancy to postpartum is notable. The influence of decreased received affection on overall perceived support during the postpartum period was not specifically analyzed as part of the current study. But in this study, the proportion of women who reported lower levels of perceived overall social support remained the same despite a significant decrease in their reports of affection support during the postpartum time periods. This apparent discrepancy between perceived support and affection support raises questions about how women interpret overall perceived support during the postpartum period. In the current study, the receipt of material support reported by the majority of women and/or the stability of one person in the support network over time as reported by two thirds of the women, may explain women’s unchanged perceived social support levels despite decreases in affection support. Further investigation is needed.
Most women in this study reported a stable mother figure in their support network during the perinatal period, while less than one third of women reported stability of support from the father of the baby. This is congruent with a previous longitudinal study of fathers’ engagement, which found that half of the fathers who were not engaged prenatally were also inaccessible in the lives of infants at three-months post-birth (Shannon, Cabrera, Tamis-LeMonda, & Lamb, 2009). While that study did not evaluate the relationship of fathers’ involvement over time to the mothers’ depressive symptoms, the researchers did highlight the importance of involvement of the father of the baby during the prenatal period for continued stability of later involvement. The limited proportion of women in the current study who reported stable support from the father of the baby demonstrated the need for community and health resources that can effectively facilitate consistent involvement of the father of the baby as a supportive partner when that relationship is a nonabusive and supportive one.

4. **What demographic factors, psychological traits, and characteristics of the social environment influenced women’s depressive symptoms at pregnancy or at two-months or six-months postpartum?**

This study developed and applied the maternal social environment and depression model, which theorized that pre-existing factors of demographics, psychological factors, and social environmental factors have direct effects on perinatal depressive symptoms (see Figure 1). The model examined the influence of pre-existing demographic factors of age, ethnicity, parity, and education, and psychological characteristic of self-esteem on women’s depressive symptoms during pregnancy. Further, the analysis controlled for these demographic factors and pre-existing psychological factors, including depressive symptoms at pregnancy or two-months postpartum, when examining the influence on women’s perinatal depressive symptoms from social
integration, support-network characteristics, perceived social support, and difficult life circumstances at pregnancy and at two-months and six-months postpartum.

Our analyses across time points confirmed the overall usefulness of the theoretical model to explain variation in women’s perinatal depressive symptoms. The final predictive models accounted for 37%, 38%, and 56% of the variation in women’s depressive symptoms at pregnancy, two-months postpartum, and six-months postpartum, respectively. Consistent predictors of women’s depressive symptoms during pregnancy and postpartum included social integration, perceived support, difficult life circumstances, and pre-existing depressive symptoms during pregnancy or two-months postpartum. The stability of the father of the baby as a supportive network member across all time points also had a significant protective effect on women’s depressive symptoms at six-months postpartum.

In general, demographic factors were not found to contribute uniquely to the variance in depressive symptoms for this sample of low-income women, as confirmed with previously reported risk factors (AHRQ, 2012; C. T. Beck 1996, 2001). Of note among this group of African American and Mexican American women was that ethnicity did not significantly explain variance in pregnant or postpartum women’s depressive symptoms at any time point, consistent with findings of C. T. Beck (2001) and O’Hara (2009). The lack of significance for ethnicity in the predictive model must be interpreted with caution since a comparison group of non-Hispanic whites was not included in this homogenous group of low-income, minority women (Wei, Greaver, Marson, Herendon, Rogers, & Robeson Healthcare Corporation, 2008). Also, urban, low-income women have been reported to be at higher risk of perinatal depression as
demonstrated by the high rates of severe levels of depressive symptoms during pregnancy among this group of participants (Clare & Yeh, 2012).

As a psychological trait, self-esteem was a relatively strong and significant predictor at pregnancy. However, the influence of self-esteem was not significant for women’s depressive symptoms at two-months or at six-months postpartum after accounting for pre-existing levels of depressive symptoms. As expected, levels of depressive symptoms at pregnancy and at two-months postpartum had significant and relatively strong positive influence on women’s later levels of depressive symptoms. This finding is consistent with the result of meta-analyses by C. T. Beck (1996, 2001).

Women’s prenatal level of social integration, as measured by the Social Integration Index, was significantly related to depressive symptoms. However the nature of the relationship remains unclear. The direction of the relationship of antenatal social integration changed from inverse at pregnancy to a positive influence at two-months postpartum. At six-months postpartum, the direction of the relationship of social integration with depressive symptoms shifted back to an inverse relationship, with higher levels of social integration again related to lower depressive symptoms scores. Although caution in interpreting these findings is warranted, it is possible that women with a higher level of social integration at pregnancy may perceive the initial postpartum period as more isolating during the initial postpartum transition, in contrast to their previous level of social interaction, resulting in higher depressive symptoms postpartum (Daly, 2003). By six-months postpartum, many women have resumed their previous roles and relationships and a higher level of social integration, so that women who had higher levels of
social integration at pregnancy now have fewer depressive symptom levels. Because social integration was only measured at intake, we cannot explore this possible explanation. Further research on the influence of social integration for perinatal depressive symptoms is warranted.

As predicted by the model, there was some influence from social-network characteristics. Social network size was significantly predictive at six-months postpartum, but the level of social integration prenatally may confound these findings. Also, the finding contrasts with previously reported findings that recently delivered women with only one or no family members or friends available for support had significantly higher levels of depressive symptoms (Surkan, Peterson, Hughes, & Gottlieb, 2006). Regarding network size and women’s depressive symptoms, the direction of influence may be reciprocal in that network members respond to women’s depressive symptoms as more involved supporters. The influence of social-network composition was specific to time points, with the presence of a mother figure significantly related at pregnancy only. The stability of the father of the baby as a supportive member of the social network over time was inversely and significantly related to depressive symptoms at six-months postpartum, in contrast to presence of the father figure as a supportive person at a single time point. The finding that a stable and supportive relationship with the father of the baby is protective for women’s postpartum depressive symptoms is consistent with reported findings on the risk for single versus married women (Ji et al., 2011; Logsdon, Birkimier, Simpson, & Looney, 2005; Matsumoto et al., 2011; Reid & Meadows-Oliver, 2007).

As with previous studies, perceived social support and difficult life circumstances were confirmed as independent and strong predictors of women’s perinatal depressive symptoms, with
the exception of perceived social support during pregnancy (AHRQ, 2012; C. T. Beck, 1996, 2001; Dunkel-Schetter, Sagrestano, Feldman, & Killingsworth, 1996; Orr, 2004; Rubertsson et al., 2005; Seguin, Potvin, St-Denis, Loiselle, 1995). However, other aspects of the model were not supported. In contrast to the predictions, the indicators of quality of support relationships, including diversity, non-reciprocity, difficulty, and conflict, did not significantly contribute to the explained variance in the levels of depressive symptoms for this sample of women. Similarly, the current findings on specific types of received support (advice, affection, and material assistance) did not significantly contribute to explaining the variation in depression. These findings may be at least partially explained by the intercorrelation of these measures with the measure used for perceived support in this study, the PRQ.

The presence of a mother figure in women’s social support networks was a significant predictor of depression in the regression models at pregnancy only, and the stability of the mother figure was not significantly related in the six-month regression model. This finding is consistent with results from a Canadian study of postpartum mothers in which support from a mother did not differentiate between depressed or nondepressed new mothers (Dennis & Letourneau, 2007). Gee & Rhodes (2007) also found that support from mothers did not predict depressive symptoms.

The presence of the father of the baby was not a significant predictor of women’s depressive symptoms at pregnancy or two-months postpartum. These results compare to results from Gee & Rhodes (2007) that satisfaction and availability of support from male partners was not related significantly to postpartum depressive symptoms. In the current study, the stability of
the father figure in the social-support network did significantly contribute to the explained variance in women’s depressive symptoms at six-months postpartum. This finding confirms the important influence of women’s ongoing relationships with their intimate partners and the fathers of their babies on their depressive symptoms, including during the perinatal period (Ji et al., 2011; Logsdon et al., 2005; Shannon et al., 2009).

Higher levels of difficult life circumstances significantly and consistently predicted higher depressive symptoms for this group of women. While overall perceived support was not a significant predictor of lower depressive symptoms at pregnancy, social support did contribute significantly to both of the final postpartum regression models. These findings are consistent with meta-analyses that identified lack of social support as a risk factor for postpartum depression (AHQR, 2012; C. T. Beck 1996, 2001). The addition of these two factors, difficult life circumstances and perceived social support, as a single block in the hierarchical linear multiple regression analysis contributed to the overall change in the proportion of variance in women’s depressive symptoms that was explained by the prediction model ($R^2$ Change = .116, .087, and .050, respectively; $p<.01$). These findings are consistent with previous evidence that chronic stress from difficult life situations during pregnancy and postpartum is related to depression in new mothers (Melville, Gavin, Guo, Fan, & Katon, 2010; Stowe, Hostetter, & Newport, 2005).

5. **Did perceived social support moderate depressive symptoms under conditions of high stress?**

A moderating effect of perceived support on women’s perinatal depressive symptoms under conditions of high stress was posited based on theoretical considerations. However, tests
of the buffering effect were not significant at any of the three time points. The buffering theory of social support with depression was not supported for women during pregnancy or postpartum, which is consistent with classic findings of Cutrona (1984) with postpartum women. Another study reported that prenatal social support for postpartum depressive symptoms demonstrated direct versus interaction effects (Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993). More recently, in contrast to the findings of this study, a study with young couples during pregnancy found that social support had a buffering effect during pregnancy, providing a protective effect on depressive symptoms from the influence of stressful life events (Divney et al., 2012). The need persists for further research to determine the specific conditions when social support has a buffering effect for perinatal depressive symptoms.

B. Study Limitations

There were several limitations to this study. All of the data were from women’s self-reports, including women’s perceptions of their social network and overall support provided by social-network members. However, selected measurement instruments had been well tested for validity and reliability. Some data for the two-month measures of depressive symptoms were missing and needed to be interpolated, but careful and consistent interpolation procedures were applied for a limited number of cases. This analysis would have been strengthened by including reported family history of depression and a history of being emotionally, physically, or sexually abused. Among this group of low-income women, potentially at increased risk for exposure to acute life stress, a measure of recent stressful life events and a measure of previous stressful life events would have strengthened this analysis, which included only chronic stress represented by the difficult life circumstances as assessed for this study.
C. Implications of the Study Findings

1. Implications for future research

The current investigation adds to evidence from a limited number of previous longitudinal studies into the influence of social-support-network characteristics on women’s perinatal depressive symptoms. The findings support application of the maternal social environment and depression model for further research with larger samples and more diverse population groups. Researchers also can consider future study designs to permit application of social network analysis methodology, such as the study by Rosenquist, Fowler, and Christakis (2011). Because of the increased level of risk from previous history of depressive episodes and from the history of abusive relationships in the recent or more distant past, future research should include measures for these risk factors (Shonkoff & Garner, 2012).

2. Clinical implications

The findings of this study confirm the need for nurses and other health professionals to implement screening for depressive symptoms among low-income women prior to, as well as during, the postpartum period. Although these screenings are increasingly mandated in many states, implementation has not been uniform. For low-income women with severe levels of depressive symptoms during pregnancy, continued screening for high levels of depressive symptoms through six-months postpartum is especially important. In particular, screening is indicated for women known to be at higher risk for depressive symptoms. Screening for depression of women with a prior history of depression, or with a reported history of being abused in a relationship, is particularly important. Screening in health care settings serving high-risk groups would be potentially cost-effective, such as public health service locations serving high proportions of low-income women (Nylen, Segre, & O’Hara, 2005).
The potential role of interventions focusing on increased social support for new mothers was supported by this study’s finding of the influence of perceived social support on women’s depressive symptoms, particularly during the postpartum period. Strategies by nurses and other clinicians, during opportunities for preconception planning and prenatal care services, can assist women and their families to plan for anticipated assistance from supportive members of women’s social networks following the birth of a baby. In particular, this study confirmed the importance of facilitating the support and involvement of the father of the baby during the prenatal and postnatal period as an intervention for depressive symptoms among new mothers (Surkan et al., 2006). If the father of the baby is abusive toward pregnant or postpartum women, nurses and other providers of health and social services should facilitate intervention and foster involvement of other supportive persons during this critical period.

Findings of the current study are consistent with other research reports on the role of chronic stress from difficult life circumstances on perinatal depression, with implications for public policy decisions (Ertel, Rich-Edwards, & Koenen, 2011; Orr, James, Burnes, & Thompson, 1989). Investment of social resources is needed for effective strategies to alleviate the impact of violence and poverty on women’s perinatal depressive symptoms, further affecting their lives and the well-being of their children (Lehrer, Crittenden, & Norr, 2002; Petrou Cooper, Murray, & Davidson, 2002; Tronick & Reck, 2009).
APPENDICES
Exemption Granted

December 13, 2010

Susan Misnerr, MS
Women, Child, & Family Health Science
1159 Kingslea Road
Columbus, OH
Phone: (312) 996-0621 / Fax: (312) 996-8945

RE: Research Protocol # 2010-1071
“The Influence of Social Support and Social Network Characteristics on Depressive Symptoms of Low-Income, Urban Mothers (Previously UIC Research Protocol Number 2005-0176)”

Dear Ms. Misnerr:

Your Claim of Exemption was reviewed on December 13, 2010 and it was determined that your research protocol meets the criteria for exemption as defined in the U. S. Department of Health and Human Services Regulations for the Protection of Human Subjects [(45 CFR 46.101(b)]. You may now begin your research.

Please note the following regarding your research:

Exemption Period: December 13, 2010 – December 12, 2013
Sponsor: None
Performance Site(s): UIC
Subjects: Existing de-identified data only (279 cases)

The specific exemption category under 45 CFR 46.101(b) is:
(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.

You are reminded that investigators whose research involving human subjects is determined to be exempt from the federal regulations for the protection of human subjects still have responsibilities for the ethical conduct of the research under state law and UIC policy. Please be aware of the following UIC policies and responsibilities for investigators:

1. Amendments You are responsible for reporting any amendments to your research protocol that may affect the determination of the exemption and may result in your research no longer being eligible for the exemption that has been granted.
1. **Amendments** You are responsible for reporting any amendments to your research protocol that may affect the determination of the exemption and may result in your research no longer being eligible for the exemption that has been granted.

2. **Record Keeping** You are responsible for maintaining a copy all research related records in a secure location in the event future verification is necessary, at a minimum these documents include: the research protocol, the claim of exemption application, all questionnaires, survey instruments, interview questions and/or data collection instruments associated with this research protocol, recruiting or advertising materials, any consent forms or information sheets given to subjects, or any other pertinent documents.

3. **Final Report** When you have completed work on your research protocol, you should submit a final report to the Office for Protection of Research Subjects (OPRS).

4. **Information for Human Subjects** UIC Policy requires investigators to provide information about the research protocol to subjects and to obtain their permission prior to their participating in the research. The information about the research protocol should be presented to subjects in writing or orally from a written script. When appropriate, the following information must be provided to all research subjects participating in exempt studies:
   a. The researchers affiliation; UIC, JBVMAC or other institutions,
   b. The purpose of the research,
   c. The extent of the subject’s involvement and an explanation of the procedures to be followed,
   d. Whether the information being collected will be used for any purposes other than the proposed research,
   e. A description of the procedures to protect the privacy of subjects and the confidentiality of the research information and data,
   f. Description of any reasonable foreseeable risks,
   g. Description of anticipated benefit,
   h. A statement that participation is voluntary and subjects can refuse to participate or can stop at any time,
   i. A statement that the researcher is available to answer any questions that the subject may have and which includes the name and phone number of the investigator(s).
   j. A statement that the UIC IRB/OPRS or JBVMAC Patient Advocate Office is available if there are questions about subject’s rights, which includes the appropriate phone numbers.
APPENDIX A (continued)

Please be sure to:

Use your research protocol number (listed above) on any documents or correspondence with the IRB concerning your research protocol.

We wish you the best as you conduct your research. If you have any questions or need further help, please contact me at (312) 355-2908 or the OPRS office at (312) 996-1711. Please send any correspondence about this protocol to OPRS at 203 AOB, M/C 672.

Sincerely,

Charles W. Hoehne, B.S.
Assistant Director, IRB # 2
Office for the Protection of Research Subjects

Enclosure(s): None

cc: Rosemary C. White-Traut, Women, Child, & Family Health Science, M/C 802
    Kathleen F. Norr, Child, & Family Health Science, M/C 802
APPENDIX B

List of Selected Data Collection Instruments from the
Resources, Education, and Care in the Home for Healthy Futures Program

The de-identified data for this dissertation research, a secondary data analysis, was collected during the original evaluation study of the Resources, Education, and Care in the Home for Healthy Futures Program (Norr, et al., 2003) and employed the following data collection instruments:

- Centers for Epidemiologic Studies-Depression Scale (Radloff, 1977)
- Community Life Skills Scale (Barnard, 1991)
- Difficult Life Circumstances Scale (Barnard, 1989)
- Network Survey (Brandt, 1989)
- Personal Resource Questionnaire (Brandt & Weinert, 1981)
- Rosenberg Self-esteem Scale (Rosenberg, 1965)

References:


## APPENDIX C

### TABLE XVI

PEARSON’S CORRELATIONS: PREDICTOR VARIABLES WITH DEPRESSIVE SYMPTOMS (CES-D) AT PREGNANCY

<table>
<thead>
<tr>
<th></th>
<th>Assignment group</th>
<th>Ethnicity</th>
<th>Parity</th>
<th>Maternal age</th>
<th>HS/GED or less than</th>
<th>Social integration</th>
<th>DLC: Intake</th>
<th>PRQ: Intake</th>
<th>Advice Intake</th>
<th>Material : Intake</th>
<th>Affection Intake</th>
<th>Network size: Intake</th>
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<td>.064</td>
<td>-061</td>
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<td>-004</td>
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<td>.122</td>
<td>.087</td>
<td>.159(*)</td>
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<td>.043</td>
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<td>-222(**)</td>
<td>-123</td>
<td>-041</td>
<td>-130</td>
<td>-145(*)</td>
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<td>Maternal age on the date of delivery</td>
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<td>.041</td>
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<td>-050</td>
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<td>-086</td>
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<td>-074</td>
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<td>-.222(**)</td>
<td>-.062</td>
<td>-.050</td>
<td>-.073</td>
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<td>Difficult life circumstances total: Intake</td>
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<td>-.088</td>
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<td>-.052</td>
<td>-.024</td>
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<tr>
<td>Personal Resource Questionnaire Total: Intake</td>
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<td>.265(**)</td>
<td>.240(**)</td>
<td>.272(**)</td>
<td>.344(**)</td>
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<tr>
<td>Advice sum: Intake</td>
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<td>.202(**)</td>
<td>.398(**)</td>
<td>.396(**)</td>
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<td>Material support: Intake</td>
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<td>.276(**)</td>
<td>.848(**)</td>
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<td>Affection sum: Intake</td>
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<td>Network size: Intake</td>
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<td>Number of mother figures (Total): Intake Recoded</td>
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<td>FOB listed or not: Intake Recoded</td>
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<tr>
<td>All-female-kin network: Intake</td>
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<td>Difficulty, 2 categories: Intake</td>
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<tr>
<td>Conflict 2 categories: Intake</td>
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<tr>
<td>Non-reciprocal relationships: Intake</td>
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<tr>
<td>Self-esteem total: Intake</td>
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### APPENDIX C (continued)

**TABLE XVI (continued)**

PEARSONS CORRELATIONS: PREDICTOR VARIABLES WITH DEPRESSIVE SYMPTOMS (CES-D) AT PREGNANCY

<table>
<thead>
<tr>
<th></th>
<th>Number of mother Intake</th>
<th>Father of baby listed Intake</th>
<th>All-female-kin network: Intake</th>
<th>Difficulty (2 categories): Intake</th>
<th>Conflict (2 categories): Intake</th>
<th>Non-reciprocal relationships: Intake</th>
<th>Self-esteem total: Intake</th>
<th>CES-D total score: Intake</th>
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<td>.029</td>
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<td>-.061</td>
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<td>-.129</td>
<td>.090</td>
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<td>-.100</td>
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<td>-.041</td>
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<td>-.023</td>
<td>-.074</td>
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<td>HS/GED or less than</td>
<td>.046</td>
<td>.055</td>
<td>-.006</td>
<td>-.019</td>
<td>-.102</td>
<td>-.064</td>
<td>.301(**</td>
<td>-.060</td>
</tr>
<tr>
<td>Social integration</td>
<td>.170(*)</td>
<td>.095</td>
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<td>.022</td>
<td>.041</td>
<td>.028</td>
<td>.206(**</td>
<td>-.194(**</td>
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<td>-.032</td>
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<td>.429(**</td>
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<td>-.030</td>
<td>-.011</td>
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<td>Advice sum: Intake</td>
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<td>.035</td>
<td>-.015</td>
<td>-.040</td>
<td>.156(*)</td>
<td>-.134</td>
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<td>Total material supp sum: Intake</td>
<td>.409(**)</td>
<td>.223(**)</td>
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<td>.192(**)</td>
<td>.145(*)</td>
<td>.161(*)</td>
<td>.206(**)</td>
<td>-.070</td>
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<td>Affection sum: Intake</td>
<td>.322(**)</td>
<td>.224(**)</td>
<td>.013</td>
<td>.060</td>
<td>.024</td>
<td>.123</td>
<td>.213(**</td>
<td>-.107</td>
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<td>Network size: Intake</td>
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<td>.299(**)</td>
<td>.050</td>
<td>.173(*)</td>
<td>.146(*)</td>
<td>.201(**)</td>
<td>.245(**</td>
<td>-.132</td>
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<tr>
<td>Number of mother figures (Total): Intake recoded</td>
<td>---</td>
<td>.184(**)</td>
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<td>.074</td>
<td>.140(*)</td>
<td>.172(*)</td>
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<td>.061</td>
<td>.050</td>
<td>.047</td>
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<td>.005</td>
<td>.044</td>
<td>.024</td>
<td>.013</td>
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<td>.192(**)</td>
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<td>-.094</td>
<td>.196(**)</td>
<td>---</td>
<td>---</td>
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<td>Non-reciprocal relationships: Intake recoded</td>
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*p< 0.01 level (2-tailed).

**p< 0.05 level (2-tailed).
### APPENDIX D

### TABLE XVII

PEARSON’S CORRELATIONS: BACKGROUND VARIABLES (WITH CES-D AT PREGNANCY), AND SUPPORT, NETWORK VARIABLES FOR PREDICTION OF CES-D AT TWO-MONTHS POSTPARTUM

<table>
<thead>
<tr>
<th>Assignment group</th>
<th>Ethnicity</th>
<th>Parity</th>
<th>Maternal age on the date of delivery</th>
<th>Education</th>
<th>Social integration</th>
<th>Difficult life circumstances total: 2 months</th>
<th>Personal resource questionnaire total: 2 months</th>
<th>Advice Sum: 2 months</th>
<th>Total material supp sum: 2 months</th>
<th>Affection sum: 2ms</th>
<th>Network size: 2ms</th>
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<tbody>
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<td>Assignment group</td>
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<td>-.001</td>
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<td>.127</td>
<td>.039</td>
<td>-.073</td>
<td>.004</td>
<td>-.002</td>
<td>.029</td>
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<tr>
<td>African American</td>
<td>---</td>
<td>-.167(*)</td>
<td>-.149(*)</td>
<td>.110</td>
<td>.108</td>
<td>.141(*)</td>
<td>.182(**)</td>
<td>.118</td>
<td>.261(**)</td>
<td>.080</td>
<td>.301(**)</td>
</tr>
<tr>
<td>Multipara</td>
<td>---</td>
<td>.400(**)</td>
<td>.021</td>
<td>-.193(**)</td>
<td>.029</td>
<td>-.182(**)</td>
<td>-.071</td>
<td>-.026</td>
<td>-.099</td>
<td>-.080</td>
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<tr>
<td>Maternal age on</td>
<td>---</td>
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<td>-.170(**)</td>
<td>-.109</td>
<td>-.078</td>
<td>-.046</td>
<td>.027</td>
<td>-.037</td>
<td>-.008</td>
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<tr>
<td>the date of</td>
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<td>-.118</td>
<td>.186(**)</td>
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<td>-.015</td>
<td>.093</td>
<td>.029</td>
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<td>Social integration</td>
<td>---</td>
<td>.008</td>
<td>.251(**)</td>
<td>.051</td>
<td>.144(*)</td>
<td>.069</td>
<td>.146(*)</td>
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<td>Difficult life</td>
<td>---</td>
<td>-.214(**)</td>
<td>.139(*)</td>
<td>.062</td>
<td>.029</td>
<td>.015</td>
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<td>circumstances</td>
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<td>.278(**)</td>
<td>.191(**)</td>
<td>.375(**)</td>
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<td></td>
<td>Advice sum: 2 months</td>
<td>---</td>
<td>.269(**)</td>
<td>.183(**)</td>
<td>.365(**)</td>
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<td></td>
<td>Total material supp sum: 2 months</td>
<td>---</td>
<td>.122</td>
<td>.890(**)</td>
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<td>Affection sum: 2 months</td>
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<td>.259(**)</td>
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<td>Network size: 2 months</td>
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*p < .05

**p < .01
**APPENDIX D** (continued)

**TABLE XVII** (continued)

PEARSON’S CORRELATIONS: BACKGROUND VARIABLES (WITH CES-D AT PREGNANCY), AND SUPPORT, NETWORK VARIABLES FOR PREDICTION OF CES-D AT TWO-MONTHS POSTPARTUM

<table>
<thead>
<tr>
<th>No. of mother figure (Total): 2ms recoded</th>
<th>Father of baby listed or not: 2ms recoded</th>
<th>Female-kin network: 2ms</th>
<th>Difficulty (2 categories): 2ms</th>
<th>Conflict (2 categories): 2ms</th>
<th>Non-reciprocal relationships: 2ms</th>
<th>Self-esteem Total: Intake</th>
<th>CES-D total score: Intake</th>
<th>CES-D total score: 2 ms</th>
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</thead>
<tbody>
<tr>
<td>Assignment group</td>
<td>-.029</td>
<td>.039</td>
<td>.011</td>
<td>-.074</td>
<td>-.006</td>
<td>.033</td>
<td>.000</td>
<td>.075</td>
</tr>
<tr>
<td>African American</td>
<td>.357(**)</td>
<td>.231(**)</td>
<td>.017</td>
<td>-.105</td>
<td>.073</td>
<td>.145(*)</td>
<td>.240(**)</td>
<td>.000</td>
</tr>
<tr>
<td>Multipara</td>
<td>-.160(*)</td>
<td>.082</td>
<td>-.102</td>
<td>.048</td>
<td>-.038</td>
<td>-.107</td>
<td>-.103</td>
<td>.108</td>
</tr>
<tr>
<td>Maternal age on the date of delivery</td>
<td>-.270(**)</td>
<td>.020</td>
<td>-.085</td>
<td>-.027</td>
<td>-.085</td>
<td>-.078</td>
<td>-.001</td>
<td>-.056</td>
</tr>
<tr>
<td>HS/GED</td>
<td>-.003</td>
<td>.046</td>
<td>.070</td>
<td>-.083</td>
<td>-.031</td>
<td>-.082</td>
<td>.274(**)</td>
<td>-.095</td>
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<tr>
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<td>.131(*)</td>
<td>.094</td>
<td>-.016</td>
<td>-.017</td>
<td>-.094</td>
<td>-.046</td>
<td>.163(*)</td>
<td>-.193(**)</td>
</tr>
<tr>
<td>Difficult life circumstances Total: 2ms</td>
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<td>.034</td>
<td>.202(**)</td>
<td>.090</td>
<td>.080</td>
<td>-.194(**)</td>
<td>.443(**)</td>
</tr>
<tr>
<td>Personal resource questionnaire Total: 2 Months</td>
<td>.265(**)</td>
<td>.192(**)</td>
<td>.065</td>
<td>-.105</td>
<td>.002</td>
<td>-.073</td>
<td>.556(**)</td>
<td>-.382(**)</td>
</tr>
<tr>
<td>Advice sum: 2ms</td>
<td>.058</td>
<td>.106</td>
<td>-.078</td>
<td>.083</td>
<td>.193(**)</td>
<td>.048</td>
<td>.018</td>
<td>.093</td>
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<tr>
<td>Total material supp sum: 2ms</td>
<td>.422(**)</td>
<td>.370(**)</td>
<td>-.028</td>
<td>.179(**)</td>
<td>.174(**)</td>
<td>.225(**)</td>
<td>.116</td>
<td>.017</td>
</tr>
<tr>
<td>Affection sum: 2ms</td>
<td>.043</td>
<td>.058</td>
<td>.019</td>
<td>.019</td>
<td>-.015</td>
<td>.151(*)</td>
<td>.148(*)</td>
<td>.096</td>
</tr>
<tr>
<td>Network size: 2ms</td>
<td>.475(**)</td>
<td>.391(**)</td>
<td>-.044</td>
<td>.176(**)</td>
<td>.212(**)</td>
<td>.210(**)</td>
<td>.188(**)</td>
<td>-.031</td>
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<td>No. of mother figures (Total): 2ms recoded</td>
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<td>.186(**)</td>
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<td>.068</td>
<td>.082</td>
<td>.098</td>
<td>.132(*)</td>
<td>-.201(**)</td>
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<tr>
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<td>.070</td>
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<td>.130(*)</td>
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<td>-.118</td>
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<tr>
<td>All-female-kin network: 2ms</td>
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<td>.070</td>
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<td>-.017</td>
<td>.019</td>
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<tr>
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<td>.557(**)</td>
<td>.111</td>
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<td>.099</td>
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<td>Conflict 2 categories: 2ms</td>
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<td>.039</td>
<td>.027</td>
<td>.079</td>
<td>.115</td>
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<tr>
<td>Non-reciprocal relationships: 2ms</td>
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<td>.089</td>
<td>.052</td>
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<tr>
<td>Self-esteem total: Intake</td>
<td>---</td>
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<td>-.249(**)</td>
<td>.491(**)</td>
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<td>CESD total score: Intake</td>
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<tr>
<td>CESD 2 months</td>
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*p < .05

** p < .01
### APPENDIX E

#### TABLE XVIII

PEARSON'S CORRELATIONS: BACKGROUND VARIABLES (INCLUDING CES-D DURING PREGNANCY AND TWO-MONTHS POSTPARTUM) WITH SUPPORT, NETWORK, STABILITY AND CES-D AT SIX-MONTHS POSTPARTUM

<table>
<thead>
<tr>
<th>Assignment group</th>
<th>Ethnicity</th>
<th>Parity</th>
<th>Maternal age on the date of delivery</th>
<th>Education</th>
<th>Social integration</th>
<th>Difficult life circumstances total: 6 Months</th>
<th>Personal Resource Questionnaire total: 6 months</th>
<th>Advice sum: 6ms</th>
<th>Total material supp sum: 6ms</th>
<th>Affection sum: 6ms</th>
<th>Network size: 6ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment group</td>
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<td>-.155(*)</td>
<td>-.025</td>
<td>-.020</td>
<td>.133</td>
<td>.028</td>
<td>.024</td>
<td>-.067</td>
<td>-.029</td>
<td>-.049</td>
</tr>
<tr>
<td>African American</td>
<td>---</td>
<td>-.155(*)</td>
<td>-.148(*)</td>
<td>.144(*)</td>
<td>.118</td>
<td>.113</td>
<td>.027</td>
<td>-.005</td>
<td>.150(*)</td>
<td>-.013</td>
<td>.191(**)</td>
</tr>
<tr>
<td>Multipara</td>
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<td>.378(**)</td>
<td>.002</td>
<td>-.174(*)</td>
<td>-.004</td>
<td>-.079</td>
<td>-.048</td>
<td>.020</td>
<td>.101</td>
<td>-.025</td>
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</tr>
<tr>
<td>Maternal age on the date of delivery</td>
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<td>.228(**)</td>
<td>-.173(*)</td>
<td>-.094</td>
<td>-.051</td>
<td>-.037</td>
<td>.001</td>
<td>.073</td>
<td>.062</td>
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<tr>
<td>HS/GED</td>
<td>---</td>
<td>.032</td>
<td>-</td>
<td>-.047</td>
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<td>-.001</td>
<td>.056</td>
<td>.100</td>
<td>.039</td>
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<tr>
<td>Social integration</td>
<td>---</td>
<td>-.050</td>
<td>-</td>
<td>.225(**)</td>
<td>.051</td>
<td>.091</td>
<td>.129</td>
<td>.144(*)</td>
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<td>-.016</td>
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<td>.030</td>
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<tr>
<td>Personal Resource Questionnaire total: 6 months</td>
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<td>.103</td>
<td>.227(**)</td>
<td>.183(**)</td>
<td>.317(**)</td>
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<td>Advice sum: 6ms</td>
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<td>.151(*)</td>
<td>.141(*)</td>
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<tr>
<td>Total material supp sum: 6ms</td>
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<td></td>
<td>.151(*)</td>
<td>.141(*)</td>
<td>.187(**)</td>
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<tr>
<td>Affection sum: 6ms</td>
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<td></td>
<td>.139(*)</td>
<td>.797(**)</td>
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<tr>
<td>Network size: 6ms</td>
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</table>

*p < .05

**p < .01
APPENDIX E (continued)

TABLE XVIII (continued)

PEARSON'S CORRELATIONS: BACKGROUND VARIABLES (INCLUDING CES-D DURING PREGNANCY AND TWO-MONTHS POSTPARTUM) WITH SUPPORT, NETWORK, STABILITY AND CES-D AT SIX-MONTHS POSTPARTUM

<table>
<thead>
<tr>
<th>Assignment group</th>
<th>No. of mother figure (total): 6ms recoded</th>
<th>Father of baby listed or not: 6ms recoded</th>
<th>All-female-kin network: 6ms</th>
<th>Difficulty (2 categories): 6ms</th>
<th>Conflict (2 categories): 6ms</th>
<th>Non-reciprocal relation-ships: 6ms</th>
<th>Whether mother had at least one person available at all three waves</th>
<th>Father of baby was listed at all three waves</th>
<th>At least one mother figure available at all three waves</th>
</tr>
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<tr>
<td>Assignment group</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>.148(*)</td>
<td>.217(**)</td>
<td>.040</td>
<td>.007</td>
<td>.084</td>
<td>.086</td>
<td>.188(**)</td>
<td>.189(**)</td>
<td>.171(*)</td>
</tr>
<tr>
<td>African American</td>
<td>.118</td>
<td>.079</td>
<td>.067</td>
<td>.008</td>
<td>-.075</td>
<td>.018</td>
<td>.012</td>
<td>-.006</td>
<td>-.020</td>
</tr>
<tr>
<td>Maternal age on the date of delivery</td>
<td>-.239(**)</td>
<td>-.079</td>
<td>-.065</td>
<td>.028</td>
<td>-.123</td>
<td>-.122</td>
<td>-.104</td>
<td>-.018</td>
<td>-.106</td>
</tr>
<tr>
<td>HS/GED</td>
<td>-.071</td>
<td>.146(*)</td>
<td>.071</td>
<td>.024</td>
<td>-.025</td>
<td>-.053</td>
<td>.092</td>
<td>.128</td>
<td>.108</td>
</tr>
<tr>
<td>Social integration</td>
<td>.109</td>
<td>.032</td>
<td>-.043</td>
<td>.029</td>
<td>-.069</td>
<td>.021</td>
<td>.022</td>
<td>.098</td>
<td>.063</td>
</tr>
<tr>
<td>Difficult life circumstances total: 6 months</td>
<td>-.003</td>
<td>.063</td>
<td>.017</td>
<td>.087</td>
<td>.025</td>
<td>.014</td>
<td>-.054</td>
<td>-.057</td>
<td>-.072</td>
</tr>
<tr>
<td>Personal Resource Questionnaire Total: 6 months</td>
<td>.236(**)</td>
<td>.370(**)</td>
<td>-.019</td>
<td>-.080</td>
<td>.067</td>
<td>-.053</td>
<td>.295(**)</td>
<td>.279(**)</td>
<td>.217(**)</td>
</tr>
<tr>
<td>Advice sum: 6ms</td>
<td>.120</td>
<td>.106</td>
<td>-.018</td>
<td>.206(**)</td>
<td>.014</td>
<td>.081</td>
<td>.059</td>
<td>.091</td>
<td>.100</td>
</tr>
<tr>
<td>Total material supp sum: 6ms</td>
<td>.296(**)</td>
<td>.282(**)</td>
<td>.093</td>
<td>.180(**)</td>
<td>.005</td>
<td>.185(**)</td>
<td>.192(**)</td>
<td>.173(*)</td>
<td>.263(**)</td>
</tr>
<tr>
<td>Affection sum: 6ms</td>
<td>-.124</td>
<td>.083</td>
<td>.015</td>
<td>.039</td>
<td>-.034</td>
<td>.063</td>
<td>.069</td>
<td>.051</td>
<td>.014</td>
</tr>
<tr>
<td>Network size: 6ms</td>
<td>.449(**)</td>
<td>.327(**)</td>
<td>.074</td>
<td>.211(**)</td>
<td>.107</td>
<td>.135(*)</td>
<td>.173(*)</td>
<td>.167(*)</td>
<td>.254(**)</td>
</tr>
<tr>
<td>No. of mother figures (Total): 6ms recoded</td>
<td>---</td>
<td>.198(**)</td>
<td>-.040</td>
<td>.107</td>
<td>.105</td>
<td>.010</td>
<td>.209(**)</td>
<td>.123</td>
<td>.522(**)</td>
</tr>
<tr>
<td>Father of baby listed or not: 6ms recoded</td>
<td>---</td>
<td>.081</td>
<td>.023</td>
<td>.101</td>
<td>.045</td>
<td>.336(**)</td>
<td>.582(**)</td>
<td>.206(**)</td>
<td>.206(**)</td>
</tr>
<tr>
<td>All-female-kin network: 6ms</td>
<td>---</td>
<td>-.059</td>
<td>.116</td>
<td>.019</td>
<td>.050</td>
<td>.099</td>
<td>.099</td>
<td>.021</td>
<td>.021</td>
</tr>
<tr>
<td>Difficulty, 2 categories: 6ms</td>
<td>---</td>
<td>.082</td>
<td>.152(*)</td>
<td>.036</td>
<td>.075</td>
<td>.056</td>
<td>.045</td>
<td>.037</td>
<td>.037</td>
</tr>
<tr>
<td>Conflict 2 categories: 6ms</td>
<td>---</td>
<td>-.045</td>
<td>.082</td>
<td>.045</td>
<td>.045</td>
<td>.045</td>
<td>.109</td>
<td>.078</td>
<td>-.045</td>
</tr>
<tr>
<td>Non-reciprocal relationships: 6ms</td>
<td>---</td>
<td>.045</td>
<td>.045</td>
<td>.045</td>
<td>.045</td>
<td>.045</td>
<td>.109</td>
<td>.078</td>
<td>.045</td>
</tr>
<tr>
<td>Father of baby was listed at all three waves</td>
<td>---</td>
<td>.160(*)</td>
<td>.160(*)</td>
<td>.160(*)</td>
<td>.160(*)</td>
<td>.160(*)</td>
<td>.160(*)</td>
<td>.160(*)</td>
<td>.160(*)</td>
</tr>
<tr>
<td>At least one mother figure available at all three waves</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

*p < .05

**p < .01
**APPENDIX E (continued)**

**TABLE XVIII (continued)**

PEARSON'S CORRELATIONS: BACKGROUND VARIABLES (INCLUDING CES-D DURING PREGNANCY AND TWO-MONTHS POSTPARTUM) WITH SUPPORT, NETWORK, STABILITY AND CES-D AT SIX-MONTHS POSTPARTUM

<table>
<thead>
<tr>
<th>Assignment group</th>
<th>At least one mother figure available at all three waves</th>
<th>Self- esteem total: Intake</th>
<th>CES-D total score: Intake</th>
<th>CES-D total score: 2 ms</th>
<th>CES-D total score: 6 ms</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>-.041</td>
<td>.025</td>
<td>-.025</td>
<td>.048</td>
<td>-.051</td>
</tr>
<tr>
<td>Multipara</td>
<td>-.020</td>
<td>-.092</td>
<td>.060</td>
<td>.090</td>
<td>.037</td>
</tr>
<tr>
<td>Maternal age on the date of delivery</td>
<td>-.106</td>
<td>-.020</td>
<td>-.073</td>
<td>.034</td>
<td>-.083</td>
</tr>
<tr>
<td>HS/GED</td>
<td>.108</td>
<td>.296(**)</td>
<td>-.109</td>
<td>-.107</td>
<td>-.159(**)</td>
</tr>
<tr>
<td>Social integration</td>
<td>.063</td>
<td>.142(*)</td>
<td>-.141(*)</td>
<td>.002</td>
<td>-.205(**)</td>
</tr>
<tr>
<td>Difficult life circumstances total: 6 months</td>
<td>-.072</td>
<td>-.087</td>
<td>.320(**)</td>
<td>.325(**)</td>
<td>.338(**)</td>
</tr>
<tr>
<td>Personal Resource Questionnaire Total: 6 months</td>
<td>.217(**)</td>
<td>.537(**)</td>
<td>-.373(**)</td>
<td>-.306(**)</td>
<td>-.480(**)</td>
</tr>
<tr>
<td>Advice sum: 6ms</td>
<td>.100</td>
<td>.021</td>
<td>.068</td>
<td>-.051</td>
<td>.044</td>
</tr>
<tr>
<td>Total material supp sum: 6ms</td>
<td>.263(**)</td>
<td>.067</td>
<td>.040</td>
<td>.079</td>
<td>.088</td>
</tr>
<tr>
<td>Affection sum: 6ms</td>
<td>.014</td>
<td>.232(**)</td>
<td>-.058</td>
<td>-.100</td>
<td>-.141(*)</td>
</tr>
<tr>
<td>Network size: 6ms</td>
<td>.254(**)</td>
<td>.150(*)</td>
<td>.028</td>
<td>.068</td>
<td>.069</td>
</tr>
<tr>
<td>No. of mother figures (Total): 6ms recoded</td>
<td>.522(**)</td>
<td>.088</td>
<td>-.092</td>
<td>-.034</td>
<td>-.043</td>
</tr>
<tr>
<td>Father of baby listed or not: 6ms recoded</td>
<td>.206(**)</td>
<td>.150(*)</td>
<td>-.109</td>
<td>-.159(*)</td>
<td>-.204(**)</td>
</tr>
<tr>
<td>All-female-kin network: 6ms</td>
<td>.021</td>
<td>-.068</td>
<td>.164(*)</td>
<td>.056</td>
<td>.126</td>
</tr>
<tr>
<td>Difficulty, 2 categories: 6ms</td>
<td>.056</td>
<td>-.133</td>
<td>.030</td>
<td>.000</td>
<td>.082</td>
</tr>
<tr>
<td>Conflict 2 categories: 6ms</td>
<td>.037</td>
<td>.124</td>
<td>-.008</td>
<td>.043</td>
<td>.026</td>
</tr>
<tr>
<td>Non-reciprocal relationships: 6ms</td>
<td>-.045</td>
<td>-.082</td>
<td>.126</td>
<td>.084</td>
<td>.076</td>
</tr>
<tr>
<td>Father of baby was listed at all three waves</td>
<td>.160(*)</td>
<td>.195(**)</td>
<td>-.187(**)</td>
<td>-.148(*)</td>
<td>-.273(**)</td>
</tr>
<tr>
<td>At least one mother figure available at all three waves</td>
<td>---</td>
<td>.134(*)</td>
<td>-.165(*)</td>
<td>-.174(*)</td>
<td>-.099</td>
</tr>
</tbody>
</table>

*p < .05  
**p < .01
**APPENDIX E** (continued)

**TABLE XVIII** (continued)

**PEARSON'S CORRELATIONS: BACKGROUND VARIABLES**  
(INCLUDING CES-D DURING PREGNANCY AND TWO-MONTHS POSTPARTUM)  
WITH SUPPORT, NETWORK, STABILITY AND CES-D AT SIX-MONTHS POSTPARTUM

<table>
<thead>
<tr>
<th></th>
<th>Self-esteem at intake</th>
<th>CES-D at intake</th>
<th>CES-D at 2 mo.</th>
<th>CES-D at 6 mo.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-esteem total: Intake</td>
<td>---</td>
<td>-.398(**)</td>
<td>-.242(**)</td>
<td>-.378(**)</td>
</tr>
<tr>
<td>CES-D total score: Intake</td>
<td>---</td>
<td>-.500(**)</td>
<td>.621(**)</td>
<td></td>
</tr>
<tr>
<td>CES-D total score: 2 ms</td>
<td>---</td>
<td>---</td>
<td>.540(**)</td>
<td></td>
</tr>
<tr>
<td>CES-D total score: 6 ms</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

*Note:* ** indicates statistical significance at the .01 level.
REFERENCES


Heron, J., O'Connor, T. G., Evans, J., Golding, J., Glover, V. & the ALSPAC Study Team. (2004). The course of anxiety and depression through pregnancy and postpartum in a community sample. Journal of Affective Disorders, 80, 65-73.


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2200 169th Street
Hammond, Indiana 46323-2094
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EDUCATION
1988 M.S. University of Illinois at Chicago, IL Public Health Nursing
1976 B.S. Lewis University, Lockport, IL Nursing
1971 Diploma Wesley Memorial, Chicago, IL Nursing

PROFESSIONAL EXPERIENCE
2010-Present Visiting Assistant Professor, School of Nursing, Purdue University Calumet
Hammond, IN
2004-2008 Public Health Nurse Specialist, Ohio Department of Health
Columbus, OH
1994-2004 Program Coordinator, Minority International Research Training Program
College of Nursing, University of Illinois at Chicago
Chicago, IL
1996-1998 Family Nursing Practitioner, Women’s Health Clinic
University of Illinois at Chicago
Chicago, IL
1988-1994 Research Specialist, College of Nursing, University of Illinois at Chicago
Chicago, IL
Chicago, IL
PROFESSIONAL EXPERIENCE (continued)

1981-1983  Clinical Instructor, Department of Nursing  
Waubonsee Community College  
Sugar Grove, IL

1978-1982  Staff Nurse, Good Samaritan Hospital  
Downer’s Grove, IL

1974-1977  Nursing Development Instructor, Palos Community Hospital  
Palos Heights, IL

1972-1974  Nursing Instructor, LPN Program  
St. Margaret’s Hospital/School of Nursing, Purdue University  
Hammond, IN

1971-1972  Staff Nurse, Maternity-Gynecology Unit, Loyola Medical Center  
Maywood, IL

LICENSES AND CERTIFICATIONS

Registered Nurse License:  
State of Indiana:  28055250A  
State of Illinois:  041-141452  
State of Ohio:    IR.941403

HONORS AND AWARDS

2003  Seth Rosen Award, College of Nursing, University of Illinois at Chicago  
Chicago, IL

2003  Sigma Theta Tau Scholarship, Alpha Lambda Chapter

1999-2000  Chancellor's Student Service Award, University of Illinois at Chicago

1977  Summa cum laude, Lewis University

MAJOR RESEARCH/PRACTICE INTERESTS

Focus of doctoral dissertation is the relationship of perinatal mood disorder and social network support among low-income, minority women. Additional research interests include access to health care and the ethics of international health research. Recent nursing practice has centered on women’s health care and public health service delivery for families.
PROFESSIONAL MEMBERSHIPS

Organizational Memberships

American Nurses Association
American Public Health Association
Marcé Society
Ohio Public Health Association
Sigma Theta Tau

PROFESSIONAL ACTIVITIES

2011 to present
Public Policy Committee
Ohio Public Health Association

2010 to present
Advisory Board Member,
Reynoldsburg Health (HS-2) Academy
Reynoldsburg City Schools in association with
Ohio Public Health Association.

2011
External grant reviewer, invited.
Competitive applications, Reproductive and Women’s Health Program
Ohio Department of Health

1988 to 2005
Illinois Nurses Association, District 21
Treasurer; convention delegate

1995 to 1996
President, Graduate Student Organization
School of Nursing, University of Illinois at Chicago.

GRANTS AND CONTRACTS EXPERIENCE (Selected)

Ohio Department of Health. Title X Reproductive and Women’s Health Program

Sigma Theta Tau, Alpha Lambda Chapter. Graduate research scholarship: PhD
dissertation: Social networks, social support, and depressive symptoms
GRANTS AND CONTRACTS EXPERIENCE (Selected, continued)


PUBLICATIONS

Refereed Papers


PUBLICATIONS (refereed, continued)


Misner, S.J. (1977). Nursing research: Key to a locked-in profession. Supervisor Nurse, 8(8), 37-42.

Non-refereed Papers


Dissertation


Book Chapters


**Book Chapters** (continued)


---

**Monographs (invited)**


---

**SCHOLARLY PRESENTATIONS**


SCHOLARLY PRESENTATIONS (continued)


Levin, P.F., Hewitt, J.B., & Misner, S.T. “Integrative review of female workplace homicide research.” Poster presentation at the Sigma Theta Tau International Nursing Research Conference. April, 1992, Columbus, OH.


INVITED ADDRESSES


Misner, S. & Fulwider, T. “Breastfeeding support for mothers with perinatal mood disorders.” Peer breastfeeding counselor training program, Ohio Department of Health, January, 2011, Columbus, OH.
INVITED ADDRESSES (continued)


Misner, S. “Results of survey of program directors: evaluation of client satisfaction.” Nursing Program Directors Meeting. 2007, Columbus, Ohio.

Misner, S. “Structure and planning for evaluation survey of client satisfaction approaches.” Nursing Program Directors Meeting. 2006, Columbus, Ohio.


COMMUNITY SERVICE

Board member, Perinatal Outreach & Encouragement for Moms (POEM). 2010 to present. Columbus, OH.