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Social Support in Pregnancy: Psychosocial Correlates of Birth Outcomes and Postpartum Depression

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This prospective study examined the effects of prenatal social support on maternal and infant health and well-being in a sample of low-income pregnant women (N = 129). Three aspects of support (amount received, quality of support received, and network resources) and four outcomes (birth weight, Apgar scores, labor progress, and postpartum depression) were studied. Results indicated that women who received more support had better labor progress and babies with higher Apgar scores. Women with higher quality support had babies with higher Apgar scores and experienced less postpartum depression. Also, women with larger networks had babies of higher birth weight. Further analyses indicated that the outcomes as a whole were more consistently predicted by instrumental rather than emotional forms of support. Finally, although there was some evidence for stress-buffering effects of support, the overall findings were more consistent with a main effect model.

Social relationships play a central role in shaping the quality of people's lives. Yet surprisingly little is known about the specific social resources that influence health and well-being. This may be due, in part, to inconsistencies between the way that social support is defined and the way it is operationalized (Coyne & Bolger, 1990; Coyne & DeLongis, 1986; Lakey & Cassady, 1990). Empirical research on support and health has been largely intrapersonal despite the interpersonal emphasis of social support theory. As noted by Gottlieb (1985), "investigators have settled into a way of measuring social support that makes it a property of the person rather than an environmental resource or at least an interpersonal exchange that has some basis in actual experience" (p. 357).

In seeking to understand the role of supportive relationships in well-being, it is important to distinguish between the effects of social support on psychological versus physical health. Although there is fairly strong evidence that social support is beneficial to psychological well-being (see Kessler & McLeod, 1985, for a review), research on physical health outcomes has been less conclusive (for reviews, see Berkman, 1985; Schwarzer & Leppin, 1991; Wallston, Alagna, DeVellis, & DeVellis, 1983). Here, shortcomings in the measurement of social support, coupled with methodological weaknesses, have made it difficult to draw definitive conclusions (Cohen & Syme, 1985). For example, the dependent measure of health used in most studies is self-reported symptomatology, a highly subjective index that is influenced by a variety of personality, mood, and cultural factors (Pennebaker, 1982). Unfortunately, the few studies that have included more objective outcomes such as mortality and morbidity (e.g., Berkman & Syme, 1979; House, Robbins, & Metzner, 1982; Schoenbach, Kaplan, Fredman, & Kleinbach, 1986) have used structural measures of support that provide little information about the functional aspects of relationships that may contribute to people's health (Berkman, 1985; Cohen & Syme, 1985). Thus, after years of research, many questions about the health benefits of social support remain.

The present article addresses some of these questions by examining the effects of enacted support in a prospective study of women during pregnancy. Our primary focus was on objective indicators of maternal and infant health, although significant psychological outcomes were studied as well. Examining social support in the context of pregnancy is valuable for a number of reasons. First, unlike illnesses such as coronary heart disease or cancer, pregnancy is relatively short in duration and has specific endpoints. Second, pregnancy is a health event for which there is a defined set of physical and mental health outcomes. Measures such as infant birth weight provide reliable and objective indicators of infant health, and maternal postpartum depression is a well-researched mental health outcome. Finally, there is a pressing need for further research on the psychosocial variables that contribute to birth outcome. The United States has an alarmingly high infant mortality rate, and biomedical risk factors alone are poor predictors of adverse birth outcomes (In-

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stitute of Medicine, 1985). As a result, researchers have become increasingly interested in the psychosocial factors that may contribute to maternal and infant health (e.g., Bragonier, Cushner, & Hobel, 1984; Istvan, 1986; Lobel, in press). Indeed, in his classic review, Sidney Cobb (1976) highlighted the importance of social support in pregnancy.

Conceptualizing Social Support

There is some agreement that support involves the exchange of social resources between individuals (Cohen & Syme, 1985; Kahn & Antonucci, 1980; Shumaker & Brownell, 1984; Thoits, 1985). A number of taxonomies have been developed to identify these resources (e.g., House, 1981; Weiss, 1974; Wills, 1985), and there is consensus on at least three broad categories of provisions: (a) emotional support (expressions of caring and esteem), (b) informational support (advice or guidance), and (c) instrumental support (tangible goods or assistance with tasks).

Although theoretical definitions of social support emphasize the interpersonal exchange of resources, the vast majority of studies operationalize support by asking people to report on whether support is available to them rather than whether they have actually received support from others. Measures of *available support* concern a person's general perception or belief that people in their social network would provide assistance in times of need. In contrast, *received* or *enacted* support refers to supportive exchanges that have actually occurred within a specific context. These exchanges may be directly observed, but they are most often measured by asking people to report on support that they have received in some recent time period (e.g., Barrera, Sandler, & Ramsey, 1981).

As noted by Schwarzer and Leppin (1991), perceived available support is anticipatory, whereas received support involves behaviors that are perceived to have actually occurred. And, whereas we might expect the two forms of support to be closely associated, they appear, instead, to be largely independent constructs. For example, in a review on this topic, Dunkel-Schetter and Bennett (1990) found that in studies that measured both constructs, expectations of available support were associated only modestly or not at all with actual support received in specific situations (also see Barrera, 1986). In addition, researchers are beginning to conclude that perceptions of available support are more closely tied to stable individual differences than to environmental provisions that exist outside the individual (Bolger & Eckenrode, 1991; Lakey & Cassady, 1990; Sarason, Sarason, & Shearin, 1986).

Both aspects of social support—its availability and its receipt—are likely to be important in understanding the various ways in which social relationships may influence health and well-being. Nevertheless, when ongoing events require the continued regulation of emotional and environmental demands and it becomes necessary to seek the help of others, a person's well-being should depend largely on the amount and quality of supportive provisions received from his or her network (Gottlieb, 1985). As Gore (1985) stated, "the question of a stress-buffering effect of social support, strictly speaking, is contingent upon evidence that support is mobilized, not that it exists as a potential" (p. 269). Understanding these processes calls for increased attention to environmental and behavioral perspectives of social support, which have been underemphasized in the research literature.

A shift from studying available support to studying aspects of received support requires that a number of important conceptual issues be considered. First, received support is complex and multidimensional (Dunkel-Schetter & Bennett, 1990; Shinn, Lehmann, & Wong, 1984; Tardy, 1985). Past research has often simply measured the frequency of supportive acts or the number of network members who provided types of support. Yet, whether support is given in a considerate manner and whether the recipient is satisfied with it are likely to be crucial in determining whether such provisions are beneficial (Barrera, 1981; Dunkel-Schetter, Blasband, Feinstein, & Herbert, 1992). Thus, quality of support received may need to be distinguished from the amount or quantity of support given. Other important distinctions can be made between different types of support received (i.e, instrumental vs. emotional) and between different providers of support (e.g., friends vs. family). Support researchers and theorists have tended to emphasize the value of emotional support, but several studies suggest that the provision of instrumental support may be a critical resource for successfully managing many life challenges (Kaniasty & Norris, 1992; Schaefer, Coyne, & Lazarus, 1981).

A second concern in assessing received support is that the demands of a particular stressor and the ecological context must be considered (Cohen & Wills, 1985; Dunkel-Schetter & Bennett, 1990; Vaux, 1988). Different recipients of social support and different stressors may vary in the extent to which they benefit from specific types of social support (Cutrona & Russell, 1987; Hobfoll, 1989). In addition, certain outcomes (e.g., physical vs. mental health) may be more strongly associated with particular types or aspects of support (Kaniasty & Norris, 1992). For these reasons, beneficial health effects of received support should be more easily detected in studies of particular life events (and particular samples) rather than general population studies that involve assessments of life events in general (Kessler & McLeod, 1985; Wethington & Kessler, 1986).

Finally, an important issue to consider is the timing of the support measures with respect to the developmental time course of a health outcome. As noted by Cohen (1988), short-term changes in a person's behavior or in one's environment are unlikely to have an impact on outcomes that have a long developmental sequence. Hence, repeated measures of social support would provide a more valid assessment of the social provisions received over the course of a stressor as well as a more reliable and powerful basis for detecting their effects. Many past studies have been cross-sectional, and longitudinal studies have failed to measure support on more than one occasion.

In sum, strong tests of the effects of received support in correlational studies will require that researchers be responsive to a number of important conceptual issues not addressed in past work. In the present study, we responded to these issues in several ways. First, we studied social support in a group of individuals experiencing a common life challenge—pregnancy—increasing the likelihood that support effects could be detected. Second, our support measures were specifically designed with consideration of the support needs and experiences of this population, and our instruments were tailored to our particular sample, which was composed of women of diverse ethnic back-

grounds, low levels of education, and low income. Third, we assessed several types of support and measured the amount of support received, as well as satisfaction with that support. Finally, we measured support on multiple occasions throughout pregnancy.

Role of Social Support in Pregnancy

How might social support promote maternal and infant health? Although pregnancy and the birth of a child are often joyful, they are also typically stressful experiences characterized by substantial psychological and physical change (Lederman, 1984; Reading, 1983). Supportive relationships may enhance feelings of well-being, personal control, and positive affect, thereby helping women to perceive pregnancy-related changes as less stressful (Norbeck & Anderson, 1989; Tietjen & Bradley, 1985). This may result in lowered rates of stress-induced biochemical responses and fewer stress-related health behaviors such as smoking and alcohol use (Pagel, Smilkstein, Regen, & Montano, 1990). Pregnancy is also a health challenge that requires specific health-care regimens. Informational support may provide guidance with respect to adequate prenatal care, proper nutritional and health-care practices, and preparation for labor and delivery (Aaronson, 1989; Burnes-Bolton, 1988; Zweig, LeFevre, & Kruse, 1988). In addition, help with daily tasks such as household chores and child care can provide needed assistance with physically taxing demands that may be harmful to expectant mothers, especially late in pregnancy (Mamelle, Laumon, & Lazar, 1984; McDonald et al., 1988).

Although social support should be valuable to all expectant mothers, life circumstances may place some women in greater need than others. For example, adolescents, unmarried women, and women with few economic resources may be especially likely to benefit from support. Pregnancy is not uniformly stressful for all women, and there is growing evidence that women with especially high prenatal stress are at greater risk for poor outcomes (Lobel, Dunkel-Schetter, & Scrimshaw, 1992; Turner, Grindstaff, & Phillips, 1990; see Lobel, in press, for a review). Consequently, the effects of social support on maternal and infant health may be more pronounced among women who experience high levels of environmental stress. Interactions between support and stress are generally interpreted as evidence for a stress-buffering effect of social support (Cohen & Wills, 1985).

Although only a handful of studies have examined the physical health benefits of social support in pregnancy, there is some evidence for both main effects (Boyce, Schaeffer, & Uitti, 1985; Pagel et al., 1990; Turner et al., 1990) and stress-buffering effects (Barrera & Balls, 1983; Norbeck & Tilden, 1983; Nuckolls, Cassel, & Kaplan, 1972) in correlational studies. However, variations in measures of support and birth outcomes make it difficult to abstract a clear pattern and, unfortunately, most of these studies used very limited measures of support. Some studies used only retrospective reports of support (e.g., Berkowitz & Kasl, 1983), others confounded social support with other constructs (e.g., Nuckolls et al., 1972), and none have adequately tested the effects of enacted support. Other important shortcomings include the assessment of support only once during pregnancy and failure to control for medical risk factors and background factors that may covary with support. Nevertheless, the value of enacted support has been clearly demonstrated in two experimental studies that found that providing women with a supportive companion (or "doula") during labor dramatically reduced labor length and complications (Kennell, Klaus, McGrath, Robertson, & Hinkley, 1991; Sosa, Kennell, Klaus, Robertson, & Urrutia, 1980).

Present Study

The present study examines the effects of prenatal social support on birth outcomes and maternal depression in a sample of economically disadvantaged women. This research had three primary goals. The first goal was to test the effects of different aspects of enacted support (e.g., quality vs. quantity) on maternal and infant health and well-being. It was predicted that women who received more social support and higher quality support during pregnancy would have healthier babies, better progress in labor, and fewer depressive symptoms after childbirth. A second goal was to determine whether specific types of support (i.e., instrumental vs. emotional) were more strongly associated with particular outcomes (e.g., physical vs. psychological health). Given the needs of the population being studied, we predicted that instrumental support would emerge as especially beneficial. Our final goal was to determine whether social support was more strongly associated with health and well-being in women who experienced the highest levels of stressful life events. Because our sample was composed of low-income women with many sources of stress in their lives, we expected there to be stronger evidence for main effects of support than for stress-buffering effects.

Method

Overview

The current study used a subset of data from a larger investigation of psychosocial factors in pregnancy conducted in the public prenatal clinic of a university-affiliated hospital (also see Dunkel-Schetter, Lobel, Collins, Hobel, & Scrimshaw, 1993; Lobel et al., 1992). The clinic serves women from the local area, most of whom are economically disadvantaged. Information was gathered on a variety of psychological and social variables, but this report is concerned only with findings related to social support. Women were interviewed on multiple occasions throughout pregnancy. Some aspects of social support (amount and quality of received support) were measured repeatedly; other aspects (social network and satisfaction with support from baby's father and from health-care providers) were measured at a single interview only. Birth outcomes were abstracted from medical charts, and maternal postpartum depression was assessed in a single postpartum interview. Multivariate analyses were conducted using structural equation modeling, which allowed us to simultaneously examine the impact of different aspects of support on several correlated birth outcomes while controlling for background factors and medical history.

Subjects

Eligibility and recruitment. To participate in the study, subjects were required to be at least 18 years of age, at 15 weeks or less gestation,

and able to speak either English or Spanish.[1] Of all the eligible women approached during a 3-year span, 88% agreed to participate. Reasons for not enrolling included not wanting to discuss personal topics, feeling too tired, and husband's disapproval.

Current sample description. The current sample was composed of 129 women enrolled in the project who delivered a live infant at the study hospital and completed a postpartum interview. On average, subjects were 12.4 (SD = 3.2) weeks pregnant upon entry into the study. Participants ranged in age from 18 to 42 (M = 27.7, SD = 5.1) years and had an average of 10.8 (SD = 3.3) years of education. The sample was primarily Latina (65%), with a small percentage of African-Americans (20%), Anglos (13%), and others (2%). The majority of women (68%) were multiparas (had previously borne children), and more than half chose to be interviewed in Spanish. A total of 58% of the subjects were married, although 78% reported living with the baby's father at the time of entry into the study. Although we did not gather information on income, approximately one in five subjects (21.5%) reported that they received no monetary support from the baby's father. In addition, 70% of the women in the sample reported that they had difficulty paying for medical care and meeting monthly expenses, and over 50% reported difficulty in paying for food. Most subjects paid for prenatal care on a visit-by-visit basis or had public medical assistance.

During the period of data collection, an additional 134 clinic patients enrolled in the project but did not complete all components of the study and are therefore not included in this report. Known reasons include spontaneous abortions, therapeutic abortions, transfer to private care or to other medical facilities, moving, and no return for postpartum care, with attempts at telephone contact unsuccessful. Analyses of partial questionnaire data showed that these women were not significantly different from the present sample with respect to age, education, parity, or marital status. However, the current sample was significantly more likely to be Latino and living with the baby's father. Additional analyses of 65 women who had medical records data showed that women in the present sample were at lower medical risk and delivered babies that weighed slightly more and had higher Apgar scores than women not in the sample (all $ps < .05$). Although these differences tended to be small, they indicate that the current sample was somewhat better off than those who did not complete all components of the study, as might be expected. These differences, however, suggest that any results obtained with the current sample may underestimate, rather than overestimate, the effects of support on birth outcomes.

Measures

The selection of measures was made with particular concern for the sample's cultural and linguistic diversity, low level of education, and the necessity to administer interviews in the clinic quickly and with ease. Standard scales and specially developed sets of structured questions were used to assess the major study variables. All measures required equivalent Spanish and English versions, and the selection, adaptation, and translation of measures took place during 1 year of pretesting in the clinic. Instruments were chosen and developed so that they yielded equivalent meaning in Spanish and English and could be easily understood by women with little formal education. All instruments were translated in a forward and backward fashion by experienced translators. Because there are national and dialect differences in the way that Spanish is spoken, translations were also confirmed by a group of Spanish-speaking research team members with varying national backgrounds.

Received social support. On the basis of the guidelines discussed above, we developed a measure of social support that would be appropriate for low-income pregnant women and would be meaningful to administer repeatedly.[2] Of the forms of support identified in the theoretical and empirical literature, it was expected that four types would be most applicable to this sample: (a) material aid, (b) assistance with tasks, (c) advice or information, and (d) listening while one expresses beliefs or feelings.

The social support instrument had four sections, one corresponding to each type of support. For each section, subjects were first asked whether they had received that type of support in the previous week. For example, to assess task support, women were asked, "In the past seven days, did you get help from anyone with things you had to do such as errands, household tasks, or child care?" Responses were recorded as yes or no. If subjects answered yes, they were asked to list who provided that type of support and to rate how satisfied they were with the support that person had provided on a scale from 1 (*not at all*) to 4 (*very much*). The current sample was queried about received support an average of four times during pregnancy, with the number of interviews ranging up to nine. The vast majority of women (93%) had at least three prenatal assessments.

Several indexes were computed from this measure. First, to provide an overall summary score of the support each woman received during pregnancy, an index of average amount of received support was computed. For each interview, receipt of the four types of support was counted, with 0 indicating no support received, 1 indicating one type of support, 2 indicating two types, and so on. Thus, for any one interview, subjects reported from 0 to 4 types of support received. Scores across interviews were then averaged so that amount of support was not confounded with the number of interviews completed.[3] On average, women reported receiving 1.7 (SD = 0.94) types of support at each interview. Four percent of the sample reported no support at each interview, and only 2% reported receiving all four types of support at each interview. Because we also wanted to explore the relative effects of different types of support, separate indexes were also computed for each of the four types. Thus, women received scores that reflected the average amounts of material, task, informational, and emotional support they received over the course of pregnancy. These scores could range from 0 (for women who never reported receiving that type of support at *any* interview) to 1 (for women who reported receiving that type support at *every* interview). Thus, higher scores on these indexes indicate that

[1] Near the end of data collection, the eligibility requirement based on weeks of gestation was relaxed to allow medically high-risk women who had reached as many as 20 weeks of gestation to participate in the study. This change was initiated to increase the number of high-risk subjects in the study.

[2] Although there are several existing measures of enacted support, none was appropriate for the current study because it was too long, was inappropriate for use with the present sample, or had features that did not meet the project's goals. For instance, the most widely used measure, the Inventory of Social Support Behaviors (ISSB; Barrera et al., 1981), has 40 items, which was much too long for repeated use in the clinic. In addition, this instrument does not differentiate types or sources of support, does not measure satisfaction with support, and contains highly specific behavioral items that were not well suited for our study needs.

[3] An examination of the consistency in these measures over time indicated moderate stability in the amount of social support a woman reported each week and in her satisfaction with that support. Because there was some fluctuation, averaging over the course of pregnancy provides the best overall summary index of the quantity and quality of support received during that time. Nevertheless, the apparent fluctuation raises interesting theoretical and empirical questions about how particular patterns of support or changes in support might influence outcomes. Although the current sample was too small to conduct meaningful comparisons over time, future work might benefit from examining the impact of social support at different points in pregnancy (e.g., across trimesters).

women received that type of support more often over the course of pregnancy.

Next, an index of satisfaction with received support was computed. Average satisfaction ratings from each interview were computed, then averaged across interviews. This score ranged from 1 to 4. The mean satisfaction rating was 3.7 (SD = 0.41). Separate satisfaction indexes were also computed for each of the four types of support.

Baby's father support. An eight-item scale was developed to assess overall support received during pregnancy from the baby's father. This measure was administered once in the third trimester (at 30 weeks gestation, on average) and women were asked to respond in terms of the father's behavior since they became pregnant. Respondents were asked how much the baby's father had provided money, helped with errands, listened to worries and concerns, helped solve problems, and showed that he cared. Two additional items asked how often the baby's father disappointed them and was critical or short-tempered. These seven items were rated on a scale from 0 (*never*) to 4 (*almost always*). A final item asked subjects how satisfied they were, overall, with the support given by the baby's father since they became pregnant, on a scale from 1 (*not at all*) to 4 (*very much*). When factor analyzed, all eight items loaded highly on one factor and were therefore summed to form a single composite.[4] Scores ranged from 6 to 34, with a mean of 26.9 (SD = 6.9). The scale had high internal consistency in both English (α = .94) and Spanish (α = .90).

Health care provider support. A six-item scale was developed to assess satisfaction with support received from health care providers. This measure was also administered in a single interview during the third trimester. Three items asked how satisfied subjects were with the emotional support, information, and overall care they had received from nurses at the clinic. Three identical items asked about support from their doctors. Responses were made on a scale from 1 (*not at all*) to 4 (*very much*). When factor analyzed, all items loaded highly on a single factor and were therefore summed. Scores ranged from 9 to 24, with a mean of 20.59 (SD = 3.7). Cronbach's alpha was .92 for assessments conducted in English and .81 for assessments in Spanish.

Network resources. To assess social network resources, a variable was computed on the basis of number of kin, number of close friends, and whether the subject was living with the baby's father. Subjects were given one point each if they (a) had at least one relative living in the area, (b) had at least one close friend in the area, and (c) were living with the baby's father. The mean network score was 2.7 (SD = 0.50). None of the women reported having no network resources, but 25% of the sample were lacking at least one of the three.

Depression. Postpartum depressive symptoms were measured with the Center for Epidemiological Studies Depression scale (CESD; Radloff, 1977). This 20-item scale is a widely used measure of depressive symptomatology and has been shown to be valid and reliable in many samples, including pregnant women (Turner et al., 1990; Zuckerman, Amaro, Bauchner, & Cabral, 1989). Subjects were asked to respond in terms of how they felt during the previous week. Scores ranged from 20 to 63, with a mean of 33.67 (SD = 10.6). Cronbach's alpha in this sample was .88 in English and .89 in Spanish.

A brief measure of depressive symptoms was also included in each prenatal interview. Women were asked the extent to which they felt sad, felt hopeless, and had been crying during the previous 7 days. Responses to each of these three items were given on a scale from 1 (*not at all*) to 4 (*very much*). Cronbach's alpha ranged from .59 to .83 within interviews, with a mean reliability of .78 in English and .71 in Spanish. The three items were summed for each interview and then averaged across interviews. The mean prenatal depression score was 1.65 (SD = 0.56). When computed across interviews, the reliability was .86 in English and .85 in Spanish, indicating a fair degree of stability in depressive symptoms over the course of pregnancy.

Prenatal life events. A measure of stressful life events was adapted from the Los Angeles Epidemiological Catchment Area study (Golding, 1989) and was administered in the postpartum interview. This measure contained 22 events such as moving, being robbed, having troubles with immigration, and having someone close die. Subjects were asked whether they or a close family member had experienced these events at any time during their pregnancy. Women reported an average of 2.3 life events during pregnancy, with a range from 0 to 10. Twenty-eight subjects (21.5%) experienced no event.

Parity and medical risk. Because women giving birth for the first time have been shown in some studies to experience more adverse outcomes (e.g., Zax, Sameroff, & Farnum, 1975), it was important to control for this variable (parity). Nearly one third (31.5%) of the sample was giving birth for the first time.

Medical risk was scored from information recorded in each woman's medical chart. Although medical risk is often used as a dichotomous variable (i.e., high vs. low risk), a more sensitive continuous measure was developed here that took both prepregnancy and pregnancy conditions into account. A list of 62 criteria considered as contributing to risk was developed after a review of the medical literature and consultation with obstetric experts. Six categories of maternal risk were included on the basis of major medical risk classification instruments (Selwyn, 1982): (a) subject's medical history (e.g., renal disease or epilepsy), (b) family history of diabetes or hypertension, (c) gynecological and obstetric history (e.g., previous stillbirths or second trimester spontaneous abortions), (d) complications of past pregnancies (e.g., pre-eclampsia or placenta abruptio), (e) unusual features of current pregnancy (e.g., multiple gestation or Rh negative status); and (f) current pregnancy complications (e.g., edema or incompetent cervix). Each item was rated 1 if present and 0 if absent. Medical risk was calculated by summing these ratings. Scores ranged from 0 (6.2% of the sample) to 14 (0.8% of the sample). Average medical risk was 3.5, and the median was 3. Although most subjects experienced at least one risk-contributing condition, risk scores for the majority were at the low end of the scale, as would be expected.

Labor and infant outcomes. Birth outcomes were selected on the basis of several criteria. First, we chose outcomes that have the greatest clinical significance and have been examined in prior research on psychosocial and medical predictors of pregnancy outcome. In addition, to be used in regression analyses, the outcome had to be measured on either an interval or an ordinal scale. Finally, to reduce redundancy in our dependent measures, we sought outcomes that were expected to be somewhat independent from one another. On the basis of these considerations, two infant outcomes (birth weight and 5-min Apgar score) and one maternal outcome (abnormal labor progress) were selected.

Birth weight is one of the most important objective determinants of

[4] As one reviewer pointed out, this index includes items on both the frequency of support received from baby's father and overall satisfaction with that support, making the total scale somewhat ambiguous. However, all eight items were highly intercorrelated, and the factor analysis and alpha coefficient provide clear support for combining them into a single composite. It is likely that because women were asked in the third trimester to provide assessments of support from the baby's father throughout pregnancy (a fairly long time frame), they relied primarily on their global evaluations of his supportiveness. This is quite different from the repeated measures of support received, which asked women whether they had been given support within the past week, a much smaller time frame for which they are better able to remember specific interactions and less likely to rely on general evaluations. For this reason, the baby's father support index is probably best considered a measure of overall satisfaction with support from baby's father, rather than a measure of the amount of support from him. Consistent with this, as we will see later, this index was correlated with other measures of support satisfaction but not with the index of amount of support received.

newborn health. In this sample, birth weight ranged from 1,000 to 4,470 g, with a mean of 3,370 g (SD = 636). Eight percent of the sample delivered babies weighing 2,500 grams or less (approximately 5 1/2 pounds), which is generally defined as low birth weight (Cunningham, MacDonald, & Gant, 1989). No infant in the sample weighed more than 4,500 g, which is considered abnormally high birth weight.

Because birth weight is confounded with gestational age, we wanted a measure of infant birth weight that was independent from variations in weeks of gestation. Following procedures suggested by Turner et al. (1990), we regressed birth weight onto gestational age and then computed residual scores (observed scores minus predicted scores). These residual birthweight scores were then used in all subsequent analyses.[5]

Infant Apgar score is the most widely used measure of newborn status. Infants are rated 1 min and 5 min after delivery on five criteria: heart rate, respiratory effort, muscle tone, reflex irritability, and skin color. Each criterion is rated from 0 (*worst*) to 2 (*best*), and these ratings are summed to form the Apgar score. We used the 5-min Apgar score because it is more clinically significant than the 1-min Apgar score (Cunningham et al., 1989). Apgar scores in this sample ranged from 1 to 10, with a mean of 8.7 (SD = 1). Two percent of the sample had a 5-min score below 7, which is considered an adverse outcome.

Maternal labor difficulties were indexed by assessing abnormal labor progress during first-stage labor. Labor progress was coded as 0 if normal, 1 if the mother experienced primary dysfunction, and 2 if she experienced secondary arrest. *Primary dysfunction* refers to a slowdown in the normal progression of first stage labor, and *secondary arrest* refers to the complete arrest of first stage labor for 2 or more hours (Friedman, 1982). Thirty-four percent of the sample experienced some abnormality of labor.

Procedure

Interviewers. Twelve bilingual female interviewers were trained in group sessions and individually on site with the assistance of a survey interviewing consultant, an obstetric nurse, a cultural anthropologist, and clinic staff.

Sequence and timing of interviews. Women were interviewed at each clinic visit throughout pregnancy and once postpartum. Each interview was administered at least 10 days after the preceding one to space interviews for those receiving frequent care. Postpartum interviews were typically scheduled for 4 to 8 weeks after birth. Initially, these interviews were conducted in the clinic when subjects returned for their first visit after birth. However, the number of missed appointments turned out to be extremely high, so telephone interviewing was initiated. The mean number of interviews completed was 7, with a range from 2 to 11.

Medical charts. Medical risk factors, prenatal care variables, and labor and delivery outcome variables were abstracted from subjects' medical charts by obstetric nurses. To calculate interrater reliability, an independent coder, also an obstetric nurse, coded the medical charts of 45 randomly selected subjects a second time. Agreement averaged 92% and ranged from 86% to 100% across five variables appearing in different sections of the medical chart.

Results

Overview

We began with structural equation modeling (SEM) to test the main effects of social support on pregnancy outcomes while controlling for relevant background variables. Next, we examined these effects more closely in correlational analyses to determine whether particular types of support were contributing more strongly to these relationships. Finally, stress-buffering effects were tested by examining the interaction of social support and stressful life events in hierarchical regression models.

Multivariate Analyses of Social Support and Birth Outcomes

We conducted SEM to examine the main effects of social support on birth outcomes while controlling for biomedical risk factors and prenatal depression. This is analogous to fitting several multiple regression equations simultaneously. SEM has many advantages over traditional multiple regression. Among them is the ability to incorporate latent factors, which are composed of several correlated predictors and which enable one to separate error variance from the more meaningful common variance among the measures (Newcomb, 1990). These techniques also allow one to model relationships among the independent and dependent variables, which is especially useful here because the predictors and outcomes were expected to covary.

Specifying the model. An exploratory factor analysis was conducted first to determine whether the five support indexes, or some subset of them, should form a latent variable in the model. A principal-components analysis with orthogonal (and oblique) rotation resulted in a three-factor solution. Three of the support measures (satisfaction with received support, baby's father support, and satisfaction with health-care provider support) loaded on a single factor, whereas the amount of support index and the network index each formed a separate factor. Social network and amount of support may be viewed as reflecting two different conceptualizations of quantity of support. In contrast, the remaining measures appeared to reflect the quality of support received and shared enough variance to be modeled as a single latent variable.

The hypothesized model included six independent variables: (a) a latent construct, labeled *support quality*, composed of baby's father support, health-care provider support, and satisfaction with received support, (b) amount of received support, (c) social network resources, (d) maternal medical risk, (e) parity, and (f) prenatal depression.[6] Several relationships among the predictors were specified in the model. First, it was predicted that more and better support would be associated with less prenatal depressed mood. Thus, our initial model specified correlations between the three support variables and prenatal depression. Second, the three support indexes were allowed to freely correlate with each other. No other relationships were expected among the predictors.

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[5] Two thirds of low birth weight infants are explained by preterm delivery, and the remaining third by growth retardation. As a result, weeks gestation and birth weight are largely redundant and were therefore not included here as separate outcomes. By removing variations in gestational age from birth weight, we are able to disentangle the effects of growth retardation from those of premature delivery. Nevertheless, preterm delivery is an important outcome in its own right and was explored here in supplementary analyses, as described in Footnote 8.

[6] Two additional control variables, age and education, were excluded because they were uncorrelated with all predictor and outcome variables. Although there were some ethnic differences in social support, this variable was also excluded from the model because it was uncorrelated with the birth outcomes and, when partialed out, did not alter relationships between social support and these outcomes.

Table 1
Correlation Matrix of All Study Variables Included in the Multivariate Model

Variable	1	2	3	4	5	6	7	8	9	10	11
1. BF support	—										
2. HCP support	.140	—									
3. Satisfaction received	.328	.336	—								
4. Amount received	−.073	−.084	.163	—							
5. Network	.121	−.033	.027	−.001	—						
6. Medical risk	−.032	−.012	−.018	.041	−.120	—					
7. Parity	−.112	−.095	−.079	−.130	−.056	.087	—				
8. Prenatal depression	−.406	−.050	−.216	.245	−.135	.099	.046	—			
9. Birthweight	.153	.068	−.066	−.041	.198	−.018	.112	−.098	—		
10. 5-min Apgar	.057	.185	.250	.183	−.089	−.069	−.075	.053	.114	—	
11. Abnormal labor	.113	−.027	.017	−.155	.135	.222	−.135	−.080	.254	−.100	—
12. Postpartum CESD	−.326	−.200	−.335	−.002	−.201	.122	−.051	.426	−.202	−.076	−.066

Note. Critical value for Pearson r is .17 at $p < .05$, .23 at $p < .01$, and .28 at $p < .001$, two-tailed. $N = 129$. BF = baby's father. HCP = health care provider. CESD = Center for Epidemiological Studies Depression Scale.

The dependent variables in the model were the four pregnancy outcomes (birthweight, Apgar score, labor progress, and postpartum depression). Two relationships among these variables were predicted. First, because bigger babies are more difficult to deliver, a directional path was included from birth weight to abnormal labor progress. Second, because bigger babies are likely to be healthier, a correlation between birth weight and Apgar score was also predicted.

Finally, the existing research literature was used as a guide for specifying directional paths from the independent to the dependent variables. First, regression paths from all three support indexes to all four outcomes were included in the initial model. In addition, higher medical risk was expected to predict lower birth weight, and medical risk and primiparity were expected to predict more difficulties in labor. Finally, prenatal depression was expected to predict postpartum depression. Table 1 contains the correlation matrix of all variables entered in this analysis.[7]

Testing the model. Model testing was conducted using EQS software (Bentler, 1989). Two indexes were used to assess model fit, the chi-square statistic and the Comparative Fit Index (CFI; Bentler, 1990). A nonsignificant chi-square and a CFI (which can range from 0 to 1.0) greater than .95 indicated a good-fitting model.

The test of our initial model resulted in a chi-square of 48.24 ($df = 39$, $N = 129$, $p = .15$) and a CFI of .92. Although these statistics indicated an acceptable model fit, the CFI suggested that the model could be improved. Several adjustments were made following procedures suggested by Bentler (1989). First, to produce the most conservative model, nonsignificant paths were removed first. On the basis of the results of Wald tests, each such path was removed one at a time, and the model was reestimated. This continued until all remaining paths were significant. On the basis of this, several correlations and regression paths were removed. Next, Lagrange multiplier tests were used to add any statistically indicated and theoretically meaningful parameters one at a time. Only two such parameters were added; both were correlations among the independent variables.

The chi-square statistic for the final model was 41.40 ($df = 49$, $N = 129$, $p = .77$) and the CFI was 1.0, indicating that this model was a very good representation of the data. The final model is presented in Figure 1. All paths are significant at $p < .05$ or greater. Paths with double-headed arrows are interpreted as correlations, and those with single-headed arrows are standardized regression paths.

Relationships among predictors. As shown on the left side of Figure 1, the social support variables were unrelated to each other, with the exception of one significant correlation between the amount of support received and the residual of a single component of the latent construct, satisfaction with support received ($r = .31$). This indicates that women who reported receiving more support during pregnancy tended to be more satisfied with that support. However, this association is unique to this one support quality indicator and is not shared with the other components of the latent factor (satisfaction with baby's father support and with health-care provider support). This may be partly due to shared method variance because, unlike the other support variables, these two were measured on multiple occasions and were always assessed together within each interview. As expected, there were no significant correlations between prenatal social support and medical risk or parity.

As predicted, there were several significant relationships between prenatal support and depressed mood during pregnancy. First, women who reported higher quality support (as indicated by the latent construct) reported less depression during pregnancy ($r = -.24$). In addition to this overall relationship, there was also a unique relationship between prenatal depression and the residual of one component of the latent factor, satisfaction with support from the baby's father ($r = -.32$). This indicates that baby's father support was associated with less prenatal depression in ways not already shared by the other two support quality indicators. Finally, women who received greater amounts of support were more likely to feel depressed ($r = .23$).

[7] To include the full sample in this analysis, missing values on predictor variables were replaced by mean substitution. As would be expected, relationships between the predictors and outcomes were virtually identical before and after this procedure.

This finding is consistent with previous cross-sectional research on received support and probably reflects the "mobilization" of support (Cutrona, 1986; Schwarzer & Leppin, 1991) by depressed women who sought or elicited more social support. There was no relationship between network size and prenatal depression.

Relationships between predictors and outcomes. First, with regard to infant and maternal health outcomes, women with more network resources delivered babies of higher birth weight ($\beta = .20$). Next, women who were more satisfied with their support and who received more support had babies with higher Apgar scores ($\beta = .29$ and $\beta = .19$, respectively). Finally, women who received more support had fewer difficulties in labor ($\beta = -.18$), after controlling for medical risk, parity, and birth weight.

With regard to maternal mental health, women who reported lower quality support and who had fewer network resources were significantly more depressed after childbirth (βs = $-.34$ and $-.15$, respectively, after controlling for prenatal depression). Postpartum depression was unrelated to the amount of prenatal support received.

In sum, this model provides considerable evidence for main effects of prenatal social support on infant and maternal health and well-being. The three components of support studied (amount, quality, and network resources) are largely independent from each other and are differentially related to the various birth outcomes. Moreover, relationships between social support and outcomes remained significant after considering the contributions of relevant biomedical factors. The total variance accounted for in each outcome by all predictors in the model was 4% for birth weight, 12% for Apgar scores, 23% for abnormal labor progress, and 30% for postpartum depression.[8]

Testing an alternative model. Because many models may fit a data set equally well, increased confidence in an obtained model can be gained by demonstrating that it fits better than a reasonable alternative model. This is especially important if the sample size is somewhat small, as in the present case, because reduced power may lead one to accept even a poorly fitting model (because a nonsignificant chi-square indicates a good fit). In the current instance, the most reasonable alternative is to assume that birth outcomes are predicted only by biomedical factors, and that postpartum depression is predicted only by prenatal depression. Thus, a second model was tested in which the three birth outcomes were predicted by medical risk alone, except for labor progress, which was also predicted by parity. Postpartum depression was predicted only by prenatal depression. Correlations among the social support variables were allowed to remain the same, as were correlations between social support and prenatal depression. Relationships among the outcomes also remained the same. In sum, this model was identical to the obtained model except that all regression paths from the social support variables to the outcome variables were removed and thus assumed to be zero.

This alternative model resulted in a chi-square of 77.42 ($df = 53$, $N = 129$, $p = .01$) and a CFI of .81, both of which indicated that the model could be clearly rejected as a good representation of these data. In addition, chi-square difference tests were computed to compare the fit of this alternative model with the fit of the final modified model (shown in Figure 1) as well as with the fit of the original hypothesized model. Results indicated that both the final model, $\chi^2_{\text{difference}}(16, N = 129) = 29.18$, $p < .01$, and the original hypothesized model, $\chi^2_{\text{difference}}(4, N = 129) = 36.02$, $p < .01$, fit the data significantly better than the alternative model. In sum, a model that assumes no effects of social support on birth outcomes and postpartum depression is not supported by these data.

Relationships Broken Down by Type of Support

Because the two repeated measures of received support (average amount of support received and satisfaction with support received) were created by summing across four different types of prenatal support, it was important to explore whether any one type was contributing more strongly to relationships involving these indexes. (Recall that separate receipt and satisfaction indexes were computed for each type of support.) To accomplish this, partial correlations were computed between the support subscales and the four outcomes.[9] For each outcome, the effects of relevant control variables were partialed out, as indicated by the previous multivariate model.

As shown in the upper panel of Table 2, the relationship between amount of support and Apgar score appears to be primarily due to receipt of task and information support, and the association with labor progress is primarily a function of task and material support. In addition, it is interesting to note that although the overall index of support received had not been significantly related to postpartum depression in the structural model, these results indicate that women who received more material support tended to be less depressed after childbirth.

As shown in the lower panel of Table 2, the relationship between satisfaction with received support and Apgar score was primarily due to the quality of task and material support, whereas postpartum depressive symptoms were significantly predicted by satisfaction with material and confiding support. In summary, some types of support were more strongly related to various birth outcomes. Although no one type is clearly superior, task and material support appear to be more consistently related to the various outcomes.

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[8] Because this model was run with birth weight after removing the effects of gestational age, we wanted to be sure that the results obtained were not unique to this modified variable. Therefore, the same model was run using unadjusted birth weight scores. Results from this model were identical to those presented in Figure 1, except that the regression path from network resources to birth weight increased from .20 to .26 and the regression path from birth weight to abnormal labor progress increased from .27 to .34. A final model that included gestational age as an additional outcome variable was also run. No significant relationships were found between any of the prenatal support variables and gestational age at birth. This suggests that any links between social support and low birth weight in this sample are due primarily to growth retardation and not to premature delivery.

[9] Correlations between the different types of support received ranged from .09 (between material and confiding) to .45 (between confiding and informational). Correlations between satisfaction ratings for different types of support ranged from .03 (between material and informational) to .38 (between material and task). Satisfaction ratings were provided only by women who received that specific form of support and, because not all women received each type of support, sample sizes shown in Table 2 for the satisfaction scores are reduced.

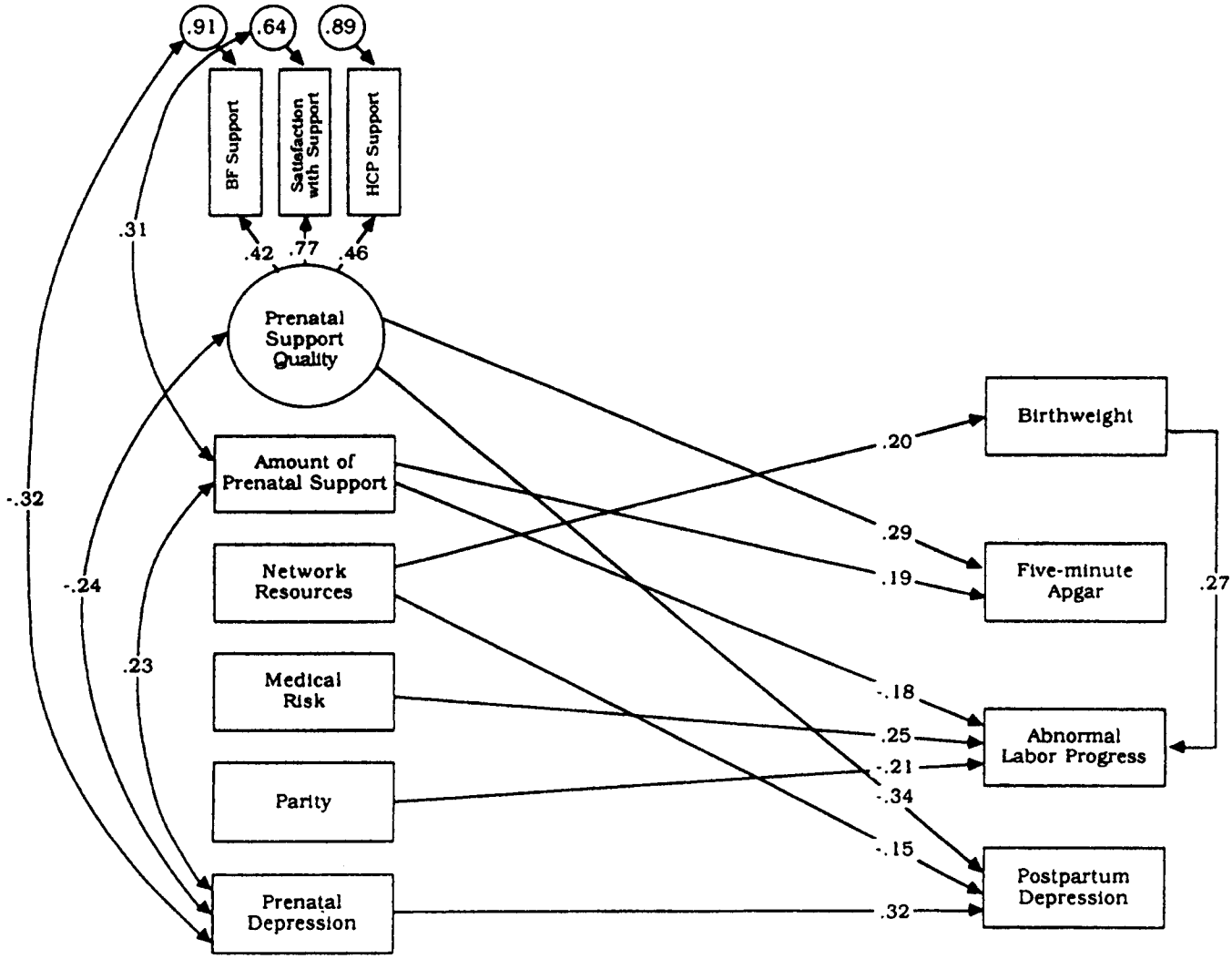

Figure 1. Multivariate model of social support, biomedical risk factors, and birth outcomes. (χ^2[49, N = 129] = 41.40, p = .77; Comparative Fit Index = 1.0; all paths significant at $p < .05$ or less. BF = baby's father; HCP = health care provider.)

Stress-Buffering Analyses

Although we were interested primarily in the main effects of support on birth outcomes, we wanted to explore the possibility that support effects would be more pronounced among women experiencing high levels of life stress, as indicated by the number of prenatal life events.[10] To accomplish this, a series of hierarchical regression analyses was conducted to examine the interactions of social support and life events, which is the conventional method of testing stress-buffering effects (Cohen & Wills, 1985).[11] For each support index, the main effects of social support and life events were entered first, followed by the interaction term. In addition, for each birth outcome, we included the social support variable after controlling for other relevant factors, as indicated by the structural model. For these analyses, we computed a single index of support quality by standardizing and averaging the three components of the latent construct.

First, analyses for the three health outcomes yielded a single significant interaction, which was between life events and support quality for the prediction of birth weight. To illustrate this interaction, the regression of birth weight on support quality

[10] The prenatal life events index was uncorrelated with all birth outcomes except that women with more life events were more depressed after birth (r = .23, $p < .05$). Life events were also associated with prenatal social support. Women with more life events received more support (r = .26, $p < .01$) but were less satisfied with that support (r = -.26, $p < .01$) and with support from the baby's father in particular (r = -.32, $p < .01$).

[11] Structural equation modeling can be used to examine stress-buffering by testing the specified model separately for high and low stress groups (Newcomb, 1990). Our sample size was too small to permit an adequate test of a multiple-group model, so traditional regression procedures were used.

Table 2
Correlations Between Birth Outcomes and Social Support Received Broken Down by Type of Support

Support measure	Birthweight	5-min Apgar	Abnormal labor[a]	Postpartum depression[b]
Amount received				
Task	−.058	.157*	−.220***	.008
Material	.071	.044	−.157*	−.197**
Confiding	−.078	.111	−.070	−.031
Information	−.041	.179**	−.102	−.116
Satisfaction with support				
Task (n = 94)	−.003	.296**	−.136	−.145
Material (n = 71)	−.071	.393***	−.057	−.252**
Confiding (n = 113)	−.002	−.060	.196**	−.179*
Information (n = 81)	.149	.168*	.020	−.043

Note. n = 129, unless otherwise noted.
[a] Medical risk, parity, and birthweight partialed out. [b] Prenatal depression partialed out.
* $p < .10$ ** $p < .05$. *** $p < .01$.

was plotted at one standard deviation above and below the mean on life events (Cohen & Cohen, 1983). As shown in Figure 2, support quality was unrelated to birth weight when life events were low ($\beta = -.06$), but when life events were high, better support quality predicted higher birth weight ($\beta = .26$).

Next, the analyses for postpartum depressive symptoms revealed a single interaction, which was between life events and amount of prenatal support received. To illustrate this interaction, the regression of CESD scores on support received was plotted at one standard deviation above and below the mean on

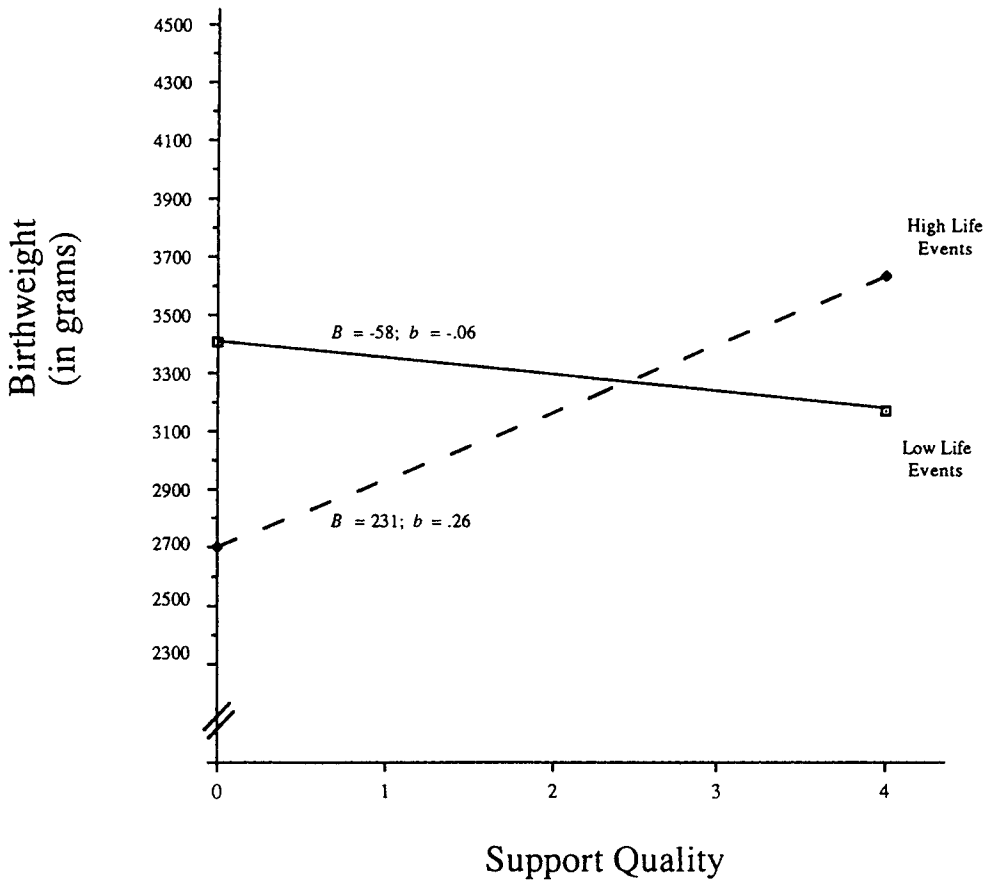

Figure 2. Interaction of life events and prenatal support quality for the prediction of birthweight. (B = unstandardized regression coefficient; b = standardized regresssion coefficient.)

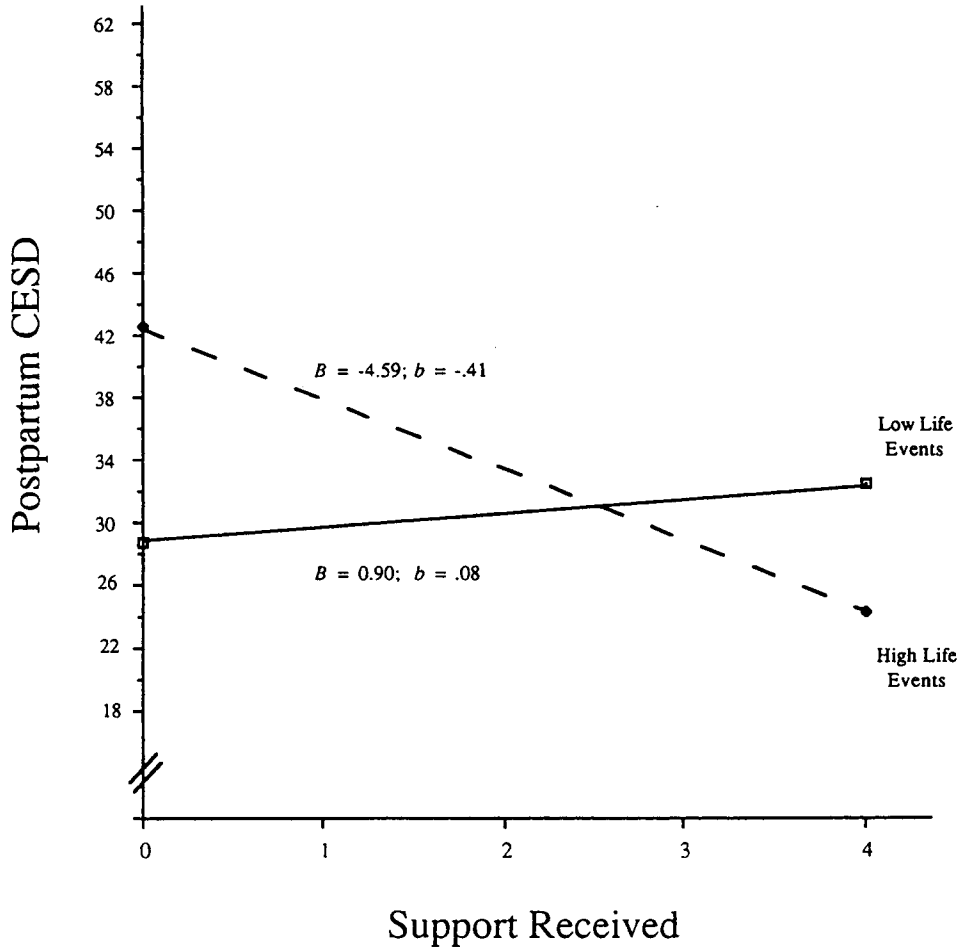

Figure 3. Interaction of life events and prenatal support received for the prediction of postpartum depression (B = unstandardized regression coefficient; b = standardized regression coefficient; CESD = Center for Epidemiological Studies Depression Scale.)

life events. As shown in Figure 3, the amount of support received was unrelated to depression when life events were low (β = .08), but when life events were high, women who received more support were significantly less depressed (β = −.41). Viewed another way, life events was unrelated to depression for women with high support (r = .16, *ns*), but was associated with increased depression for women with low support (r = .33, $p <$ .01). In sum, receiving social support appears to have buffered women against the increased risk of depression associated with stressful life events.

Discussion

Behavioral and social scientists have long been interested in the effects of interpersonal relationships on health. This topic is clearly social psychological in nature and calls for increased attention to environmental and behavioral perspectives of social support, which have been underemphasized in the existing research literature. This investigation addressed this gap in a prospective study of ethnically diverse and economically disadvantaged pregnant women. The findings presented here provide some of the strongest evidence to date linking social support to physical and mental health in pregnancy.

Our primary goal was to test the prediction that women who received more prenatal social support and who were more satisfied with that support would experience fewer difficulties in labor and would give birth to healthier babies. Results provided considerable evidence for the main effects of prenatal support on these objective indicators of maternal and infant health. Women who received more prenatal support experienced better progress in labor and delivered babies who appeared healthier 5 min after birth, as indicated by their Apgar rating. Independent from the amount of support a woman received, those who were more satisfied with that support delivered babies with higher Apgar scores. When broken down by the type of support received, prenatal task, material, and informational support appeared most important for infant Apgar score, whereas prenatal task, material, and confiding support contributed disproportionately to labor progress. Finally, women with more social network resources delivered babies of higher birth weight.

A second focus of this research was to examine psychological well-being during pregnancy and after childbirth. Results pro-

vided clear evidence that women who were dissatisfied with the prenatal support they received (especially from the baby's father) were at greater risk for depressed mood during pregnancy and depressive symptomatology 6–8 weeks postpartum. Having fewer prenatal network resources was also associated with depression after childbirth.

Although other studies have demonstrated positive links between social support and mental health, these findings are some of the first to show clear benefits of enacted support. Past work has tended to find either no effects or negative relationships between received support and well-being. One reason for this may be that researchers have focused almost exclusively on the amount of support received and have failed to measure the quality of that support. In addition, most studies have been cross-sectional. Like a number of these researchers (e.g., Cutrona, 1986; Dunkel-Schetter, Folkman, & Lazarus, 1987; Revenson & Majerovitz, 1990), we found a positive association between distress and the amount of support received when assessed concurrently. This has sometimes been interpreted as a negative effect of support on well-being. To be sure, support transactions may often involve costs to the recipient (such as decreased self-efficacy or increased feelings of indebtedness), which can have adverse effects on adaptation (Antonucci & Jackson, 1990; Rook, 1984). Nevertheless, this probably reflects a mobilization process whereby women who are distressed seek or elicit more support from their network (Barrera, 1986; Dunkel-Schetter, 1984; Schwarzer & Leppin, 1990; Wethington & Kessler, 1986). Consistent with this, the positive relationship between depression and support in this sample did not remain when tested prospectively. Moreover, among women with high prenatal life events, those who received more social support during pregnancy reported less depression after childbirth. Thus, cross-sectional studies are apt to confuse support elicitation and support benefit processes. Because of this, some researchers have concluded that enacted support is too confounded with stress to be useful (Cohen & Hoberman, 1983; Cohen & Wills, 1985; Kessler & McLeod, 1985). Yet, longitudinal designs like ours may be used to untangle these different processes. We also suggest that researchers gather information on the quality as well as the quantity of enacted support.

Although we were primarily interested in the main effects of social support, results provided some evidence for stress-buffering effects. It is interesting to note, however, that none of the main effects resulting from the structural model were qualified by an interaction. Instead, two new effects emerged. Among women with high prenatal life events, those with better support delivered babies of higher birth weight, and those who received more support experienced less postpartum depression. Although our sample size was somewhat small for detecting reliable interactions between social support and life events, that the evidence for stress-buffering was weak is consistent with our belief that behavioral provisions of support should be beneficial to all expectant mothers, especially if, as in the current sample, they face environmental or social–structural stresses that place them at risk. Interactions of social support and life events may be more likely to emerge within samples that are less homogeneous with respect to these variables. Consistent with this, stress-buffering effects in pregnancy have been reported most often with samples of middle-class women (Norbeck & Tilden, 1983; Nuckolls et al., 1972), whereas main effects have occurred more often with adolescents, for whom pregnancy and motherhood are likely to carry additional physical and psychological burdens (Boyce et al., 1985; Cutrona, 1984; Turner et al., 1990).

What are some of the mechanisms that may explain links between social support and health and well-being? A number of specific mechanisms were mentioned earlier, and these can be viewed as mapping onto two general pathways suggested by Cohen (1988): (a) emotion- or stress-induced physiological and biochemical processes, and (b) health-related behavioral patterns. For instance, social support may reduce the extent to which circumstances are appraised as stressful, or might promote positive affect by enhancing self-esteem or feelings of self-efficacy. These may in turn influence susceptibility to illness through effects on neuroendocrine or immune system function or through changes in health-care behaviors such as decreased substance use and improved diet or exercise patterns (Cohen, 1988; Cohen & Williamson, 1991; Cohen & Wills, 1985; Jemmott & Locke, 1984). In the present sample, information abstracted from medical charts and patient interviews provided some preliminary evidence for some of these pathways. For example, women who were satisfied with the support they received experienced less stress during pregnancy ($r = -.34$, $p < .001$), reported less prenatal substance use ($r = -.19$, $p < .05$), and tended to initiate prenatal care earlier ($r = -.16$, $p < .10$). In addition, women with more network resources reported feeling less prenatal stress ($r = -.24$, $p < .01$) and made more visits to the clinic for prenatal care ($r = .20$, $p < .05$). These findings, while very preliminary, suggest important avenues for future research. Additional mediators, such as physical strain or fatigue, may also be useful to examine. For example, providing women with child care or household assistance might reduce heavy lifting or prolonged standing, which have been linked to poor birth outcomes (Mamelle et al., 1984; McDonald et al., 1988). The positive links found between task support and birth outcomes in this study might be explained by this mediator. Understanding how social support protects against pre- and postpartum psychological distress raises yet another set of mediators. The literature in this area identifies a number of factors, including feelings of self-efficacy (Cutrona & Troutman, 1986), attributional patterns (Cutrona 1983; Whiffen, 1988; Whiffen & Gotlib, 1989), and marital quality (Tietjen & Bradley, 1985; Watson, Elliot, Rugg, & Brough, 1984; Whiffen, 1988), all of which are likely to be enhanced by supportive interactions.

Considered together, the findings presented here have a number of general implications for research on interpersonal relations and health. First, the dimensions of social support that were examined in this study—amount of support received, quality of support received, and social network resources—were largely independent from each other and had distinct relationships with measures of health and well-being. Thus, as suggested by Vaux (1988), it seems useful to conceptualize social support as a metaconstruct comprised of a number of theoretically and empirically distinct components. Distinctions between types of supportive provisions were also apparent in this study. For instance, task and material support predicted physical health outcomes more consistently than did emotional support. A similar pattern has occurred in other studies using

different populations (Schaefer, Coyne, & Lazarus, 1981; Seeman, 1984). It is likely that various types of support operate through somewhat different processes (Dunkel-Schetter et al., 1987; House, Umberson, & Landis, 1988), and future research might benefit from giving greater attention to instrumental aid, which has been underemphasized in the support literature.

Understanding the factors that influence support satisfaction appears to be an especially important issue to consider (Henderson, Byrne, & Duncan-Jones, 1981; Vaux, 1988). Although it is yet unclear what factors contributed to evaluations of support quality in this sample, it is likely that both provider and recipient factors are relevant. For example, the mood and receptivity of the recipient, the sensitivity and support skills of the provider, and the quality of the relationship between the provider and recipient are all potentially important factors (Dunkel-Schetter et al., in press; Hobfoll, Nadler, & Leiberman, 1986). There may also be important individual and cultural differences in the way that support is interpreted and used. Although ethnicity did not qualify any of the findings reported here, there were some ethnic differences in social support within our sample. This raises interesting questions about the potentially important role of culture in determining how social support is given, received, and appraised.

Whatever factors contribute to support satisfaction, the current findings suggest that a recipient's subjective interpretations of his or her interactions are likely to play a role in determining whether they are beneficial. We speculate that support quality will be especially critical for physical and psychological health outcomes that are mediated by cognitive processes (such as stress perceptions), whereas the amount of support may have more direct links to other outcomes. For example, if emotional support protects against depression by enhancing self-esteem, then the subjective appraisal of that support should be critical. On the other hand, if assistance with household chores affects a health outcome by reducing a woman's strenuous activity, we need not assume that she subjectively evaluate this support as helpful (or even that she is aware of it). In this way, the amount of support may be directly associated with positive health outcomes regardless of support quality. Consistent with this, we found that the amount of prenatal task support predicted higher Apgar scores and better labor progress, independent of support quality. Thus, future work should distinguish between different aspects of support as well as between different outcomes. Progress in this area should be facilitated by recent theoretical models that attempt to specify the conditions under which different dimensions of social support are beneficial (e.g., Cutrona & Russell, 1990; Hobfoll, Freedy, Lane, & Geller, 1990).

Although structural aspects of support were not the main focus of this study, it is noteworthy that women with more network resources did not report greater amounts of support, as might be expected. This may be due to limitations in our index of network resources, but our finding that women with larger networks delivered higher birth weight infants suggests that social ties influence well-being through processes other than, or in addition to, enacted support. For example, network researchers have argued that social and community ties promote feelings of belonging and attachment, provide positive models and reference groups, and exert pressures to conform to normative standards and to social roles (Fischer et al., 1977; Mitchell & Tricket, 1980; Moos & Mitchell, 1982). Larger networks may also be associated with greater perceptions of available support or with increased opportunities for shared activities and companionship (Rook, 1987).

By focusing on aspects of received support, this study differs from past empirical work, which has emphasized available support, and converges with most current definitions of social support as interpersonal transactions and exchanges. It is important to acknowledge, however, that our measures were not objective indicators of supportive interactions. And, although past research suggests that reports of enacted support are less vulnerable to perceptual and motivational biases than are measures of support availability (Bolger & Eckenrode, 1991; Lakey & Cassady, 1990), it is possible that various biases may influence these reports. Clearly the next step is to incorporate observations into our procedures or to measure support from informants. Yet, as the current study suggests, any efforts to clarify the interpersonal nature of social support should include subjective (e.g., self-report) assessments. This might be accomplished by measuring partners' emotional and cognitive responses during or immediately after support interactions (Bolger & Eckenrode, 1991).

Before concluding, a few additional limitations of this work should be noted. First, although the prospective design and rigorous methodology increase our confidence that prenatal support contributed to outcomes of pregnancy in this sample, causal inferences are still not permitted. Controlled intervention studies are needed to draw definitive conclusions (Elbourne & Oakley, 1990). Another issue not addressed in this study is whether personality or contextual variables affect one's ability to develop supportive networks or one's appraisal of support transactions (Gottlieb, 1985). Past research indicates that help-seeking beliefs (Eckenrode, 1983; Hobfoll & Lerman, 1988), social anxiety and social competence (Cohen, Sherrod, & Clark, 1986), self-esteem (Hobfoll & Lerman, 1989), attachment style (Collins & Read, 1990; Simpson, Rholes, & Nelligan, 1992), and family and cultural norms (Vaux, 1988) are among the many factors that affect one's ability or willingness to make use of social resources. Our finding that different aspects of support were differentially related to various outcomes makes it unlikely that any one personality trait (such as neuroticism) is responsible for our study results. Nevertheless, personality factors are likely to contribute in complex ways to the nature and quality of one's relationships, and research is needed to clarify these links. Finally, our sample was composed of lower income, primarily Latino women, and it is unclear whether these findings would generalize to other populations. We might expect that different types of support, for example, would be more or less beneficial to populations of women who share different life circumstances or cultural histories. Nevertheless, there are strong theoretical reasons, and some empirical evidence using different samples, that suggest that the provision of social support in pregnancy will be beneficial to most, if not all, women.

In conclusion, these findings provide evidence that in the context of a life transition that is stressful for many women, especially those who are economically and socially disadvantaged, the assistance and support provided by others may indeed be consequential to physical and psychological health. This research is an early step toward what we hope will be an increasing

empirical focus on the interpersonal and relational aspects of social support. One continuing challenge is to identify the mechanisms through which supportive interactions affect health and the complex ways in which social and personality factors interact. These issues are central to the development of more comprehensive theoretical models of social support, and they are likely to be critical to the design of interventions aimed at promoting the health and well-being of mothers and their infants.

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