

Stress, Psychosocial Resources, and Depressive Symptomatology During Pregnancy in Low-Income, Inner-City Women

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The authors examined the prospective influence of stress, self-esteem, and social support on the postpartum depressive symptoms of 191 inner-city women (139 European Americans and 52 African Americans) over 3 waves of data collection. Depressive symptomatology was measured by multiple indicators, including self-report and clinical scales. Women became less depressed as they move from prenatal to postpartum stages and adjusted to their pregnancy and its consequences. LISREL and regression analyses indicated that stress was related to increased depression, whereas greater income and social support were related to decreased depression. Self-esteem was related to lower depression at the prenatal and postpartum periods but not to change in depression from the prenatal to the postpartum period. The results also indicated that self-esteem and social support did not have additional stress-buffering effects over and above their direct effects on depression. Finally, African American women did not differ from European American women terms of depression or in terms of how they were impacted by stress or psychosocial resources.

Key words: stress, social support, psychosocial resources, self-esteem, depression

Stress plays a key role in pregnancy outcomes (Dunkel-Schetter, 1998; Rini, Dunkel-Schetter, Wadhwa, & Sandman, 1999; Turner, Grindstaff, & Phillips, 1990). The stresses associated with poverty and racism have been suggested as factors that underlie these high mother and infant morbidity and mortality rates (Hummer, 1993; LaVeist, 1992). These outcomes have been attributed to a variety of contextual factors, including racism, blocked access to material resources and health care, and increased exposure to a litany of life stressors, many of which are chronic (Dunkel-Schetter, Sagrestano, Feldman, & Killingsworth, 1996; Institute of Medicine, 1985; LaVeist, 1992; Rini et al., 1999; Wilson & Schifflin, 1980; Zambrana, Dunkel-Schetter, Collins, & Scrimshaw, 1999).

Although the nature of the relationship between stress and psychological outcomes of pregnancy among inner-city and ethnic

minority populations has received increased examination, we still know very little about the relationship between stress and depression among inner-city residents or among African Americans (Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995). In particular, the lack of prospective studies pertaining to inner-city women's adjustment to life stress during pregnancy precludes any clear understanding of causal relationships that may be operating (Dunkel-Schetter et al., 1996). Moreover, too often when poverty is studied, only ethnic minority individuals are included. This inadvertently supports the fallacy that poor, Black, and Hispanic are equivalent and that White means middle class.

It has also been difficult to disentangle how variables such as stress, social support, and self-esteem influence depression. Rini et al. (1999) argued that studies of how psychosocial resources mediate or moderate the impact of stress on inner-city women examine only single resources, ignoring the overlap among resources that women might have available. On one hand, it is theoretically more concise to study one type of variable at a time. However, others argued persuasively for the need to extend studies of health to include multiple causes in an integrated framework (Link & Phelan, 1995; House, Landis, & Umberson, 1988; Pearlin, 1989; Williams, 1990). Hummer (1996) proposed that the consideration of numerous factors in the same study is particularly needed in the area of ethnic differences in morbidity and mortality.

Moderators of the Stress–Depression Relationship

In this article, we were particularly interested in examining the effects of two key psychosocial resources: social support and self-esteem.

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Social Support

House et al. (1988) noted that social support may even have a more positive direct effect on health than stress has a negative effect. Although stressful life events often have deleterious effects on physical and psychological health, social support has been found to limit these negative stress reactions (Cohen & Wills, 1985; House et al., 1988; Norbeck & Tilden, 1983; Oakley, 1985; Ritter, 1988). Given the chronic stressors in inner-city women's lives, this general beneficial influence of social support is especially relevant.

In the context of pregnancy, social support has been found to have a positive effect on psychological well-being (Cutrona, 1982; Hobfoll & Leiberan, 1987; Norbeck & Tilden, 1983; O'Hara, Rehm, & Campbell, 1983; Stemp, Turner, & Noh, 1986). This effect has also been noted among women of low socioeconomic status (Collins, Dunkel-Schetter, Lobel, & Scrimshaw, 1993). Because of the relative lack of financial resources, low-income pregnant women may be particularly reliant on social support, because they may become less likely to work and have greater needs for emotional and emotional assistance. Other studies, however, noted that social support does not relate to more positive outcomes for inner-city or ethnic minority women (Gallagher, Hobfoll, Ritter, & Lavin, 1997). Inner-city women's social resources may already be stretched owing to chronic stressful conditions (Dohrenwend & Dohrenwend, 1981) and may no longer be available during stressful periods (Allen & Brito, 1983).

In that social support is actually a multifaceted concept, it is important to define the way we conceptualize it. We were concerned with two aspects of social support. For pregnant women, a close link with an intimate partner may be critical (Hobfoll & Leiberan, 1987). Pregnancy is accompanied by many challenges, and those with an intimate partner have someone with whom to share their trials and tribulations. This intimacy has implications for family stability, economic viability, and fulfillment of sexual and emotional needs. Hence, we assessed whether women had a partner and, if so, the level of intimacy with their partner. Recipients' satisfaction with social support has also been found to be important (Stokes, 1983).

Self-Esteem

Personal resources, including self-esteem, have been less well studied in the context of pregnancy than social support (Rini et al., 1999). Kobasa (1987) argued that self-esteem may be a critical resource for women, because many life contexts challenge women's sense of self-evaluation. Self-esteem has been found to limit women's depression in the face of stress (Hobfoll & Leiberan, 1987). Higher self-esteem may directly limit depression by enhancing a positive sense of self throughout life circumstances. It might also buffer stress, however, such that those with high self-esteem are able to resist translating stress to negative self-evaluation, because they can see beyond the particular circumstances being faced (Cohen & Edwards, 1989).

High self-esteem might also buffer stress because it is a robust resource. It is available to women who possess it when they need it (Hobfoll, Shoham, & Ritter, 1991). This might be contrasted with social support, which can be overtaxed in some high-stress conditions (Riley & Eckenrode, 1986). For example, Rini et al.

(1999) found self-esteem to be associated with lower state anxiety, lower pregnancy-related anxiety, and healthier birth outcomes among a sample of White and Hispanic low-income urban women. These findings suggest that self-esteem is an important variable for further study, because it may be associated with both the perception of stress and pregnancy outcomes.

Study Overview

The purpose of this study is to examine prospectively the influence of stress, self-esteem, and social support on depressed mood among inner-city African American and European American women. To examine the relationships among these factors, we studied women over the course of their pregnancy. As stated, although other researchers considered the influence of stress, social support, or self-esteem on postpartum depression, a unique contribution of this study is that we assess the influence of all three both additively and interactively. In addition, this study is one of the first that includes a sufficient number of African American and European American women together to assess whether differential processes explain potential ethnic-racial differences in changes in depression over the course of pregnancy.

A number of related hypotheses were examined:

1. We predicted that women who experience greater numbers of stressful life events before delivery will have increased depressed mood after delivery compared with women who experience fewer such events, even though many of these events were chronic in nature.
2. We predicted that social support will have both a direct effect and a stress-buffering effect on depressed mood after delivery. Specifically, we hypothesized that women with high social support will experience fewer symptoms of postnatal depression independent of their level of stressful life events, and that they will be less negatively affected by undesirable life events than women with low social support.
3. We predicted that self-esteem will have both a direct effect and a stress-buffering effect on postnatal depression. Specifically, we hypothesized that women with high self-esteem will experience fewer symptoms of depression independent of their level of stressful life events, and that they will be less negatively affected by undesirable life events than women with low self-esteem.
4. Finally, we predicted that the effects of ethnicity on postpartum depressive symptoms will not be independent of the other predictor variables. In other words, we predicted that past findings of more deleterious psychological outcomes of pregnancy for African Americans are attributable to stressful events they experience and their access to personal and social resources.

Method

Participants

Participants were 232 African American or European American women who received care at one of three obstetrical clinics for low-income women located in a midsize midwestern city and who were available for all three

interviews.¹ Of the 232 women who entered the study and were potentially available for Time 2 and Time 3 interviews, 191 (139 European Americans and 52 African Americans; 82.3%) completed the study and 41 did not. There were too few women from other ethnic groups to include them in the analysis ($n = 8$). The women who were approached for participation met several criteria: (a) age between 17 and 40 years, (b) 16 to 24 weeks of gestational age, and (c) free from serious medical complications at intake (e.g., heart disease, childhood diabetes). Charts were screened for complications by medical personnel. Women meeting the criteria were arbitrarily assigned to the study (i.e., other studies were operating at the clinics).

To determine whether there were differences between the 191 who completed the study and the 41 who dropped out, logistic regression was used to predict retention. The results of this analysis indicated that, controlling for ethnicity, other variables had no effect on completion. Ethnic status was the only variable that affected completion; African Americans were significantly less likely to complete. Among the African Americans, 70.3% completed the study compared with 88% of the European Americans.

Procedure

Women were invited to participate in the study by medical personnel during obstetric clinic visits. Clinics operate as one of two major centrally located sites for the pre- and postnatal care of low-income women, mostly on welfare assistance. The study was explained, and the women were assured that their medical care was in no way contingent on their participation. After confidentiality procedures were explained, consent forms were signed by interested women. Most of the women who were approached agreed to participate (80%).

Participants were interviewed once during the second trimester (no later than the 24th week of gestation), once during the third trimester (approximately 7 to 9 weeks before expected delivery), and once 7 to 9 weeks after delivery. They received payments for each interview of \$10, \$15, and \$20, respectively. Completers were eligible to win television sets through a lottery conducted each year of the study.

Interviews were generally conducted at the medical facility or at participants' homes. Interviews lasted 1 to 1.5 hr. Interviewers were a culturally diverse group of female clinical psychology graduate students. They were trained on the interview materials using didactic, videotaped, and role-play procedures. Staff met on a regular basis to discuss issues of cultural sensitivity and to maintain standardized procedures.

Measurement

Information from each of the three interviews was used for this investigation. Demographic variables and family characteristics were measured at the time of the first interview (no later than the 24th week of gestation). These include ethnicity, age, marital status, intimate partner status, number of children, education, and family income. Social support, self-esteem, and prenatal depressed mood were also measured at Time 1. Prenatal depressed mood was measured at Time 1 to assess changes in it over the course of pregnancy. Stress was measured both at Time 1 and Time 2 (7 to 9 weeks before expected delivery) and combined. This was done to assess stress over the course of pregnancy up to the time of the second interview and before delivery. (It should be noted that this measure includes events that may have been experienced before becoming pregnant as well as events that had been experienced up to that point in the pregnancy). Postpartum depressed mood was measured using Time 3 data (7 to 9 weeks after delivery).

Depressive symptomatology. Prenatal and postpartum depressive symptomatology was assessed with three indicators: (a) the Beck Depression Inventory, (b) a measure of severity of depressive symptoms that was developed from a modified version of the Research Diagnostic Criteria (RDC) interview (Spitzer, Endicott, & Robins, 1978), and (c) a single item

measuring dysphoria. We measured depressed mood instead of clinical depression because of our interest in determining risk factors for changes in subclinical depressive symptomatology.

The first indicator of depression was based on a shortened version of the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This shortened version was adapted after pilot data indicated that BDI scores were inflated by the somatic symptoms of pregnancy. Items assessing physical symptoms such as sleep problems and eating difficulties that are commonly reported by nondepressed pregnant women (Items 15 to 21) present a potential source of confound for studies assessing depression during pregnancy (Troutmann & Cutrona, 1990). The scores on Items 1 to 14 were summed as is typically done. The α reliability for this unidimensional, self-reported scale is .79 for both prenatal and postpartum depressed mood.

For the measure of severity of depressive symptoms, interviewers rated respondents on a 6-point scale on each of eight categories of symptoms. The eight categories were appetite disturbance (increased-decreased appetite and weight gain-loss were rated separately), sleep disturbance (decreased or increased sleep were rated separately), fatigue, loss of interest, guilt, impaired concentration, suicidal ideation, and motor disturbance (psychomotor agitation and retardation were scaled separately). Three of eight categories (appetite, sleep, and motor disturbance) had two or more symptoms associated with them, resulting in a total of 13 possible symptoms. Scores on each symptom were adjusted to remove the likely physical effects of pregnancy (O'Hara, Neunaber, & Zekoski, 1984). In addition, 8 items were included that asked the respondent to indicate whether, in the last month, they experienced crying spells, felt pessimistic, were worried, felt inadequate, were irritable, were in need of reassurance, or experienced self-pity.

For this measure of depressed mood, interviewers were trained using prepared videotapes and engaged in role-plays until their ratings achieved interrater agreement above .90 with those of two experienced clinicians involved in the project. Scores on each symptom were summed and used as an indicator of depression. Cronbach's α for this 21-item scale was .77 for Time 1 and .92 for Time 3. The lower reliability at Time 1 may be because the women were experiencing more somatic symptoms at that point in their pregnancy.

The third indicator for depressed mood was a measure of dysphoria that was assessed by a single 7-point item. This item was part of the RDC interview, indicating the depth of dysphoric mood. The question asks each respondent whether she had experienced a sustained period (more than a few days) in the past month or so when she felt sad, blue, moody, down, empty, or as if she did not care about things. If so, she was asked how bad the feeling was: slight, mild, moderate, severe, extreme, or very extreme.

Social support. Satisfaction with social support was measured using the short form of the Social Support Questionnaire (SSQ-6; Sarason, Sarason, Shearin, & Pierce, 1987). This measures the number of individuals who are perceived to be available, the relationship of those mentioned to the respondent, and overall satisfaction with perceived support. The six items that are included in this measure ask about satisfaction with perceived support (a) "when under stress and in need of someone to distract you from your worries," (b) "when under pressure or feel tense and need someone to help you feel more relaxed," (c) "from those who accept you totally," (d) "from those who you can count on to care about you," (e) "from those who can help you feel better when you are down in the dumps," and (f) "from those who you console you when you are very upset." Response categories for each of these items are on a 5-point scale

¹ An additional 47 women completed the study but were not available for Time 2 interviews usually owing to hospitalization, which precluded their being interviewed in the allotted time period; thus, they were not included in the current study.

ranging from *very dissatisfied* (1) to *very satisfied* (5). These items form a scale with an Cronbach's α of .82.

A second measure of social support was derived from the SSQ-6. As far as we know, this measure has only been used in one previous study (Gallagher et al., 1997). This measure is a count of the number of items for which the respondent named their spouse or partner for the six items asked about (range = 0–6). This measure can be considered to be a measure of the breadth of intimacy between the respondent and her spouse or partner. Although only 41% of the participants were married, 68% reported having a romantic partner. The reliability of this scale as measured by Cronbach's α is .83. Because all respondents did not have a romantic partner or spouse to name, initial analyses included an item representing the presence of a romantic partner. (This was shown not to make a difference and was, therefore, eliminated.)

Stressful life events. A series of 50 general and pregnancy life events were assessed as to their occurrence in the past year (first interview) or since the first interview (second interview), adapted from Barnett, Hanna, and Parker (1983). We divided events into conceptually eight related categories. The type of events included events related to (a) death of loved ones, (b) problems with spouse or partner, (c) economic hardships, (d) problems with friends or family, (e) discrimination, (f) pregnancy being a disruption from normal activities, (g) health-related experiences (e.g., hospitalization), and (h) events having to do with potentially health-compromising experiences (e.g., exposure to measles). In these analyses, only the first six indicators were used, because the latter two are directly confounded with pregnancy outcomes.

Self-esteem. This measure consists of the 10-item Rosenberg (1965) Self-Esteem scale. Items were answered on a 5-point scale ranging from *very much agree* to *very much disagree*. Negative items were reverse coded. Positive and negative items were summed into a single indicator because of their high reliability ($\alpha = .87$).

Ethnicity. A dummy variable measuring ethnic status (African American vs. European American) was used throughout the analyses.

Control variables. Several control variables were considered: age, education, a dummy variable for marital status (married = 1), a dummy variable for romantic status (yes = 1), family income, and number of children. Family income in the previous year was measured on an 8-point scale that ranged from less than \$5,000 to more than \$50,000 (1 = 0–\$5,000; 2 = \$5,001–\$10,000; 3 = \$10,001–\$15,000; 4 = \$15,001–\$20,000; 5 = \$20,001–\$25,000; 6 = \$25,001–\$30,000; 7 = \$30,001–\$50,000; 8 = more than \$50,000). Level of education was measured by asking the participant to indicate how many years of formal education she had completed.

Results

Means for all of the variables included in the analyses are presented in Table 1. Postpartum depression is lower than prenatal depression for two of our measures of depression. The results of *t* tests indicate that the BDI and the measure of dysphoria are significantly lower at Time 3 than at Time 1. There is no difference for the severity measure. A similar trend toward lower postpartum clinical depression was previously noted for this sample. Specifically, Hobfoll et al. (1995) found that during the postpartum period, 23.4% of this sample met the RDC for either major or minor depression, 7.3% met the criteria for major depression, and 16.1% met the criteria for minor depression. During the second trimester, these values were 27.6%, 11.5%, and 16.1%, respectively. Hobfoll et al. (1995) also reported changes in the prevalence of clinical depression during and after pregnancy.

Table 1
Means for the Total Sample and by Ethnic Status

Variable	Total sample (<i>N</i> = 191)	European Americans (<i>N</i> = 137)	African Americans (<i>N</i> = 52)	<i>t</i>	<i>p</i>
Depression					
BDI (Time 3)	5.13	4.97	5.54	−0.75	.46
Severity (Time 3)	13.01	12.26	14.98	−0.69	.49
Dysphoria (Time 3)	2.23	2.28	2.08	1.00	.87
BDI (Time 1)	7.93	7.75	8.42	−0.79	.43
Severity (Time 1)	10.65	10.11	12.10	−0.84	.40
Dysphoria (Time 1)	2.61	2.58	2.69	−0.56	.58
Life events (Time 1 + Time 2)					
Pregnancy as disruption	5.05	4.25	7.18	−3.80	.00
Discrimination	1.65	1.65	2.86	−0.23	.82
Economic	7.08	7.56	5.83	2.03	.04
Family and friends	11.48	11.32	11.90	−0.45	.65
Partner	7.93	7.70	8.53	−0.76	.45
Death of a loved one	1.39	1.35	1.48	−0.42	.67
Social support (Time 1)					
Satisfaction	31.96	31.99	31.88	0.16	.88
Partner/spouse	3.43	3.71	2.71	2.87	.01
Self-esteem (Time 1)	29.55	28.68	31.87	−3.87	.00
Demographics (Time 1)					
Age	24.48	24.66	23.98	0.82	.42
Number of children	1.19	1.14	1.31	−0.85	.40
Education	12.01	11.99	12.06	−0.28	.78
Family income	2.69	2.80	2.40	1.47	.14
Married ^a	0.41	0.50	0.17		.001

Note. BDI = Beck Depression Inventory.

^a $\chi^2 = 39.63$.

These data indicate that, of the 30 women who met the criteria for major depression antepartum, postpartum 18 were nondepressed, 7 had minor depression, and 5 had major depression. Of the 50 women who met the criteria for minor depression antepartum, postpartum 38 were nondepressed, 8 had minor depression, and 4 had major depression. Finally, of the 112 women who were nondepressed antepartum, postpartum 91 were nondepressed, 16 had minor depression, and 5 had major depression (see Hobfoll et al., 1995). Taken together, these findings clearly indicate that in this sample depression and depressed mood decreased after delivery.

Some mean differences for the measures are included in this investigation between the 139 African Americans and 52 African Americans. As the data presented in Table 1 indicate, the African American women scored higher on self-esteem and on the measure of stress associated with pregnancy as a disruption. In addition, African American women were less likely to report experiencing economic stress, less likely to receive support from their partners, and less likely to be married.

The data presented in Table 2 show the correlations between the three measures of postpartum depressed mood, ethnic status, and the control variables we initially considered. These data indicate that the BDI is significantly correlated with education and family income. Therefore, these two variables were included in the multivariate analyses. Age, number of children, marital status, and partner status were not significantly associated with any of the three measures of postpartum depression and were, therefore, not included in further analyses. Although ethnic status was not associated with these outcome variables either, it is retained in the analysis because this investigation assesses both the potential additive and interactive effects of ethnicity on depressed mood.

We began the multivariate analyses by using confirmatory factor analysis and structural equation modeling LISREL 8 (Jöreskog & Sörbom, 1993) to assess the adequacy of measurement of latent factors and to test the main effects of stress, social support, self-esteem, and ethnicity on postpartum depression while controlling for preterm depression, education, and family income. This allowed us to test a priori specified hypotheses about the underlying structure of the measurement model and the structural controlling for measurement error (Bollen, 1989). In these analyses, our intent was to estimate a parsimonious model of the relationships of research interest. Next, the predicted stress-buffering effects of social support and self-esteem were tested by examining the interaction of these variables in hierarchical regression models.

The measurement model derived from the LISREL analyses were used to weight the contribution of the indicators to the constructs in the regression analyses. Finally, we assessed whether there were ethnic differences in the effects of stress, social support, and self-esteem on changes in depression.

Measurement Models

Confirmatory factor analysis was used to determine the adequacy of the measurement model (Jöreskog & Sörbom, 1993). We initially estimated a measurement model for the constructs of postpartum depressive symptomatology (three indicators), stressful life events (six indicators), social support (two indicators), and prenatal depression (three indicators). This and subsequent models incorporated the correlation between the latent factors. The results indicated that the fit of the model to the data was less than adequate and could be improved, $\chi^2(59, N = 191) = 189.94, p < .001$, goodness of fit index (GFI) = .87, adjusted goodness of fit index (AGFI) = .80, root mean square error of approximation [RMSEA] = .11. *T* values indicated that loss of a loved one did not load on the stressful live event latent factor and that the number of times that one's spouse or partner was named as someone called on for the six items measuring support did not load on the latent construct measuring social support. Modification indices suggested that removing these items would result in a better fitting measurement model. To improve the fit of the model, these indicators were removed. As a result of these changes, the model was significantly improved, as measured by a highly significant change in chi-square, change in $\chi^2(19, N = 191) = 102.19, p < .001$. These changes resulted in our inability to include a latent construct measuring social support. Instead, for a model that fit the data better, we decided to use a single indicator measuring satisfaction with social support received. The other implication is that our latent construct measuring stressful life events does not include the loss of a loved one.

Table 3 provides the factor loadings for the revised measurement model. All loadings were statistically significant ($p < .01$). Fit indices for this revised measurement model show a good fit with the data.

Structural Equations Models

The structural equation that was initially estimated included the exogenous latent variables of prenatal depressive symptomatology

Table 2
Correlations Among Indicators of Postpartum Depression and Potential Control Variables

Variable	1	2	3	4	5	6	7	8	9
1. BDI	—								
2. Severity	.128	—							
3. Dysphoria	.625***	.174*	—						
4. African American	.055	.051	.073	—					
5. Married	-.093	.007	.002	-.299	—				
6. No. of children	-.010	.052	.019	.062	-.026	—			
7. Education	-.203**	-.081	-.088	.021	.069	-.131	—		
8. Family income	-.143*	-.071	-.103	-.108	.174*	-.120	.232**	—	
9. Age	-.070	-.047	.021	-.059	-.041	.387***	.269***	-.027	—

Note. BDI = Beck Depression Inventory; No. = number.

* $p < .05$ (two-tailed). ** $p < .01$ (two-tailed). *** $p < .001$ (two-tailed).

Table 3
Measurement Model

Construct and Indicator	Factor loading
Depression (Time 3)	
Beck Depression Inventory	.87
Severity	.69
Dysphoria	.84
Stressful life events (Times 1 + 2)	
Pregnancy as disruption	.47
Discrimination	.52
Economic	.71
Family and friends	.43
Partner	.43
Depression (Time 1)	
Beck Depression Inventory	.69
Severity	.90
Dysphoria	.89

Note. $\chi^2(40, N = 191) = 87.75$, goodness of fit index = .93, adjusted goodness of fit index = .89.

(with three indicators) and stressful life events (with five indicators). This model also included single-item indicators for the exogenous variables of social support, African American status, income, and education. Self-esteem was also included as a single indicator based on a highly reliable, 10-item scale as reported previously.

We tested the hypothesized effects. All estimated parameters were hypothesized a priori. In addition to specifying the path coefficient, we allowed some of the residual error terms to correlate. To provide the most conservative model, nonsignificant parameters were set to zero one at a time and the model was reestimated. This was done until remaining paths were statistically significant.

In addition, modification indices indicated that two error terms should be allowed to correlate. These were between the severity indicator and the BDI for postpartum depressed mood and between the BDI for prenatal depressed mood and the BDI for postpartum depressed mood.

In the process of reestimating the model, the control variable of education was removed from the model in order to be parsimonious. Education had no effect on postpartum depressed mood and was not significantly associated with any of the other exogenous variables. Self-esteem and ethnicity did not have significant effects on postpartum depressed mood controlling for prenatal depressed mood. However, they were kept in the model because of their

theoretical relevance and their relationship to other exogenous variables. Correlations among the latent constructs and the remaining single variable indicators before model trimming are presented in Table 4.

As predicted, the correlations indicate that stress was positively related to postpartum depression and social support and self-esteem were negatively related to postpartum depression. Family income and prenatal depressed mood were also correlated with postpartum depressed mood in the expected direction.

The estimated standardized path coefficients and overall fit indices for the trimmed model are presented in Figure 1. As reported in Figure 1, our model explained 27% of the variance in postpartum depressed mood. Results indicate that the data fit the model adequately. As shown in Figure 1, stress was significantly related to prenatal depressed mood and self-esteem. Social support was related to self-esteem. Self-esteem was additionally strongly related to preterm depressive symptoms and to ethnicity, with African Americans having higher self-esteem. Family income was not associated with any of the exogenous variables.

The results predicting postpartum depressive symptoms are consistent with some of our hypotheses. Figure 1 shows that postpartum depressive symptoms were positively associated with prenatal stress and negatively associated with prenatal social support while controlling for prenatal depression as hypothesized. Self-esteem, however, was not related to postpartum depression, controlling for earlier depression.

Stress-Buffering Effects

In the next analyses we wanted to assess the possibilities that the effect of stress on postpartum depressed mood would be buffered by the psychosocial resources of social support and self-esteem. We also tested for interactions between ethnic status and stress and ethnic status and the psychosocial resources. To do this, we tested a series of hierarchical regression equations. The main effects of stress, social support, self-esteem, ethnicity, family income, and prenatal depression were entered first in one block followed by an interaction term in the second block. Five interaction terms were constructed to represent the combination of stress and social support, stress and self-esteem, stress and ethnicity, social support and ethnicity, and self-esteem and ethnicity. In addition to assessing potential stress-buffering effects, our goal was to determine whether the results differ for African American women versus European American women. For these regression analyses, the loading estimated in the LISREL analysis was used in the con-

Table 4
Correlations Among Latent Constructs and Measured Variables

Variable	1	2	3	4	5	6	7
1. Postpartum depression	—						
2. Stress	.49***	—					
3. Social support	-.19*	-.13	—				
4. Self-esteem	-.29**	-.36***	.31***	—			
5. Preterm depression	.49***	.58***	-.11	-.49***	—		
6. Family income	-.15*	-.02	-.04	.03	-.04	—	
7. African American race	-.02	.15*	.02	.32***	.03	-.03	—

* $p < .05$. ** $p < .01$. *** $p < .001$.

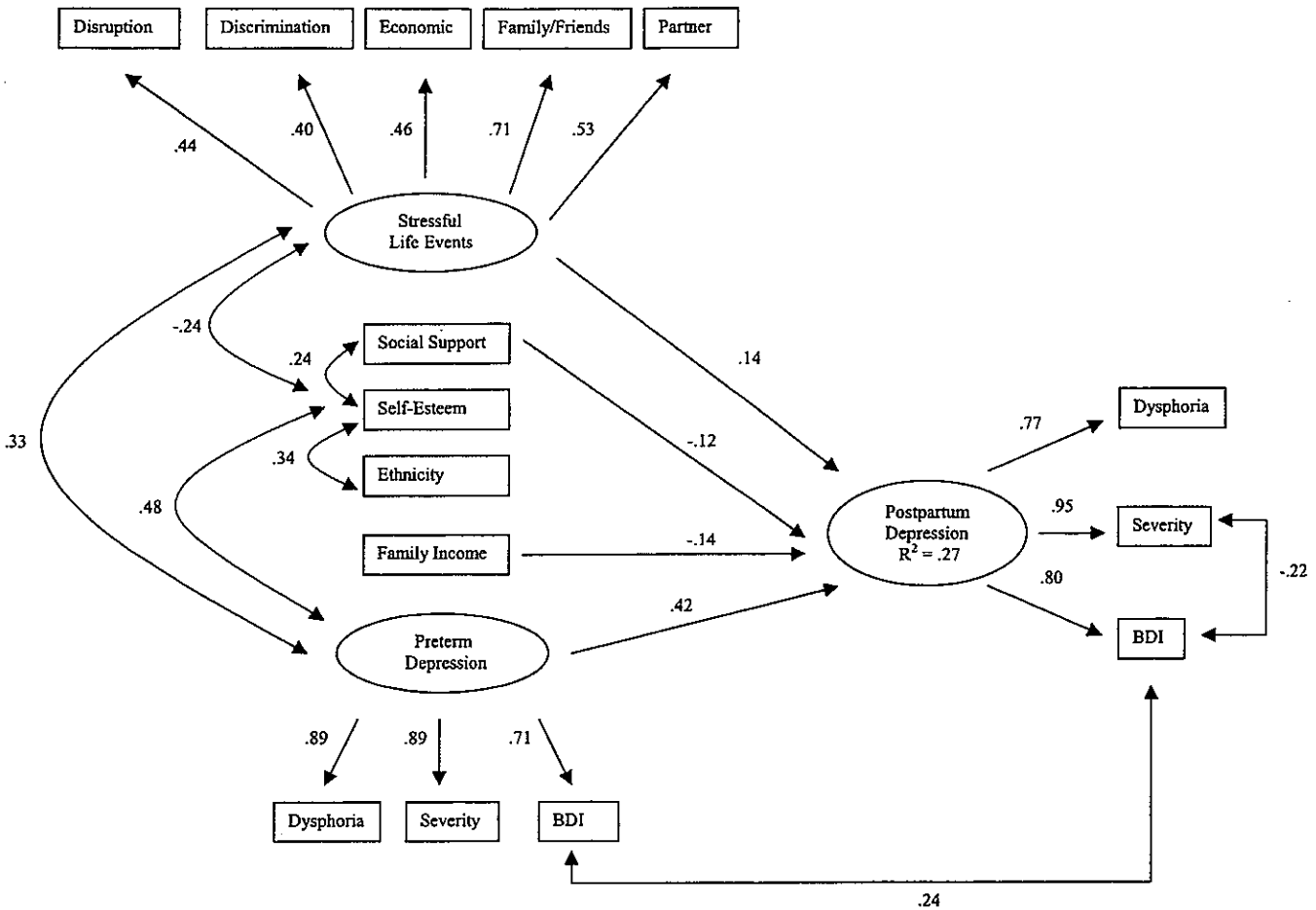


Figure 1. Model predicting postpartum depressive symptomatology, $\chi^2(83, N = 191) = 146.31, p < .001$, GFI = .91, AGFI = .87, root mean square error of approximation = .062. All paths significant ($p < .01$). BDI = Beck Depression Inventory; GFI = goodness of fit index; AGFI = adjusted goodness of fit index.

struction of the variables. None of these interaction terms were statistically significant.

As expected, because the regression results did not involve any significant interactions, they were essentially the same as those derived from the LISREL analyses. The direction, significance, and relative strength of the predictors were the same. For postpartum depressed mood, stress, social support, income, and prenatal depressed mood are once again significant predictors. Because the regression models add no new information over the LISREL model, results are not presented.

Discussion

Our findings indicate that there was a decline in depressed mood over the course of pregnancy, demonstrating the resilience of women in this often stressful period. Therefore, the statistically significant independent variables can be interpreted as predicting decreases in depressed mood. Our results further suggest that less stress, greater satisfaction with social support, and greater income are important predictors of decreases in depressed mood over the course of pregnancy. In addition, higher self-esteem is related to

lower prenatal depressed mood, fewer life events, and greater social support during pregnancy. However, at least for the period of our study, higher self-esteem does not predict decreases in depression. Women who reported higher satisfaction with social support and those who had relatively higher family incomes were more likely to experience decreases in depression over the course of pregnancy. Finally, our findings suggest that the underlying psychosocial relationships are robust and can be generalized to poor women of color as well as to poor White women.

The lack of a Stress \times Social Support interaction does not necessarily indicate that social support is not operating under high-stress conditions more than low-stress conditions. Chronic stressors associated with poverty, relationship instability, employment, and pregnancy being a disruptive factor were endemic to our sample. Few, if any, women could be categorized as truly experiencing low stress at average annual incomes below \$10,000. Hence, the finding for social support should be viewed as affecting a generally highly stressed sample.

Importantly, African Americans and European Americans did not differ in how they were impacted by stress or in their level of

depression when other factors were considered. As shown in Figure 1, the only exogenous variables related to ethnicity was self-esteem. However, positive self-esteem was not predictive of changes in depression. Moreover, the direction of the relationship between ethnicity and positive self-esteem would favor African Americans.

This study has a number of potential contributions to make to the literature on inner-city women's coping with stress during pregnancy. First, our findings help clarify the overlapping influences of multiple resources on depressive outcomes. Consistent with work by Rini et al. (1999) on the interrelated influence of key personal resources on medical outcomes of pregnancy, self-esteem and social support appear to have interrelated influences. This is a key point given that studies often choose a single resource and examine its protective influence based on theoretical notions that ignore the overlap of resources.

Although our finding that greater social support predicts lower depressed mood is consistent with those of Collins et al. (1993), there are important differences in our study that further generalize this finding. In this study, a reduction in depressive symptomatology is being predicted. Second, our study is based on African American and European American women, whereas Collins' et al. (1993) used a sample that was predominately Latina and African American. Third, we included measures of stressful life events, self-esteem, and income, whereas Collins et al. (1993) did not. Fourth, we show that the negative effect of social support on depressed mood holds when depressed mood is measured using multiple indicators and when measurement error is taken into account. Of added importance is the fact that our measure of stressful life events includes items pertaining to general life stress, pregnancy-specific stress, poverty, and urban risk. In sum, this study provides additional evidence that substantiates the effect of social support on depression in diverse samples, including controls, for additional potentially critical variables.

A third important finding was that self-esteem was found to be higher for African Americans than European Americans. This suggests that the tendency to look for deficits among ethnic minority women should not be presupposed, even though they are more likely to bear the additional stress of racial discrimination. Because few studies evaluate African American and European American women who are as comparable as our current sample in terms of income or socioeconomic status, they are likely to confound socioeconomic differences with ethnic variation.

Finally, the study challenges a long-held doctrine that the time of high risk for depression is postpartum (O'Hara et al., 1984; Stanton & Danoff-Burg, 1995; Whiffen, 1992a, 1992b). Rather, for these women, confronting the fact of their pregnancy was the high-risk period. Apparently, by coming to terms with their pregnancy and making life adjustments (e.g., welfare and housing arrangements), many were able to adapt. Those who have ongoing stressful life events and lack social support, however, continued to be at risk, and their depression was diminished less from the prenatal to the postpartum period.

Because we find that levels of depression are higher during pregnancy than postpartum, this appears to be a critical window for intervention (also see Hobfoll et al., 1995). These interventions should encourage, provide training for, or directly inject (e.g.,

home visits by a social worker) a greater shoring up of personal and social resources during this period of risk. This may include providing positive expectations about the potential course of depression over the pregnancy. Intervention should also alert women to the key role that can be played by satisfying social support and might suggest how women could best reach out and use supportive contacts. However, this should be done with the recognition that chronic stressors and economic disadvantage are equally powerful predictors and that changes on this level will be likely to have the greatest public health impact.

Study strengths included the use of culturally trained interviewers, a prospective design, and multiple measures of stress and depressed mood. This is one of the few studies of inner-city women during pregnancy that is based in part on clinical interview assessments of depressed mood. This a particular strength because other studies uniformly relate self-reported stress with self-reported emotional outcomes. We also eliminated health-related stress events, a possible confounding factor in prior work that may have counted health events during pregnancy as additional stressors. These physical stressors may themselves be somatic indicators of depression. Further, by sampling among African American and European American women treated under a single health authority, who were generally of the same socioeconomic status, we may have been better able to reveal important ethnic findings than is typically possible. Finally, unlike most prior work on inner-city women, we obtained a very high retention rate, which aids generalizability.

A limitation of our study is that we did not include measures of social support other than satisfaction with support received. Although we attempted to measure social support as a latent construct, partner support did not load on the construct. It should be noted, however, that prior research using this sample showed that this variable was not predictive of changes in the BDI (Gallagher et al., 1997). It was initially included despite this to assess whether it had an effect as part of a more general construct. Future research on postpartum depressed mood should follow the lead of Collins et al. (1993) and include measures of the amount of support received, its quality and network resources, and types of support (e.g., task, material, confiding, and information).

As is the case in most other prospective studies of depression over the course of pregnancy, we do not have data on a nonpregnant comparison group. O'Hara, Zekoski, Philipps, and Wright (1990) reported no differences in rates of depression during pregnancy or after delivery when childbearing women are compared with a matched sample of non-childbearing women. They did, however, find significantly higher levels of depressive symptomatology among childbearing women during pregnancy and early puerperium (O'Hara et al., 1990). Without a comparison group, it is difficult to assert definitively that reduced level of depression or depressed mood is due to adaptation to the challenges of pregnancy.

Finally, a larger sample size would have allowed a more sensitive test. We had enough power to uncover moderate, but not modest, trends (Kraemer & Thiemann, 1987). Further, we did not have adequate sample size to have confidence in complex three-way interactions. Furthermore, African Americans and single women were somewhat more likely to drop out of the study than

European Americans and married women. However, by including related variables in our analyses, we were able to understand the role of these variables in the processes studied.

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