Social Support, Stress, and Maternal Postpartum Depression:

A Comparison of Supportive Relationships

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Abstract

The role of stress and social support in women's health during pregnancy and the postpartum period has gained considerable attention in the examination of postpartum depression (PPD). However, this literature has generally failed to account for the sources of social support that are most influential and the role of a woman's family structure. Moreover, the literature often assumes that social support directly impacts a woman's risk for PPD, when it may in fact act as a mediator, governing the effects of stressors. Using in-person interviews and medical record data from the Fragile Families and Child Well-being Study (N= 4,352), I draw on the stress process framework to test the mediating effects of social support on the link between stress exposure and postpartum depression. Findings suggest that the variety of support providers in a woman's social netwrok is important, especially in the context of family structure. This study also demonstrates the importance of considering social support and stress exposure as part of a larger causal pathway to postpartum depression. Implications of these findings for research and practice are discussed.

Keywords: maternal depression, social support, supportive relationships, stress-process,, postpartum mental health

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Maternal postpartum depression (PPD) is a serious and complex disorder that affects approximately one in seven new mothers in the United States (Lumley & Austin 2001; Wisner, Chambers, Sit 2006), although prevalence rates may be even greater among socially disadvantaged groups of women (Earls 2010). The consequences of maternal postpartum depression are considerable. At a time usually marked by excitement and celebration, the onset of postpartum depression can cause disruption in a woman's life (National Institutes of Health 2012) and compromise her ability to care for her newborn infant (Wisner, Chambers, Sit 2006). For women suffering from PPD, the transition to motherhood can be confusing and overwhelming (Misri et al. 2000; Beck 2006). Moreover, depression during the postpartum period is associated with an increased risk of future episodes of major depression and recurrent postpartum mood disorders in subsequent pregnancies (Philipps & O'Hare 1991; Chaudron 2003). Children of postnatally depressed mothers are also at risk. Research has clearly linked maternal depression to impaired development in infancy and behavioral problems during adolescence (Beck 2006; Chaudron 2003; Earls 2010). In addition, these children are three to five times more likely to develop depression as adults (Earls 2010).

Given the prevalence of maternal postpartum depression, and the repercussions it has for the health and well-being of women and children, this disorder represents a substantial public health concern (Wisner, Chambers, Sit 2006; Almond 2009). As such, interest in postpartum depression has increased among healthcare practitioners and health researchers alike. Understanding risk factors is central to identifying, treating, and preventing postpartum depression, however, we continue to lack a clear knowledge of the most salient risk factors related to PPD, as well as those factors that may serve to exacerbate or alleviate the risk of PPD. Increasingly, the empirical literature examining risk factors for maternal postpartum depression has begun to parallel the broader depression literature, with special consideration given to the role of stressors and social support (Swendsen & Mazure 2000; Beck 2001). Despite accumulating evidence that social support is an important resource for mental health during pregnancy and the postpartum period (Beck 2001; Robertson et al. 2004; Webster et al. 2011),

we know very little about which sources of social support are most influential for PPD in the presence of stressors and whether this varies as a function of a woman's family structure.

Using data from the Fragile Families and Child Well-being Study, this paper draws on the stress process framework (Pearlin et al. 1981; Pearlin 1989) to assess the extent to which maternal postpartum depressive symptoms are differentially influenced by the source of a woman's social support. Specifically, the role of support from a woman's friends and family is compared to that from an intimate partner in reducing the impact of stress exposure. In addition, mediating and protective pathways are tested and variations according to a woman's family structure are examined. The present study expands upon previous research on social support, stress, and postpartum depression by: (1) incorporating a stress process framework, (2) comparing the impact of social support from a woman's family and friends to that from an intimate partner, and (3) including women in non-traditional family structures. Findings from this research may contribute to our understanding of the risk factors for PPD and help establish prevention and intervention efforts aimed at reducing negative maternal-child health outcomes.

Review of the Literature

Social Support and Postpartum Depression

Definitions of social support emphasize the perception or provision of resources available to an individual from those within his or her social network (Dunkel Schetter & Brooks 2009; Gottlieb & Bergen 2009; Thoits 2011). A substantial body of evidence has accumulated documenting the beneficial effects of social ties and supportive relationships on mental health outcomes in general (Thoits 2011), and maternal postpartum depression in particular (Beck 2001; Robertson et al. 2004; Webster et al. 2011). Much in line with the literature on major depression (see Horenstein & Cohen 2008), women who report higher levels of social support have been found to report fewer symptoms of depression following childbirth compared to women with less supportive networks (Bost et al. 2002; Webster, Velacott, & Fawcett 2011). Moreover, low social support has been found to be one of the strongest predictors of PPD across several meta-analyses of risk factors (Beck 1996; Beck 2001; Robertson et al. 2004), highlighting the importance of supportive relationships for maternal well-being during the postpartum period.

Sources of Social Support

The variety of support providers in a woman's social network may be equally important in improving or sustaining mental health during the postpartum period. In the literature examining risk factors for postpartum depression, however, a woman's spouse or intimate partner is generally considered to be the primary source of support (Gallagher, Hobfoll, Ritter, & Lavin 1997; Hopkins & Campbell 2008; Gremigni et al. 2011). As such, perceptions of support from other members of a woman's social network, including family members and friends, are often overlooked in the PPD literature (e.g Gallagher, Hobfoll, Ritter, & Lavin 1997; Hopkins & Campbell 2008; Gremigni et al. 2011). Indeed, support from an intimate partner has been found to be a consistent and significant protective factor for postpartum depression (Beck 2001; Dennis & Ross 2006; Dennis & Letourneau 2007). Women who perceive stronger social support from their partners mid-pregnancy have lower emotional distress postpartum (Stapleton et al. 2012), and those who have experienced PPD report that it was helpful to have a supportive partner to help them cope with depressive symptoms (Letourneau et al. 2007). However, support from individuals outside of the romantic partnership needs to be considered as well (Bost et al. 2002). As Hobfoll and London (1986) argue, no single support provider will be beneficial in every situation.

Interestingly, there is some evidence to suggest that extended network support (i.e. friend and family support) is more important than intimate partner support among women who experience PPD. In a qualitative analyses of support needs, several women who had experienced postpartum depression felt that support from their intimate partner was limited due to their partner's inability to understand the adjustments required of motherhood (Letourneau et al. 2007). Rather, these women felt family and friends, particularly female friends and relatives with whom they had trusting relationships, were more important sources of support. In one of the few quantitative studies that investigated different sources of support in the risk for PPD, researchers found that parental support was associated with lower levels of depressive symptoms postpartum, whereas partner support was unrelated to depressive symptomatology (Haslam, Pakenham, & Smith 2006). These researchers theorize that this may be because a new mother accesses more of the support offered by her parents than by her partner when it comes to caring for a new baby. Further, they state that there may be qualitative differences in the type of support

offered by parents and a partner, such that the support offered by parents is more relevant to the needs of a new mother. For instance, a woman's parents are more likely to provide support that equips her with the resources necessary to meet the demands of infant and child care (e.g. advice on how to change a diaper). Parents may also provide encouragement and make past successes salient (Haslam, Pakenham, & Smith 2006). Despite these findings, few studies have considered the importance of different support providers for maternal well-being during the postpartum period. In an effort to address this limitation in the PPD literature, I compare the impact of social support from a woman's family and friends to that from an intimate partner in this paper.

Family Structure and Social Support

In addition to neglecting support from other members of a woman's social network, the tendency to focus on support from a woman's intimate partner in the maternal postpartum depression literature has led to a focus on women in traditional, married unions (e.g. Logsdon & Usui 2001; Bost et al. 2002; Letourneau et al. 2007). In turn, we know very little about the effects of social support from different sources among women in non-traditional family structures. Because of pronounced differences in social networks among non-traditional families (e.g. single-mother families, cohabiting families), there is reason to believe that the effects of social support may be conditional on family structure. For example, women who give birth outside of marriage are more likely to experience partnership instability (Meadows, McLanahan, & Brooks-Gunn 2008) and perceive their partner as less supportive (Gallagher, Hobfoll, Ritter, & Lavin 1997). Though the lack of a stable marriage partner may result in increased contact with family members and friends (Marks & McLanahan 1993), it is unclear whether support from other sources can substitute for a lack of partner support. It is, of course, also possible that the demands of being a single mother limit a woman's contact with family and friends altogether, decreasing her access to supportive exchanges (Marks & McLanahan 1993). Indeed, Cairney et al. (2003) found that single women report lower levels of perceived social support, social involvement, and frequency of contact with family and friends compared to their married counterparts. Given the recent changes in family formation in the United States, including declines in marriage and increases in cohabitation and non-marital childbearing (DeKlyen et al. 2006), studying postpartum depression among women in non-traditional families has become

increasingly important. As such, I compare women in traditional, married unions to women in non-traditional families in this paper.

Theoretical Link: The Stress-Process Framework

Although studies of maternal postpartum depression have emphasized the beneficial role of supportive relationships in a woman's social network, the mechanism through which support influences a woman's mental health during the postpartum period remains unclear. It has been proposed by several researchers that the presence of supportive relationships may act to cushion the stressors that are often cited as risk factors for postpartum depression (Swendsen & Mazure 2000; Bost et al. 2002; Manuel et al. 2012). Indeed, evidence points to a negative association between support and depression that is more pronounced under the presence of stressors among pregnant and postpartum women (Barnet et al. 1996; Glazier et al. 2004). Interestingly, however, most researchers investigating stress-buffering mechanisms in the PPD literature treat social support as influencing depressive symptoms through a direct effect pathway (e.g. Dennis & Ross 2006; Webster et al. 2011), without testing for potential mediating pathways common in the broader depression literature. A direct effect pathway assumes that adequate social support decreases depression by improving health behaviors, increasing positive feelings, and enhancing emotional regulation *despite* the presence of stressors (Horenstein & Cohen 2008), whereas a mediating pathway assumes that support *governs* the harmful impact of specific stressors on postpartum depression, allowing for better emotional responses to negative events (Pearlin 1989; Horenstein & Cohen 2008).

To my knowledge, no studies of social support and PPD have considered social support from a mediating pathway as defined by the general literature on stress, social support, and depression. However, some support for an interactive, or moderating, pathway has been found in this literature, lending theoretical support for a link between social support and postpartum depression over and above a direct effect pathway. Several studies have indicated that supportive intimates play a significant role in the reduction of stress levels and, subsequently, improvement of mood in new mothers (Barnet et al. 1996; Gallagher et al. 1997; Misri et al. 2000; Glazier et al. 2004). Additional support for a link between social support and postpartum depression over and above simple, direct effects comes from a study examining the stress-moderating effects of

social support on maternal depression in low-income women. Although support was found to reduce the negative effects of stress in this study, researchers found no evidence of stress-moderating effects and limited evidence for direct effects, perhaps reflecting that a mediating pathway is at work (Manuel et al. 2012).

Taken alongside findings that social support may reduce depressive symptoms, this literature suggests that research is necessary to establish whether or not social support does in fact act as a mediating resource, diminishing the effects of causal mechanisms such as stress. Variations of Pearlin et al.'s (1981) conceptual model of stress, social support, and health are commonly used to test the ways in which social support and stress exposure influence mental health outcomes, including major depression (Taylor & Turner 2002). This model, known as the stress process, is seen as combining three conceptual domains into one larger causal pathway to mental health and illness. These three domains include social stress, mediators of stress, and symptomatic manifestations of stress (Pearlin et al. 1981; Avison 2010). Social stress consists of discrete, major life changes or enduring problems, conflicts, and threats that challenge an individual to adapt or change (Aneshensel 1992). On the contrary, mediators of stress are thought to govern the detrimental effects of stress by constraining the intensity, number, and diffusion of stressors as well as constraining the extant and intensity of stress outcomes (Pearlin 1989). In work concerned with the conditions capable of mediating stressors, social support is recognized as a primary mediating resource (Pearlin et al. 1981; Avison 2010). Lastly, the symptomatic manifestations of stress are the psychological, emotional, or physical outcomes that result from exposure to social stressors. A guiding assumption in the application of stress process models is that these three domains, as well as the process itself, arise out of commonly held social statuses (Pearlin 1989). Specifically, social status is understood to influence the social stressors to which people are exposed, the mediators they are able to mobilize, and the manner in which they experience stress (Pearlin 1989).

Given the focus on mediating resources in the stress process framework, social support is hypothesized to influence maternal postpartum depression through direct and indirect mediating effects from a stress process approach. By curbing the intensity, number, and diffusion of stressors, social support may directly mediate the detrimental effects of stressors on postpartum

depression (Pearlin 1989). Notably, the effects of support may matter for some types of stressors more than others. In addition, social support may indirectly mediate the detrimental effects of stressors by curbing the extant and intensity of stress outcomes (Pearlin 1989). The indirect mediating effects of social support are largely responsible for explaining why exposure to the same stressors does not necessarily lead to the same mental health outcomes across individuals in the broader stress process and depression literature (Pearlin 1989). To my knowledge, however, only one study has used the stress process framework to examine postpartum depression. These researchers concluded that a stress process framework is useful for understanding postpartum depression both in terms of its risk factors and how it compares to major depression (Reid & Taylor 2012). Although they did not specifically examine mediating resources in their study, there is compelling evidence to suggest that a stress process framework may also elucidate the function of social support in the risk for postpartum depression.

Drawing on a stress process framework, I assess the extent to which maternal postpartum depressive symptoms are differentially influenced by the source of a woman's social support. In particular, the role of support from a woman's friends and family is compared to that from an intimate partner in reducing the impact of stress exposure. Both mediating and protective mechanisms are tested in this paper. In addition, the present study also considers whether these differences are conditional on a woman's family structure, and which specific stressors (if any) these sources of support matter most for.

Methods

Data

Data for this study comes from the Fragile Families and Child Well-being Study, an NIH funded longitudinal sample of approximately 4,900 births in 75 hospitals across 20 U.S. cities. The Fragile Families Study follows a new cohort of mostly unwed (3,600 unwed, 1,300 married) parents and their children and focuses on the conditions, capabilities, and relationships of parents, the role of fathers in child rearing, the role of environmental factors in parent's lives, and child outcomes related to these topics (Reichman et al. 2011). Subsequently, the Fragile Families contains rich information relevant to the stress process model and postpartum depression and provides an ideal sample for comparing women in non-traditional families (e.g. single-mother

families, cohabiting families) to women in traditional, married unions. Although the Fragile Families was not explicitly created to study PPD, recent research has utilized this data source to examine this outcome (Mitchell et al. 2011; Reid & Taylor 2012).

Data from the Fragile Families is primarily derived from in-person interviews with parents in the hospital shortly following childbirth. Follow-up interviews were conducted either in-person or by telephone one year after the birth of the focal child and again when the child was 3, 5, and 9 years of age. Information on the child's health at birth and the mother's health history, including information on the focal pregnancy and delivery, is also available for 3,684 respondents in the sample through medical record data extracted by Fragile Families from the birth hospitalization record. The remainder of the sample is missing medical record data for one of three reasons: (1) The hospital did not permit researchers to abstract records or there were too few cases for it to be financially feasible to collect data at that hospital, (2) the mother refused consent, or (3) the records could not be located in the hospital (http://www.fragilefamilies.princeton.edu/medrecs.asp). Although the Fragile Families is not nationally representative of mothers in the United States at risk of PPD, one substantial benefit of this data is its large sample size. Much of the research on PPD has relied on small, clinical samples (e.g. Misri et al. 2000; Dennis & Ross 2006; Gremigni et al. 2011). Furthermore, these data oversample those women with the highest risk of PPD since the women sampled are mainly young, economically disadvantaged, and have reduced social resources and support.

Sample

The onset of postpartum depression begins within a year following childbirth, thus data that establish events and sources of support prior to birth, and in the year immediately following birth, are of primary importance. As such, data from the mothers' interviews at baseline and the one year follow-up are used for the present study. Medical record data linked to mothers' baseline interviews is also used. The original sample consists of 4,898 women. I limit analyses to include only those women who participated in the one year follow-up and reported on the depression outcome (n = 4,362). Women who are missing data on marital status (n = 3) or who indicated that their current intimate partner was a female (n = 7) are excluded. The final analytic sample for this study includes 4,352 women. Missing values for all other variables are imputed

using a full information maximum likelihood (FIML) estimator, which allows all individuals to be included in the analyses without complete data. Unweighted data are used for analyses because weighting decreases the analytic sample by 30% and the weights are not appropriate when using the medical records. However, the variables used for sample selection (socioeconomic status, age, etc.) are included as controls in models, suggesting that the coefficients should be unbiased, consistent, and robust (Winship & Radbill 1994). To test whether there is variability between women in varying family structures, the sample is split into three groups (single, single and cohabiting, married).

Measures

Maternal postpartum depression. Depression is measured using information taken from the mother's one year follow-up interview. The Fragile Families draws on the Composite International Diagnostic Interview - Short Form (CIDI-SF), Section A (Kessler et al. 1998) to assess depression. The CIDI is a standardized instrument for assessment of mental disorders and follows the criteria of the Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition (DSM-IV; APA 1994). The CIDI-SF takes a portion of the full set of CIDI questions and estimates the probability that a respondent would be positively diagnosed with depression if given the full CIDI interview. Specifically, women were asked if they had experienced feelings of depression or anhedonia in the past year, that lasted two weeks or more. If so, they were asked about seven additional symptoms: (1) losing interest (2) feeling tired (3) weight changes (4) trouble with sleep (5) trouble concentrating (6) feeling worthless or (7) thinking about death. Women who answered affirmatively to having three or more of these symptoms met the criteria for depression (1 = depressed, 0 = not depressed).

History of depression. A prior history of depression or mood disorder is one of the strongest predictors of postpartum depression (Beck 2001; Horowitz & Goodman, 2005; CDC 2010). Moreover, depressed women may accumulate and/or report more stress over their life course (Wheaton 1994), which may in turn be connected with higher rates of PPD. To account for these factors, I include a control for history of depression. History of depression is taken from the medical records matched to the baseline survey (1 = history of depression, 0 = no history of depression). In sensitivity analyses not presented here, I ran alternate models including history of

any diagnosed mental health disorders (including anxiety and substance abuse) with no substantive differences. Women who did not seek medical attention for depression, were misdiagnosed, or whose healthcare provider did not record a diagnosis of depression on the medical record file will not be captured by the medical record data. As such, data are likely to reflect an underreporting of history of depression. However, I argue that women with the most risk of developing another episode of severe depression should be captured by this data.

Social Support. In an effort to address gaps in the social support and maternal postpartum depression literature, and assess the extent to which depressive symptoms are differentially influenced by the source of a woman's social support, I include two measures of social support consistent with those found in the broader stress process and depression literature. Because the Fragile Families does not include measures of emotional support from family and friends, and focuses primarily on perceived support from this source, I use two measures of perceived instrumental support to compare supportive relationships. Although this study lacks measures of received support, the bulk of the evidence pointing to the significance of social support for mental health outcomes has come from studies of perceived support (Turner & Lloyd 1999; Thoits 2011). Moreover, there is specific evidence for the salience of perceived support over received support in the stress process literature (Turner & Lloyd 1999; Cohen, Gottlieb, & Underwood 2000). *Support from friends and family* is a summed scale of five "yes/no" items taken from the one-year follow up interview (See Appendix A), measuring women's perceptions of help available to them from family and friends. For each item in this measure, women were specifically asked if they could they count on someone other than the focal child's biological father. *Intimate partner support* is measured using two items taken from the one-year follow up interview (See Appendix A). This measure captures women's perceptions of how often help is available to them from the focal child's birth father (including single mothers or those still married, cohabiting, or romantically involved with the birth father) or current romantic partner. Responses range from 0 (rarely) to 2 (always). For each measure of social support, higher values are equivalent to greater levels of support.

Stressors. Because the stress process recognizes social support as a part of a larger pathway involving stress, the full function of social support is best revealed by examining it in

conjunction with stressors as well as by itself (Pearlin 1989; Thoits 2011). Therefore, I include several measures of stress consistent with the stress process framework in this study. Although the Fragile Families data does not include eventful stress checklists, it does ask items throughout the interview corresponding to many major stressful events across the life course. As such, I created two eventful life stress indices based on relevant measures to approximate stress checklists. Though these are not true life event checklists, the items are consistent with those found in studies informed by the stress process framework (see Turner & Lloyd, 1999). *Major life event stress* ranges from 0 to 6, and assesses negative events occurring at any point within a woman's lifetime. Seven "yes/no" items are used to measure major life events (See Appendix B). All items are taken from the baseline interview with exception of one item, capturing whether or not a woman has ever been forced to perform sexual activities. Although this item is from the one year follow-up interview, I argue that it should be considered a major life event because women who have been forced to perform sexual activities were likely forced to do so prior to pregnancy and birth (Beydoun et al, 2010; Scribano, Stevens, & Kaizar 2013). In prior analyses of the stress indices (Reid & Taylor 2012), alternate models excluding this variable from the measure of major life events were tested with substantively similar results, thus I chose to retain it for analyses. In contrast to major life event stress, *recent life event stress* assesses negative events occurring within the twelve month period following the birth of the focal child. Recent life event stress ranges from 0 to 5, and is measured using five "yes/no" items from the one-year follow up (See Appendix B).

I also include four measures of chronic stress. *Neighborhood safety* is measured using the baseline question: "How safe are the streets around your home at night?" Responses range from 0 (very safe) to 3 (very unsafe). *Child-related stress* is a summed scale of seven items from the one year follow-up (See Appendix B), measuring the impact of the focal child's temperament on the risk for postpartum depression. *Parenting-related stress* is measured using a scale of four items from the one year follow-up (See Appendix B) and captures the stressors associated with raising a family. Responses range from 0 (strongly disagree) to 3 (strongly agree). Because supportive relationships are not necessarily free from conflict (Hagerty & Williams 1999), a measure of relationship strain is also included. *Relationship strain* is a summed scale of six items

from the baseline survey, measuring how often women report disagreements with the focal child's birth father (See Appendix B). Responses range from 0 (never) to 2 (often). For each of the stress measures, higher values are equivalent to greater levels of stress.

Domestic violence. Although domestic violence could be considered a part of relationship stress, or considered a major life event occurring before or after birth, I argue that it may work as both a major life event (Turner & Avison 2003) and/or an ongoing stressor (Adkins & Kamp Dush 2010). In addition, domestic violence tends to be particularly impactful on depression overall and often escalates around the time of pregnancy and birth (Mezey & Bewley 1997; Campbell 2002), suggesting that it should be examined separately from general or relationship stress. As such, I include a separate indicator of history of domestic violence with the focal child's birth father. History of domestic violence is measured using a series of questions asked at baseline and the one-year follow up (See Appendix B). Responses ranged from 0 (never encountered violence) to 2 (often encountered violence).

Sociodemographic characteristics. Several sociodemographic characteristics that have been identified as correlates of stress exposure, social support, and PPD are included as controls. *Race/ethnicity* is measured with three dummy variables: non-Hispanic black, Hispanic and other. Non-Hispanic white is used as the reference category. *Level of education* is also measured with three dummy variables, including less than high school, high school, some college, and college degree or above. Less than high school represents the reference category. *U.S. nativity* is coded 1 for U.S. native and 0 for non-native. *Household income* is measured in thousands of dollars. Due to low levels of reporting, missing values on income were imputed by regressing household income on respondent's age, race/ethnicity, education, marital status, poverty level, and presence of other biological children. *Employment* is defined as whether or not a respondent had received income from earnings in the past year and is coded 1 for yes and 0 for no. Finally, women's *age* (in years) and *other biological children* are controlled for (1 = yes, 0 = no).

Analytic Strategy

I use nested binary logistic regression models to assess the extent to which maternal postpartum depressive symptoms are differentially influenced by the source of a woman's social support. Specifically, the role of support from a woman's friends and family is compared to that

from an intimate partner in reducing the impact of stress exposure. All models are run using a structural equation modeling (SEM) framework, as structural equation modeling allows the testing of simultaneous pathways in analyses and has the added benefit of a full information maximum likelihood (FIML) estimator. FIML estimation allows individuals to contribute to the analysis given any available information. This approach also has the advantage of the MAR (missing at random) assumption, an improvement over the assumption underlying listwise deletion.

To evaluate the mediating effects of each source of social support, I follow the four steps for establishing mediation as outlined by Baron and Kenny (1986; see also Judd & Kenny 1981; MacKinnon et al. 2002). I begin by testing the direct effects of specific stressors on postpartum depression for each group of women (presented as Model 1 for each group), controlling for history of depression and sociodemographic characteristics. I also test the direct effects of specific stressors on each source of social support (not reported in a table). Then, I re-run Model 1 for each group of women, entering both sources of social support into the model simultaneously (presented as Model 2 for each group). This allows me to compare the sources of support to one another and determine whether the first three steps for mediation are met: (1) the independent variable is correlated with the dependent variable, (2) the independent variable is correlated with the mediator, and (3) the mediator has a unique effect on the dependent variable. Finally, I test whether either source of social support substantially and significantly influences the relationship between stressors and postpartum depression using the Clogg test for equality of regression coefficients (Clogg et al. 1995; Paternoster et al. 1998; MacKinnon et al. 2002). If the regression coefficients of stressors from Model 1 are significantly reduced after the addition of the social support variables in Model 2, the final step for establishing mediation is met. Path analyses displaying the standardized coefficients from Steps 1 through 4 are presented to further illustrate these relationships. All analyses are performed using Mplus version 4.1 (Muthén and Muthén 2007). [1]

Results

[1] In preliminary analyses not shown here, I introduced interaction terms for each stress measure by both measures of social support into the full model (Model 2) for each group of women. No evidence of moderating effects are found.

Descriptive Analyses

(TABLE 1 HERE)

Descriptive statistics for the full sample and each group of women (single, cohabiting, married) are presented in Table 1. The mean, standard deviation, and range are reported for each variable. T-tests for differences in mean values, also reported in Table 1, reveal significant differences in sociodemographic characteristics between women in varying family structures. Married women are more likely to be white, older (28 years of age vs. 23 years of age), and college educated (i.e. some college or college degree/above) compared to cohabiting and single women. In addition, married women are more likely to be employed and have a higher household income (M = 42.21 thousand vs. 24 thousand or less). Married women are, however, less likely to be U.S. natives. Cohabiting women do resemble married women in one regard — both married and cohabiting women are more likely to have other biological children compared to single women. Despite this apparent similarity, women in non-traditional families are more economically and socially disadvantaged than women in traditional, married families in this sample.

Significant differences in depression, social support, and stressors are evident across family structure as well. Overall, the prevalence rates of depression among women in this sample are consistent with national prevalence rates of PPD (e.g. Chaudron 2003). However, married and cohabiting women have the lowest mean values of depression (M = 0.12 and 0.14 respectively), while single women have a significantly higher mean value (M = 0.20). Single women are also substantially more likely to have a documented history of depression (M = 0.14). In fact, the prevalence of prior depressive symptoms among single women in this sample exceeds national estimates (findings from the National Health and Nutrition Survey III estimate the prevalence rate among women to be about 12.6%; Riolo et al. 2005). Yet only a small percentage of married and cohabiting women have a documented history of depression (M = 0.07 and 0.09 respectively). Though these estimates are relatively low, I argue that those married and cohabiting women most at risk are likely captured in this data, since diagnosed cases of major depression are usually more severe while undiagnosed cases tend to be mild and associated with higher functioning (Coyne, Schwenk, and Fechner-Bates 1995).

In terms of social support, married and cohabiting women report similar and substantial levels of perceived support from an intimate partner (M = 3.76 and 3.77 respectively). Single women, on the other hand, report somewhat lower levels of perceived partner support (M = 2.69). Perceptions of support from friends and family vary as well. Married women report the highest level of friend and family support (M = 4.70), with cohabiting women reporting slightly lower levels (M = 3.93) and single women reporting the lowest level (M = 3.49). With regard to stressors, the average woman has experienced few major life and recent life eventful stressors and low to moderate levels of chronic stress. In addition, very few women report a history of domestic violence with the focal child's father (M = 0.21 or less). Notably, however, meaningful differences in levels of stress exposure are evident across groups. Single women report significantly higher levels of stress exposure across all measures (except for neighborhood safety where they closely resemble cohabiting women), while married women report the lowest levels of stress exposure across all measures.

Mediation Analyses

The results of my binary logistic regression analyses examining the extent to which maternal postpartum depression is influenced by different sources of social support is presented in Table 2. As a reminder, I evaluate the mediating effects of each source of social support on depressive symptoms in four steps. I begin by testing the direct effects of specific stressors on depressive symptoms in order to establish a connection between stressors and PPD that may be attenuated by social support (Step 1). I then test the direct effects of specific stressors on each source of social support (Step 2). Next, I determine whether either source of support has a unique effect on depressive symptoms (Step 3). In the final step, I formally test whether either source of social support substantially and significantly influences the relationship between stressors and depressive symptoms (Step 4). Path analyses displaying the standardized coefficients from Steps 1 through 4 are presented to further illustrate these analyses. All relationships in Table 2 are presented as unstandardized coefficients.

(TABLE 2 HERE)

Step 1 analyses. The direct effects of specific stressors on maternal postpartum depression are presented in Models 1 of Table 2. As a reminder, I discuss general effects in terms of

unstandardized coefficients (presented in the table). In line with previous research, I find that stress exposure in general has negative implications for maternal mental health. According to Models 1, life stress is positively associated with postpartum depression, net of covariates and history of depression. Further, important differences across family structure are observed. With regard to life event stressors, major life event stress is predictive of PPD for married and cohabiting women, but not single women. It is noteworthy that the impact of major life event stress is greater for married women (odds ratio of 1.39) than cohabiting women (odds ratio of 1.28). It is also noteworthy that recent life event stress is not predictive of PPD for any group of women, suggesting that stressful life events occurring before and after childbirth work independently of one another and major life event stressors have lasting effects for some women.

In terms of chronic stressors, the stress related to parenting significantly increases the odds of postpartum depression for women across all three family types. On the other hand, the chronic stress associated with child temperament is only influential for married and single women. For example, the transformation of these logistic coefficients reveals that for every increase in the stress associated with child temperament the odds of PPD increase by 7% (exp 0.07) and 6% (exp 0.06), respectively. Additionally, the stress associated with living in an unsafe neighborhood and being in a partnership marked by conflict is only significant for single women. These findings are consistent with patterns noted in Table 1 (single women report the highest levels of chronic stress exposure). Of particular interest, however, single women fare better than married women in terms of the magnitude of chronic stressors. Nevertheless, these findings indicate that chronic stress exposure (versus exposure to life event stress) plays a substantial role in the risk for PPD among single women.

Finally, Models 1 reveal that domestic violence has a substantial impact on postpartum depression for single women, yet is not predictive of PPD for married and cohabiting women. Moreover, domestic violence has the largest magnitude among the significant stressors affecting single women. These findings not only highlight the importance of this particular stressor for single women, but also suggest that domestic violence is more in line with an ongoing stressor in its overall impact on single women (Adkins & Kamp Dush 2010), given its similarities in significance to chronic stressors.

Models 1 in Table 2 also display the predictive significance of sociodemographic and background characteristics. Age is a non-significant net predictor of PPD across family type. Thus, the risk for postpartum depression does not vary significantly by age. Likewise, the risk for postpartum depression does not generally increase by racial/ethnic minority status. Non-Hispanic black women who are single or cohabiting are less likely to report postpartum depression, as are Hispanic cohabiting women. Although employment and income are non-significant predictors, education is significant for married and single women. Single women who report at least some college education experience an increase in the risk for PPD, while married women who report a high school education or a college or more education experience a decrease in the risk for PPD. U.S. nativity and the presence of other biological children are not significant predictors, however a prior history of depression is associated with an increase in the risk for PPD across family type.

Step 2 analyses. Evident in Models 1 of Table 2, the direct effects of stress exposure on maternal postpartum depression are significant. In results not shown, I evaluate the second step necessary for mediation by regressing each stressor on both sources of social support. Overall, I find that women who are exposed to more stressors also have lower levels of social support. Major life event stress and the stress associated with living in an unsafe neighborhood are negatively associated with support from friends and family for women in all three family types. Major life event stress also reduces intimate partner support for single women. Recent life event stress reduces intimate partner support for single women and friend and family support for married women. The stress associated with being in a partnership marked by conflict is negatively associated with intimate partner support for women in all three family types, as well friend and family support for single women. Parenting related stress reduces intimate partner support for married and cohabiting women, and friend and family support for single women. Domestic violence is negatively associated with both sources of support for single women, and unrelated to support for married and cohabiting women. Last, chronic stress related to child temperament is negatively associated with friend and family support for married women, but not significantly associated with either source of support for the remainder of women in the sample. Sociodemographic and background characteristics had no significant impact on the relationships between stressors and source of support. Taken together, these findings provide only modest

support for the potential mediating effects of social support.

Step 3 analyses. The third step necessary for mediation is presented in Models 2 of Table 2. To determine whether either source of social support has a unique effect on depressive symptoms, both sources of support are entered into Models 1 simultaneously. Findings indicate that supportive relationships are predictive of postpartum depression in the anticipated direction, but the importance of different support providers varies by family structure. Both intimate partner support and friend and family support significantly lower the odds of depression among married women. The transformation of these logistic coefficients reveals that for every unit increase in supportiveness, the odds of PPD decrease by 26% by (exp 0.30) and 19% (exp 0.22), respectively. Similarly, these sources of support reduce the odds of PPD by 34% (exp 0.42) and 13% (exp 0.14) for cohabiting women. Of interest, intimate partner support has a greater impact on depression for both groups of women. In contrast to married and cohabiting women, friend and family support significantly reduces the odds of PPD for single women by 12% (exp 0.13), while intimate partner support does not reach significance.

With the addition of these variables to Models 2, several changes in stress coefficients are observed. The coefficients for major life event stress and the stress related to parenting are slightly reduced from Model 1 for married and cohabiting women, but remain highly significant. In addition, the coefficients for domestic violence, the stress associated with living in an unsafe neighborhood, and the stress related to being in a partnership marked by conflict are reduced for single women. However, these too remain high in significance. The coefficients of several sociodemographic and background characteristics are changed as well. The coefficient for a prior history of depression is reduced for cohabiting and single women, and no longer significant for married women. The effects of education also change slightly. A college or more education is reduced to non-significance for married women, but a high school education becomes a significant predictor of PPD for single women. Together, these results provide further backing for the potential mediating role of social support on the relationship between stress exposure and postpartum depression

Step 4 analyses. Analyses from Step 3 reveal that the addition of support variables into my regression equation reduces the coefficients for several key stressors. As such, I formally test

whether the association between stress exposure and maternal postpartum depression is mediated by social support in Step 4. Using the Clogg test for equality of regression coefficients (Clogg et al. 1995; Paternoster et al. 1998; MacKinnon et al. 2002), I calculate whether either source of social support significantly diminishes the effects of stressors from Model 1 to Model 2 (See Appendix C) for each group of women. Results from my Clogg test calculations reveal that none of the observed reductions in stressors are significant, suggesting that social support does not mediate the association between stress exposure and maternal postpartum depression.

Additional path analyses. Path analyses for each group of women (presented as Figures 1 through 3) further illustrate the relationships between sources of social support, stress, and depressive symptoms. Path analyses allow for a simultaneous re-examination of the findings reported in Steps 1-4 and provide additional backing for the findings listed above. These path analyses do not have the benefit of a significance test for mediation (as reported in Step 4), since the mediating and outcome variables are of different types (the support variables are assumed to be continuous where depression is binary). Therefore, direct, indirect, and total effects could not be calculated as in traditional path analysis (where both mediating and outcome variables are continuous). However, the path analyses do have the benefit of providing additional support to the logistic regression models presented above while estimating all relationships simultaneously. In addition, they are a straightforward way of presenting standardized coefficients in order to examine which factors matter most in predicting both social support and depression.

(Figure 1 HERE)

(Figure 2 HERE)

(Figure 3 HERE)

In all, results from the path analyses support the findings presented in Steps 1-4 with some notable additions. The significant relationships between stressors and depression (presented in Models 1 of Table 2) remain consistent in the path analyses, suggesting that the findings from Step 1 are robust. However, when comparing standardized coefficients in the figures to the unstandardized coefficients in the table, several differences are apparent. Parenting stress has the largest impact on depression among married women compared to other life event and chronic stressors, and the stress related to child temperament has the largest impact on depression among

single women when compared to other stressors. The figures also replicate the substantive findings reported in Step 2. Several stressors reduce social support, and these effects vary by both the source of support and a woman's family structure. Lastly, the figures paint a similar picture to that reported in Step 3. Both sources of social support significantly reduce depression among married and cohabiting women, independent of the effects of stress on depression or support. However, a closer look at the standardized coefficients reveals that both sources of support have a relatively similar impact on cohabiting women, but friend and family support has a larger impact on depression among married women. Importantly, one inconsistent finding is observed. In contrast to findings reported in Table 2, findings in Figure 3 indicate that intimate partner support does significantly reduce depression among single women, along with family and friend support. This suggests that after taking into account the selective nature of social support, and the impact of stress on support, single women begin to look similar to their married and cohabiting counterparts in terms of benefiting from support.

Discussion

The empirical literature examining risk factors for maternal postpartum depression has begun to parallel the broader depression literature, with increasing consideration given to the role of stress and social support on women's health during pregnancy and the postpartum period (e.g Beck 2001; Glazier et al. 2004; Manuel et al. 2012). Drawing on a stress process framework (Pearlin et al. 1981; Pearlin 1989), this paper assessed the extent to which maternal postpartum depressive symptoms are differentially influenced by the source of a woman's social support. Specifically, I compared support from a woman's friends and family to that from an intimate partner in reducing the impact of stress exposure. Both mediating and protective mechanisms were tested. In addition, I considered whether these differences are conditional on a woman's family structure, and which specific stressors (if any) these sources of support matter most for.

Consistent with previous research, I found that life stress is positively associated with postpartum depression. I also found a direct relationship between supportive relationships and postpartum depression, such that social support is beneficial for women in all family types. The negative effects of stressors were also slightly reduced across family types after social support was added into the models. Despite these relationships, which are suggestive of mediation,

formal testing revealed that neither source of support substantially or significantly reduced the effects of stressors. This held true for both women in traditional, married unions and women in non-traditional families. This indicates that social support is more of a protective factor in and of itself (e.g. Dennis & Ross 2006; Webster et al. 2011), but insufficient to govern the harmful effects of stress exposure. Non-significant tests of moderating effects in preliminary analyses further support this assertion.

Of particular importance, findings from this paper reveal that the variety of support providers in a woman's social network is important, especially in the context of family structure. In line with previous research, support from an intimate partner was a significant protective factor for married women. Adding to current research, I found that the same held true for cohabiting women. This suggests that partner availability and supportiveness are attributable to, and significantly protective in, any live-in relationship. With regard to extended network support, all three groups of women gained significant protection from friend and family support. Furthermore, path analyses suggest that friend and family support may be just as important as partner support for married and cohabiting women. Importantly, support from friends and family was the only source of support beneficial to single women in the logistic regression models, despite the fact that single women report the lowest levels of friend and family support overall. This suggests that, although single women are likely to have fewer friend and family ties, support from other sources may indeed substitute, to some degree, for a lack of partner support. This reinforces the assertion that no single support provider will be beneficial in every situation, and support from individuals outside of the romantic partnership needs to be considered in PPD research.

Finally, findings demonstrate that the types of stress that influence depressive symptoms vary by family structure as well. Exposure to chronic stressors appears to be of greater relevance to single women, whereas major life event stressors have important and lasting effects for women in married and cohabiting unions. Of particular interest, however, the magnitude of stressors was generally greater for married women. While it may be that some characteristic unique to marital unions amplifies the impact of certain stressors, it is presumably more likely that single women are less reactive to life event stress because they are consumed by the current

stresses and strains they endure daily. Notably, neither source of support was significantly influential in reducing certain stressors. Nevertheless, these findings illustrate that, by not considering women in non-traditional family structures, the postpartum depression literature likely neglects important aspects of risk and vulnerability.

Several limitations in this paper merit comment. First, the Fragile Families data set is a uniquely "fragile" data source. Although this is a highly appropriate data set for the current research, I caution generalizing findings to the entire population, as these women are disproportionately disadvantaged. In addition, much of the data from the Fragile Families is based on self-reports. As such, women's reports of stress and supportiveness in both papers may be influenced by current depressive symptoms. Several measures may also be subject to recall bias. Another limitation of the data centers around the history of depression indicator. The Fragile Families lacks a retrospective self-report measure for depression at baseline, thus I rely on medical record data to establish a history of depression. Due to imperfections in medical records, access to care, and geographic biases this measure likely underestimates the history of depression among women in the sample. Finally, the Fragile Families does not include measures of emotional support from family and friends, and focuses primarily on perceived support from this source. I therefore use two measures of perceived instrumental support to compare supportive relationships in this paper. Future research should compare both received and emotional support indicators from these sources.

Net of these limitations, the findings from this paper have important implications for research and practice. Though social support did not influence postpartum depression through mediating effects as a stress process framework would suggest, findings did demonstrate that this framework provides a clearer estimate of which sources of support are most influential for postpartum depression. The integration of a stress process framework also revealed the complex relationship between stressors, social support, and depression, reinforcing the assertion that social support and stress exposure are parts of a larger causal pathway to postpartum mood disorders. As such, future research may benefit from integrating a stress process framework into the study of maternal postpartum depression. Future research should also assess support from individuals outside of the romantic partnership as well as support from the intimate partner,

given the evidence that the variety of support providers in a woman's social network is important. Continued research should also consider women in all family types, since the effects of supportive relationships appear to be conditional on family structure. Failure to consider women in non-traditional families may cause important aspects of risk and vulnerability to be overlooked. A more thorough examination of the selective nature of social support is also warranted. It may be that the inability of supportive relationships to fully protect the most vulnerable women in this sample (i.e. single women), is at least in part driven by the day to day stressors that single women encounter. Additionally, because supportive relationships appear to be more of a protective factor overall, efforts that focus on identifying, treating, and preventing maternal postpartum depression should explore resources or programs that foster supportive ties. Resources or programs that reduce or mitigate the impact of stressors should also be explored, since the protective effects of social support are insufficient to govern the harmful effects of stress exposure, and stress exposure is a substantial risk factor for PPD.

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Table 1. Sample Descriptive Statistics

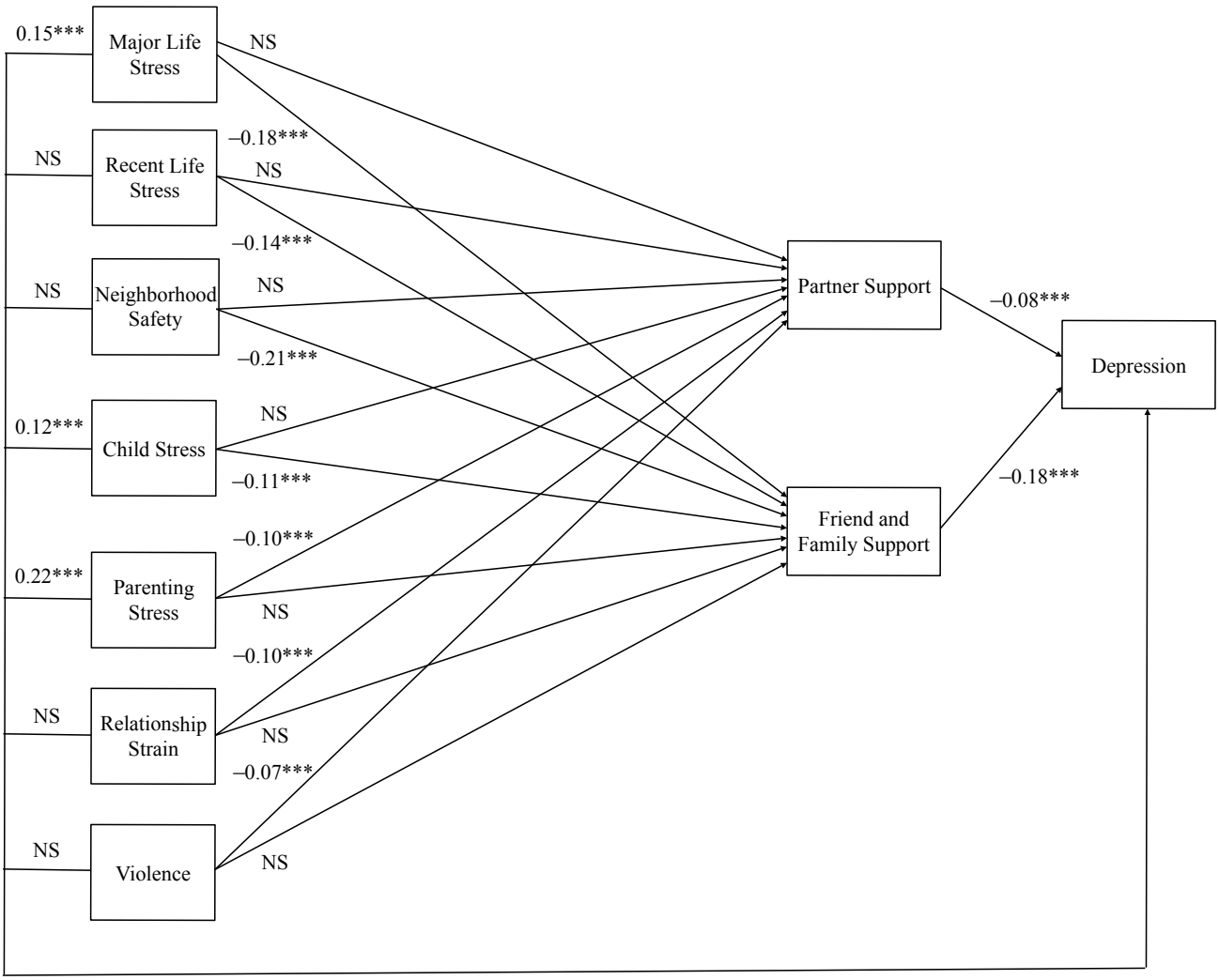
Variable	Range	Full Sample	N	Married	Cohabiting	Single	Difference
Postpartum depression	0–1	0.16 (0.36)	4352	0.12 (0.33)	0.14 (0.35)	0.20 (0.40)	MS, CS
History of depression	0–1	0.10 (0.30)	3279	0.07 (0.24)	0.09 (0.28)	0.14 (0.35)	MC, MS, CS
Age	15–43	25.18 (6.04)	4352	28.25 (5.95)	23.70 (5.39)	23.93 (5.74)	MC, MS
Race/Ethnicity							
Non–hispanic white	0–1	0.22 (0.41)	4343	0.39 (0.49)	0.16 (0.37)	0.12 (0.33)	MC, MS, CS
Non–hispanic black	0–1	0.48 (0.50)	4343	0.26 (0.44)	0.51 (0.50)	0.63 (0.48)	MC, MS, CS
Hispanic	0–1	0.27 (0.44)	4343	0.28 (0.45)	0.30 (0.46)	0.22 (0.41)	MS, CS
Other	0–1	0.04 (0.19)	4343	0.07 (0.25)	0.02 (0.15)	0.03 (0.16)	MC, MS
Education							
Less than high school		0.34 (0.47)	4347	0.19 (0.39)	0.40 (0.49)	0.41 (0.49)	MC, MS
High school	0–1	0.30 (0.46)	4347	0.23 (0.42)	0.35 (0.48)	0.33 (0.47)	MC, MS
Some college	0–1	0.25 (0.43)	4347	0.29 (0.45)	0.23 (0.42)	0.24 (0.43)	MC, MS
College or more	0–1	0.11 (0.31)	4347	0.29 (0.46)	0.02 (0.15)	0.03 (0.18)	MC, MS
Household income (thousands)	1.73–75	28.94 (21.33)	4322	42.21 (22.72)	23.58 (17.85)	22.40 (17.55)	MC, MS
U.S. native	0–1	0.84 (0.37)	4342	0.75 (0.43)	0.86 (0.35)	0.91 (0.29)	MC, MS, CS
Employed	0–1	0.69 (0.46)	4326	0.73 (0.45)	0.69 (0.46)	0.66 (0.47)	MC, MS
Other biological children	0–1	0.62 (0.49)	4337	0.64 (0.48)	0.64 (0.48)	0.57 (0.50)	MS, CS
Social support							
Partner support	0–4	3.49 (0.99)	3414	3.76 (0.57)	3.79 (0.57)	2.69 (1.38)	MS, CS
Family and friend support	0–6	4.02 (1.84)	4344	4.70 (1.71)	3.93 (1.77)	3.49 (1.84)	MC, MS, CS
Stressors							
Major life event stress	0–6	1.77 (1.19)	3112	1.15 (1.03)	1.87 (1.15)	2.17 (1.16)	MC, MS, CS
Recent life event stress	0–5	0.75 (0.77)	4013	0.57 (0.68)	0.81 (0.76)	0.88 (0.82)	MC, MS, CS
Neighborhood safety	0–3	0.95 (0.71)	4337	0.78 (0.68)	1.02 (0.71)	1.03 (0.72)	MC, MS
Relationship strain	0–12	2.57 (2.31)	4234	1.90 (1.82)	2.61 (2.26)	3.15 (2.58)	MC, MS, CS
Domestic violence	0–2	0.11 (0.40)	4313	0.03 (0.19)	0.08 (0.34)	0.21 (0.56)	MC, MS, CS
Child-related stress	0–25	11.28 (3.99)	4303	10.56 (3.80)	11.42 (3.88)	11.81 (4.18)	MC, MS, CS
Parenting-related stress	0–12	4.08 (2.97)	4352	3.85 (2.74)	3.97 (2.92)	4.41 (3.19)	MS, CS

Notes: T-tests for differences in mean values; significant at .05 or higher; MC = Married and Cohabiting; MS = Married and Single; CS = Cohabiting and Single

Table 2. Unstandardized Coefficients (SE) of Stressors and Social Support on Postpartum Depression by Family Structure

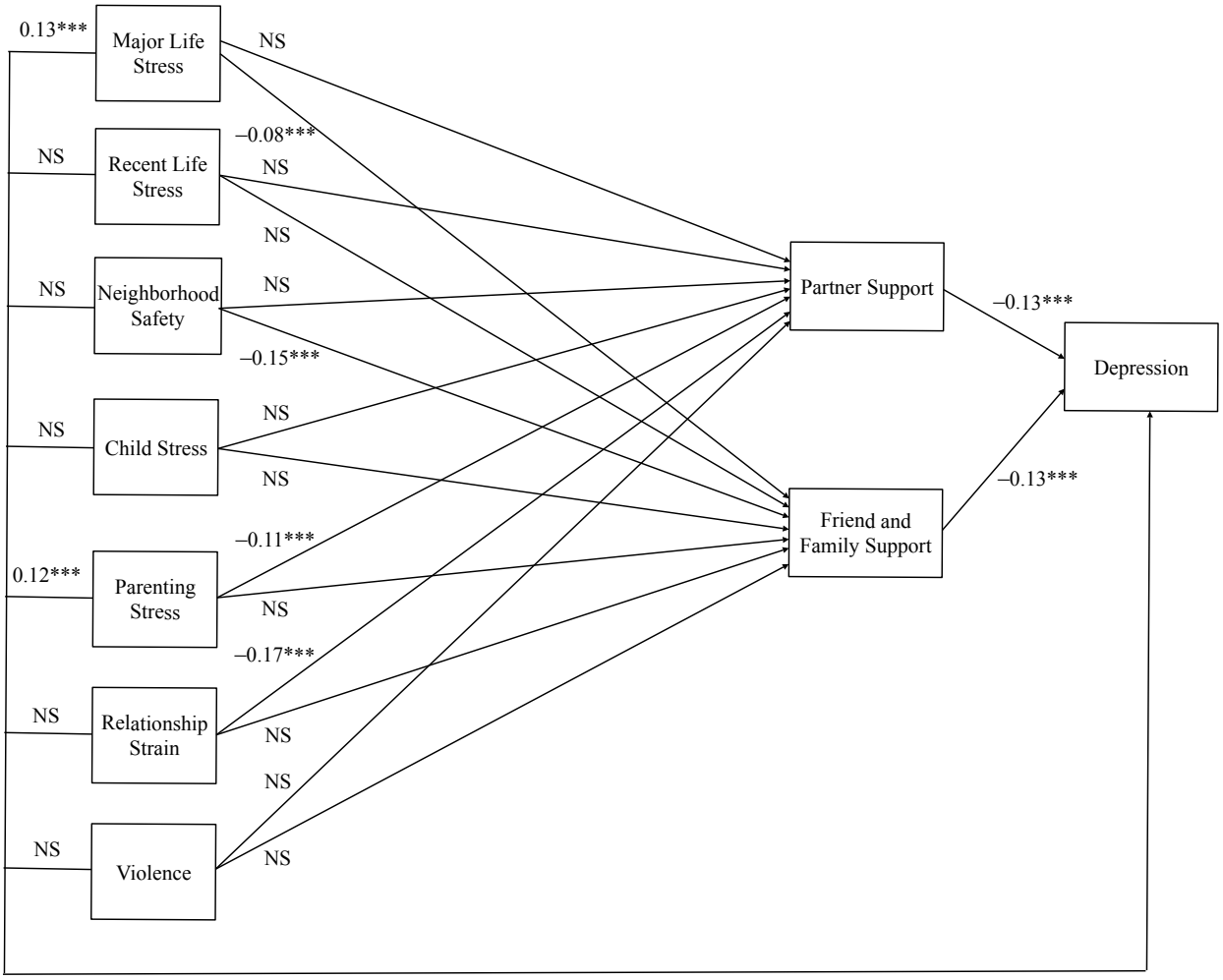
	Married (N = 1,340)		Cohabiting (N = 1,534)		Single (N = 1,478)	
	Model 1	*Model 2*	*Model 1*	*Model 2*	*Model 1*	*Model 2*
History of depression	0.72 (0.36)**	0.57 (0.37)	1.35 (0.25)***	1.30 (0.25)***	0.52 (0.20)***	0.50 (0.20)***
Age	0.02 (0.02)	0.01 (0.02)	–0.02 (0.02)	–0.02 (0.02)	–0.02 (0.01)	–0.02 (0.01)
Non-hispanic black	–0.04 (0.24)	–0.17 (0.25)	–0.46 (0.22)***	–0.44 (0.22)*	–0.50 (0.22)**	–0.50 (0.22)***
Hispanic	–0.34 (0.29)	–0.43 (0.29)	–0.55 (0.26)***	–0.59 (0.26)***	–0.16 (0.25)	–0.20 (0.25)
Other race	–0.44 (0.48)	–0.54 (0.49)	–0.58 (0.55)	–0.57 (0.55)	–0.69 (0.50)	–0.81 (0.51)
High school	–0.74 (0.28)***	–0.77 (0.28)***	–0.05 (0.19)	–0.06 (0.19)	0.32 (0.17)	0.35 (0.17)***
Some college	–0.39 (0.27)	–0.36 (0.27)	0.19 (0.23)	0.20 (0.23)	0.72 (0.20)***	0.78 (0.20)***
College or more	–0.70 (0.35)**	–0.58 (0.36)	0.39 (0.56)	0.54 (0.56)	0.57 (0.46)	0.59 (0.47)
Household income	–0.01 (0.01)	–0.00 (0.01)	0.00 (0.01)	0.00 (0.01)	0.00 (0.00)	0.00 (0.00)
U.S. native	0.11 (0.27)	0.22 (0.28)	–0.37 (0.28)	–0.26 (0.29)	–0.21 (0.28)	–0.17 (0.28)
Employed	0.39 (0.23)	0.36 (0.23)	0.10 (0.18)	0.09 (0.18)	–0.16 (0.15)	–0.18 (0.15)
Other biological children	–0.11 (0.21)	–0.15 (0.22)	0.28 (0.19)	0.24 (0.19)	0.24 (0.16)	0.20 (0.17)
Major life event stress	0.33 (0.11)***	0.30 (0.11)***	0.25 (0.09)***	0.22 (0.09)***	0.12 (0.07)	0.09 (0.07)
Recent life event stress	–0.02 (0.14)	–0.07 (0.14)	0.20 (0.11)	0.19 (0.11)	0.10 (0.09)	0.11 (0.09)
Neighborhood safety	–0.14 (0.14)	–0.19 (0.14)	0.19 (0.11)	0.16 (0.11)	0.28 (0.10)***	0.25 (0.10)***
Relationship strain	0.06 (0.05)	0.06 (0.05)	0.01 (0.04)	–0.02 (0.04)	0.09 (0.03)***	0.08 (0.03)***
Child-related stress	0.07 (0.02)***	0.07 (0.02)***	0.03 (0.02)	0.03 (0.02)	0.06 (0.02)***	0.06 (0.02)***
Parenting-related stress	0.18 (0.03)***	0.17 (0.03)***	0.09 (0.03)***	0.08 (0.03)***	0.08 (0.02)***	0.07 (0.02)***
Domestic violence	0.09 (0.42)	0.11 (0.41)	0.26 (0.20)	0.24 (0.20)	0.41 (0.11)***	0.35 (0.12)***
Partner support	---	–0.30 (0.14)***	---	–0.42 (0.12)***	---	–0.12 (0.07)
Family and friend support	---	–0.22 (0.06)	---	–0.14 (0.05)***	---	–0.13 (0.04)***
Log Likelihood (npar)	–28318.05 (229)	–31671.10 (274)	–32222.82 (229)	–36245.92 (274)	–37001.67 (274)	–37001.67 (274)
BIC	58284.99	65315.13	66125.49	74501.79	66785.72	76003.09

Notes: a. npar = Number of Free Parameters; b. BIC = Bayesian Information Criterion. * significant at .05; ** significant at .01; ***significant at .001



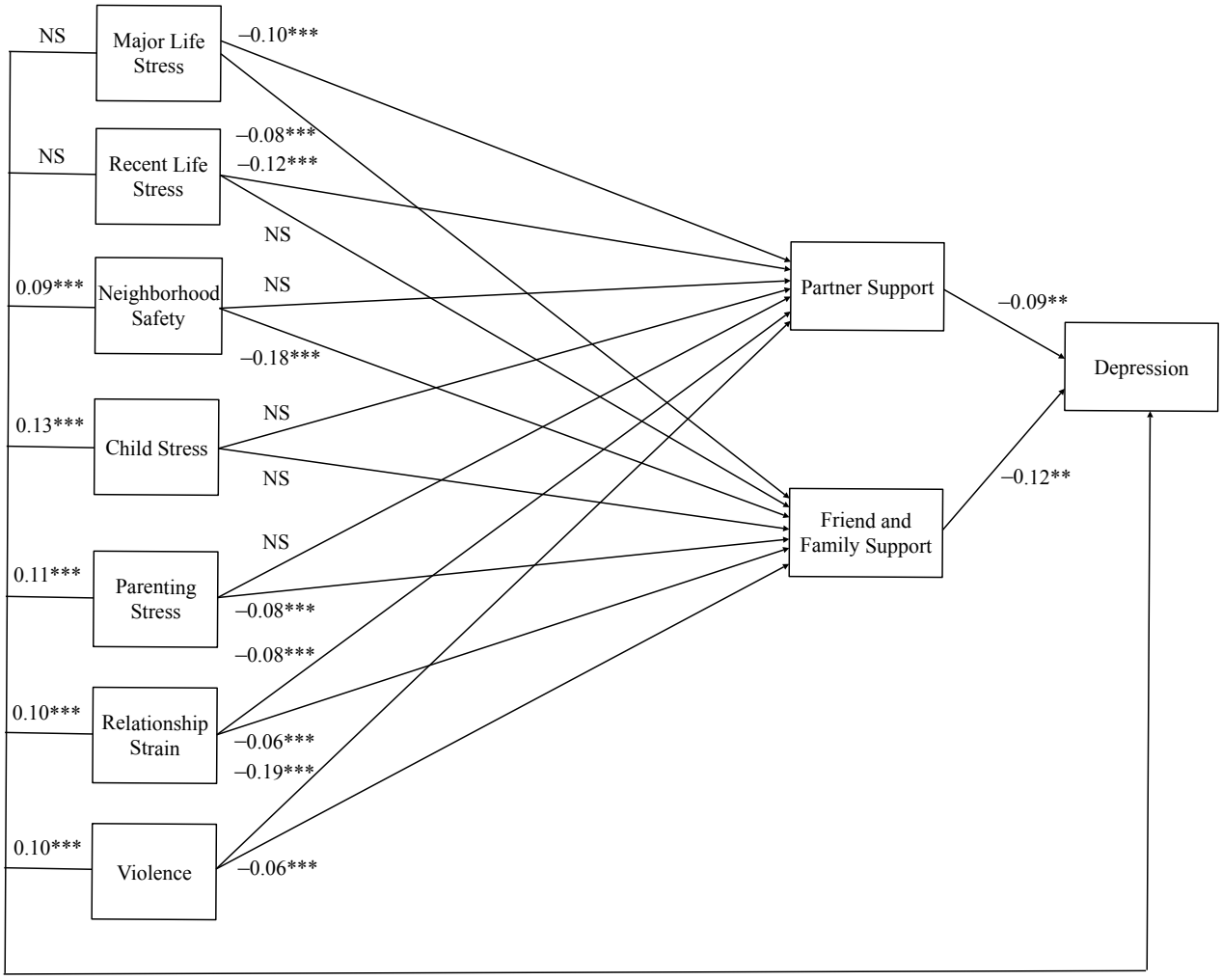
Note: * significant at .05; ** significant at .01; ***significant at .001

Figure 1. Path Analysis of the Mediating Effects of Social Support for Married Women (Standardized Coefficients)



Note: * significant at .05; ** significant at .01; ***significant at .001

Figure 2. Path Analysis of the Mediating Effects of Social Support for Cohabiting Women (Standardized Coefficients)



Note: * significant at .05; ** significant at .01; ***significant at .001

Figure 3. Path Analysis of the Mediating Effects of Social Support for Single Women (Standardized Coefficients)

Appendix A
Construction of Social Support Variables

Instrumental support from friends and family: Kuder-Richardson coefficient = 0.81
Could you count on someone (other than child's biological father) to...
1. Loan you $200 in the next year?
2. Loan you $1000 in the next year?
3. Provide you with a place to live in the next year?
4. Help you with emergency child care?
5. Co-sign for a loan for $1000?

Instrumental support from romantic partner: Cronbach's $\alpha = 0.65$
How often can you...
1. Trust father or partner to take good care of child?
2. Count on father or partner to watch child for a few hours?

Appendix B
Construction of Stress Variables

Major life stress: Kuder-Richardson coefficient = 0.33
1. Did you think about aborting this pregnancy? (proxy for undesired pregnancy)
2. Did focal child's father want you to abort this pregnancy?
3. Were you living with both your parents as a child? (proxy for parental divorce/separation)
4. Have you ever had a miscarriage or abortion?
5. Have you ever had a stillbirth?
6. Has focal child's father ever been in jail?
7. Have you ever been forced into having sex? (taken from one year follow up)

Recent life stress: Kuder-Richardson coefficient = 0.16
1. Have you moved since child was born?
2. Since focal child's birth, have you had another pregnancy/are you pregnant now?
3. Has focal child's father been jailed since baseline interview?
4. Since focal child's birth, have you had any miscarriages, abortions, or stillbirths?
5. Have you divorced or separated from focal child's father since focal child's birth?

Child-related stressors: Cronbach's $\alpha = 0.49$
Child...
1. Often fusses and cries
2. Gets upset easily
3. Reacts strongly when upset
4. Is sociable (Reverse coded)
5. Is friendly with strangers (Reverse coded)
6. Is shy (Reverse coded)
7. Had to be spanked in past month (yes/no response)

Parenting-related stressors: Cronbach's $\alpha = 0.69$
1. Being a parent is harder than I thought
2. I often feel trapped by parental responsibilities
3. Taking care of children is more work than pleasure
4. I often feel tired and worn out from parenting

Relationship Strain: Cronbach's $\alpha = 0.62$
How often (did/do) you and baby's father disagree about...
1. Money?
2. Spending time together?
3. Sex?
4. The focal pregnancy?
5. Alcohol/drug use?

6. Being faithful?

Domestic violence: *Cronbach's* $\alpha = 0.64$
Baseline:
Women who were no longer with the child's father, were not currently living with him, or were not married to him were asked if...
1. The relationship ended because of violence or abuse?
2. They were not living together/have no plan on living together because of violence or abuse?
3. They were not married/have no plan to marry because of violence or abuse?

Women who reported they were currently with the child's father were asked...
4. How often does the father hit or slap you when he is angry?

One-year follow up:
Women who reported they were no longer with the child's father were asked if...
5. The relationship ended because of violence or abuse?
6. During the last month of the relationship the father slapped or kicked you?
7. During the last month of the relationship the father hit you with fist or dangerous object?

Women who reported they were currently with the child's father were asked...
8. How often does the father slap or kick you?
9. How often does the father hit you with fist or dangerous object?

Appendix C
Clogg Test for Mediating Effects

	Model 1	Model 2	Z
Married			
Major life event stress	0.32 (0.11)	0.30 (0.11)	0.21
Recent life event stress	–0.02 (0.14)	–0.02 (0.14)	0.01
Neighborhood safety	–0.14 (0.14)	–0.18 (0.15)	–0.23
Relationship strain	0.06 (0.05)	0.02 (0.05)	0.63
Child-related stress	0.07 (0.02)	0.07 (0.03)	0.12
Parenting-related stress	0.18 (0.03)	0.16 (0.03)	0.49
Domestic violence	0.09 (0.42)	0.09 (0.40)	–0.01
Cohabiting			
Major life event stress	0.25 (0.09)	0.23 (0.09)	0.14
Recent life event stress	0.20 (0.11)	0.21 (0.11)	–0.04
Neighborhood safety	0.19 (0.11)	0.19 (0.11)	0.01
Relationship strain	0.01 (0.04)	–0.03 (0.04)	0.67
Child-related stress	0.03 (0.02)	0.03 (0.02)	0.20
Parenting-related stress	0.09 (0.03)	0.08 (0.03)	0.40
Domestic violence	0.26 (0.20)	0.26 (0.20)	–0.01
Single			
Major life event stress	0.12 (0.07)	0.09 (0.08)	0.30
Recent life event stress	0.10 (0.09)	0.14 (0.09)	–0.27
Neighborhood safety	0.28 (0.10)	0.29 (0.10)	–0.07
Relationship strain	0.09 (0.03)	0.08 (0.03)	0.27
Child-related stress	0.06 (0.02)	0.06 (0.02)	0.29
Parenting-related stress	0.08 (0.02)	0.07 (0.02)	0.13
Domestic violence	0.41 (0.11)	0.30 (0.12)	0.69

*Note. * significant at 0.05; ** significant at 0.01; *** significant at 0.001*