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Social Contingencies in Mental Health: A Seven-Year Follow-Up Study of Teenage Mothers

This paper reports analyses from a 7-year follow-up investigation of women pregnant as teenagers who had been studied during their pregnancy and shortly following their child's birth. The objective of these analyses was to identify potentially modifiable factors that might influence or condition psychological adaptation within this high-risk population. Consistent with prior research, differences in social support and in personal resources or attributes effectively predicted depressive symptomatology, suggesting that such differences constitute crucial mental health contingencies and thereby represent promising intervention targets. Contrary to prior research, differences in stress exposure were found to be of substantial explanatory significance, with lifetime accumulation of major, potentially traumatic events representing the most significant element. These findings suggest the need to develop a greater understanding of socially or programatically modifiable determinants of stress exposure and to take seriously the prospect of developing interventions that reduce such exposure.

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A variety of negative outcomes have been reliably observed among teenage mothers, including diminished employment success (Card & Wise, 1978; Klepinger, Lundberg, & Plotnick, 1998) and increased risk of ending up as a single parent (Kellam, Adams, Brown, & Ensminger, 1982) and of enduring long-term poverty (Hoffman & Foster, 1997; National Survey of Family Growth, 1982). At the same time, it is clear that the nature and adequacy of teenage mothers' social and economic adaptations over time are highly variable (Furstenburg, Brooks-Gunn, & Morgan, 1987). Furthermore, teen mothers vary substantially in their psychological adjustment (Turner, Grindstaff, & Phillips, 1990). Very little is known, however, about factors that might influence this variation—information necessary for the identification of appropriate intervention targets. The fact that the offspring of teenage mothers tend to experience elevated levels of behavior problems, school failure, and emotional impairment, combined with the clear connection between maternal emotional well-being and risk for these child outcomes (Kellam, Ensminger, & Turner, 1977; Spivak & Weitzman, 1987), further justifies attention to these issues.

One of the complexities in studying the mental health of this population is its close association with low socioeconomic status. Researchers who have employed sister-pairs to control for social

and economic disadvantage have discovered additional complexities. Specifically, it seems that an array of adversities occurs with disproportionate frequency in the lives of girls who become pregnant in their teens—both prior to and after the pregnancy—and these associations hold across socioeconomic statuses (Chilman, 1979; Stiffman, Powell, Earls, & Robins, 1990). Subsequent studies have found that these associated adversities contribute in large measure to the social and emotional difficulties that tend to accompany teenage motherhood (Geronimus & Korenman, 1993; Hoffman, Foster, & Furstenburg, 1993).

The fact that pregnancy and childrearing are often just part of a constellation of adversities experienced by a subgroup of female teens raises the question of whether teenage motherhood makes an independent contribution to the social and emotional difficulties that often characterize this population. This study cannot address this question. Rather, our focus is on the identification of potentially modifiable factors that might influence or condition psychological adaptation within a sample of young women who gave birth as teenagers. Specifically, we consider the role and significance of childhood social experience, along with more proximal social and psychological factors, in predicting depressive symptomatology 7 years after the transition to early motherhood. We discuss the results of our analyses in terms of their implications for future research and for future efforts at intervention.

We focus on depression as our outcome of interest because it is well established that depression represents a particularly salient problem for women in general and young women in particular (Nolen-Hoeksema, 1987). Depression is also salient because of its potentially adverse effects on the young women's capacity to form and maintain social and intimate relationships, to perform effectively in educational and occupational arenas, and to provide the attention and nurturance required by young children for optimal security and development.

Background

The persistent evidence for associations between mental health and such factors as gender (Al-Issa, 1982; Nolen-Hoeksema, 1987), marital status (Gove, 1972) and socioeconomic status (Dohrenwend & Dohrenwend, 1969; Hollingshead & Redlich, 1958) has stimulated a substantial body of both clinical and community-based research. These associations have been interpreted as providing clues to the etiology of mental health problems and have directed research efforts toward identification of factors and mechanisms that might be involved. Fundamental to most explanations that have been offered is the assumption that mental health risk varies with level of exposure to social stressors. In this context, stressors refer to situations or events of sufficient force to challenge the capacities of those exposed to them (Wheaton, 1994). The assumed relevance of social stress, of course, has been well justified by data establishing a compelling link between stressful life events and mental health problems (Aneshensel, 1992; Dohrenwend & Dohrenwend, 1974; Monroe, 1992; Tausig, 1982; Thoits, 1983). Moreover, although it has been shown that mental health status can influence subsequent experiences of stressful events (Turner & Noh, 1988), it is clear that a substantial portion of the causation involved in this linkage goes from social stress to mental health status (Thoits, 1983).

The Stress Process

Although there remains little doubt about a meaningful link between stressful life events and psychological distress, it is equally clear that these relationships have been of rather modest magnitude, typically accounting for less than 10% of oberved variation in psychological symptoms (Rabkin & Struening, 1976). Moreover, only a minority of individuals who are exposed to even substantial levels of social stress exhibit significant emotional distress.

These findings have led to two main theoretical elaborations of the role that social stress plays in mental health. One of these elaborations specifies social and personal resources that modify the emotional impact of stressors by conditioning individuals' vulnerability to such stressors. These stress process models (Billings & Moos, 1982; Pearlin, Lieberman, Menaghan, & Mullan, 1981) map out the pathways through which exposure to stressors and the availability of personal and social resources impact (additively and interactively) psychological well-being. Models that include indicators of personal vulnerability to stress explain substantially more variation in psychological distress than do stressful life events alone—a fact that has led researchers to investigate the relative importance of stress exposure differences and of vulnerability differences in explaining adverse mental health outcomes. This research suggests

that differential exposure to life events is substantially less important than differential vulnerability to stress in determining the relationships between mental health and social class, gender, and marital status (Kessler, 1979; Kessler & Cleary, 1980; Aneshensel, 1992; Thoits, 1987)—a conclusion that has focused the attention of mental health researchers on identifying and understanding the social and personal resources that condition vulnerability differences.

The second main theoretical elaboration, however, rejects the view that social stress differences are of only minimal significance for understanding variations in psychological well-being. Its proponents argue that previous measures of stress exposure substantially undersample what Wheaton (1994) has called the ''stress universe'' and thus they underestimate the significance of exposure differences. They also hold that it is important to recognize that the effects of unmeasured differences in stress exposure tend to be masked within research findings as vulnerability effects (Turner, Wheaton, & Lloyd, 1995).

This paper applies both of the described theoretical elaborations in assessing factors associated with the mental health of young women who were pregnant as teenagers. Although we certainly cannot claim fully adequate measurements of stress exposure, we consider a substantially broader array of social stressors than has been typical. The stress process model that we consider also assesses levels of mastery, interpersonal dependency, and social support, along with stress exposure.

Mastery. This construct has been addressed by employing such labels as sense of powerlessness (Seeman, 1959), locus of control (Lefcourt, 1976; Rotter, 1966), personal control (Bandura, 1977, 1982; Gurin, Gurin, & Morrison, 1978), helplessness (Seligman & Mair, 1967; Seligman, 1975), and fatalism (Wheaton, 1983) as well as mastery (Pearlin & Schooler, 1978). Despite differences in emphasis, these concepts are highly similar, and their meanings are reasonably captured by Pearlin and Schooler's (1978) definition of mastery as ''. . . the extent to which one regards one's life-chances as being under one's own control in contrast to being fatalistically ruled'' (p. 5).

There are a number of bases on which to hypothesize the mental health significance of mastery or personal control. Variations in mastery might affect the number and type of potentially stressful events and circumstances that the individual confronts. Because differences in the sense of mastery must be, at least substantially, a product of one's history of successes and failures in social and environmental encounters, this sense must also reflect at least gross differences in social and instrumental effectiveness. Accordingly, individuals high in mastery might effectively avoid or prevent some potentially stressful events and circumstances. Second, assuming that an individual's appraisal of an event depends importantly on the perception of ability or inability to manage or adapt to the situation, those high in mastery might also experience a narrower range of events or circumstances as problematic. Third, a sense of personal agency might attenuate the emotional impact of adverse events because of its implications for the initiation and persistence of efforts to resolve problematic situations (Mirowsky & Ross, 1989; Ross & Mirowsky, 1989). Whatever mechanism or mechanisms might be involved, a greater sense of mastery is associated with reduced risk for psychological distress and depression, with or without exposure to social stress (Pearlin & Schooler, 1978; Pearlin et al., 1981; Turner & Noh, 1983, 1988).

Interpersonal dependency. We define this construct as the degree to which an individual relies on the love and attention of others as a basis for estimating and maintaining her sense of self-worth. We include a measure of this construct in the present study for two reasons. First, findings from clinical studies have identified it as a characteristic of people prone to depression (Chodoff, 1972; Hirschfeld, Klerman, Chodoff, Korchin, & Barrett, 1976; Masserman, 1970). Second, some evidence suggests that women are more likely than men to experience such dependency. Gore and Colten (1991) summarize evidence suggesting that aspects of the socialization process result in a dependency among women ''. . . on the opinions and evaluations of others in making their own judgments of how they are doing, that is, in maintaining self-image and self-esteem'' (p. 150). The central hypothesis associated with the construct of interpersonal dependency is that individuals who rely almost exclusively on the love and attention of others in estimating and maintaining their sense of self-worth are more vulnerable to depression (Hirschfeld et al., 1976). This kind of dependency is thought to result from developmental disruptions in the process of establishing secure relationships. Such individuals may ''. . . become overly preoccupied with interpersonal security and . . . experience problems in maintaining positive

feelings about themselves without external support'' (Barnett & Gotlib, 1988, p. 119).

Social support. Social support has been the subject of an immense body of research that clearly establishes an important association with emotional well-being (e.g., Cohen & Syme, 1985; Gottlieb, 1981, 1983; House, Umberson, & Landis, 1988; Sarason & Sarason, 1985; Turner, Frankel, & Levine, 1983; Vaux, 1988). Moreover, evidence drawn from laboratory animal studies, experimental human studies, and longitudinal field studies collectively provide compelling evidence that a significant portion of the causation involved in this consistently observed connection goes from social support to mental health status (House, 1981; 1987).

Although there is general agreement in the literature that social support is a multidimensional contruct that includes actual supportive transactions along with the perception of being supported by others, it was long ago noted that the bulk of evidence pointing to the mental health significance of social support has come from studies focusing upon perceived support (e.g., House, 1981; Turner, 1992). In House's terms, ''social support is likely to be effective only to the extent perceived'' (p. 27). More recent studies continue to demonstrate that the most powerful correlations between indices of various aspects of social support and measures of psychological distress are found with measures of perceived social support (Kessler, 1992). Wethington and Kessler (1986) present specific evidence documenting ''. . . not only that perceptions of support availability are more important than actual support transactions but that the latter promote psychological adjustment through the former, as much as by practical resolutions of situational demands'' (p. 85). Accordingly, in this paper we focus on the perception of being supported by others, considering from whom the perceived support is derived and including measures taken at different times and with differing time referents.

Hypotheses. We hypothesize the following:

1. Level of stress exposure, including exposure to traumatic events in the distant past, will relate directly to levels of current depression among women 7 years after their transition to teenage motherhood. Stress exposure will also predict changes in depression over the course of those 7 years.

2. Level of mastery and of social support will relate inversely, and level of interpersonal dependency will relate directly, to current depression levels. These factors will also relate to changes in depression levels over the previous 7 years. In the case of mastery and some indices of social support, both initial (during pregnancy) and current measures are available, allowing assessment of the comparitive importance of past and current levels of mastery and social support.

3. Personal resources and social support will act to mediate or moderate the impact of stress exposure on levels of depression.

Method

Sample Selection and Retention

The data for this paper derive from a longitudinal prospective study of pregnant adolescents residing in southwestern Ontario. Subjects were initially recruited between 1983 and 1986, primarily from the caseloads of family physicians and obstetrician–gynecologists practicing in the area (84.5%), supplemented by cases recruited through public health nurses providing care to pregnant teens (4.6%) and through newspaper ads (10.9%).

We conducted in-person interviews with recruited teenagers at three different times: (a) as soon as possible after medical confirmation of pregnancy; (b) approximately four weeks following the delivery of the baby; and (c) approximately 7 years later. Except when the participant preferred an alternative site, we conducted the interviews in the young woman's residence. We completed 284 prebirth interviews and 251 postbirth interviews. Comparisons of cases lost with the total initial sample, on an array of characteristics, revealed only one significant difference. Lost subjects tended to be slightly younger than those for whom we obtained complete data. At the Time 3 follow-up, 7 years after the postbirth interviews, we interviewed 213 subjects, or 85% of the 251 women for whom postbirth data had been obtained. The mean age of participants at Time 1 was 17.6 years, with 22% being 16 or younger. At Time 3 the median annual household income for the sample was $23,000 (approximately $17,000 U.S.), with 36.2% of participants being married, 26.8% unmarried but cohabiting, 4.7%

still living with their family of orientation, and 32.4% remaining single and living on their own. Of the 213 mothers, 162 retained custody of the index child at the time of the 7-year follow-up interview.

Our inability to obtain information on young women who chose not to participate in the study limits our capacity to identify biases that might have occurred at cohort formation and thus limits our ability to estimate generalizability of findings. Our research procedure involved monthly telephone calls to the 120 family physicians and obstetrician–gynecologists who cooperated in the study, to determine whether any pregnant teenagers had appeared or had pending appointments. The anonymous information provided was recorded in a log book as a basis for comparison with interviewed subjects. From these data, we estimate that participating physicians were involved with some 447 pregnant teenagers during our catchment period, yielding 240 participants. These data suggest a rate of loss of about 46%. However, we presume that a significant proportion of those lost chose to terminate their pregnancy and hence did not meet inclusion criteria. Ontario Ministry of Health data reveal that approximately 50% of all teenage pregnancies ended in abortion during the period of our study recruitment, suggesting that a substantial majority of those comprising the 46% lost might have terminated their pregnancy. If the very conservative assumption is made that only half of these young women chose abortion, our loss rate would be about 30%. Data from the Ontario Ministry of Health also allowed comparison of our Time 1 sample with all teenagers giving birth in the same geographical area and over the same period on the factors of infant birthweight, gestational age, infant sex, maternal age, paternal age, and marital status of the mother. With the exception of paternal age, we found no substantial or statistically significant differences between the study group and the total population of parturient adolescent women. Although this is reassuring, we cannot dismiss the possibility that the original sample was biased with respect to other variables.

Reflecting the population from which they were drawn, study participants were largely of European ancestry, with the exception of a very small proportion from one of Canada's native groups. Because African-American and Hispanic minorities are overrepresented among teenage mothers within North America in general, the present sample can hardly be fully representative. However, the twin facts that (a) much of the research in the field, including highly influential studies (Furstenberg, 1976; Furstenberg et al., 1987), has focused exclusively or largely on African-Americans, and (b) that the majority of teenage mothers are White, suggests that this sample might fill an important scientific need. Another strength is that we assembled the sample in the context of the Canadian health-care system, which provides free and genuinely equitable access to all relevant services. The sample is thus unaffected by the various selection biases, faced by most studies, associated with health insurance or income issues or related limitations on where and from whom care could be recieved. We believe that findings from this sample can be cautiously generalized to a substantial proportion of the population of interest, with the understanding that their applicability to minority groups is uncertain.

The analyses presented here are based on Time 1 and Time 3 observations, with the exception of those that focus on the dependent variable of changes in depressive symptomatology over time. In these instances, change in depressive symptoms is assessed in relation to scores obained at Time 2 (4 to 6 weeks following the birth).

Measurement

Psychological adaptation. We assess psychological adaptation in terms of depressive symptomatology as measured by the Center for Epidemiological Studies Depression Scale (CES-D). This 20-item instrument was designed to measure an individual's current level of depressive symptomatology, with emphasis on depressed mood. Ample evidence suggests the reliability and validity of this widely used instrument (Devins & Orme, 1985; Husaini, Neff, Harrington, Hughes, & Stone, 1980; Radloff, 1977; Roberts & Vernon, 1983; Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977). In our data, the reliability of this scale (Cronbach's alpha) is .88 at Time 2 and .92 at Time 3.

Social stress. Our effort to achieve a more comprehensive estimate of variations in exposure to social stress considers *stressful life events, enduring or chronic stressors*, and *major lifetime traumas*. We assessed stressful life events using a 31-item checklist of negative events common to a number of life event indices (Henderson, Byrne, & Duncan-Jones, 1981; Holmes & Rahe, 1967; Sarason, Johnson, & Siegel. 1978; Turner et al.,

1995). The list includes such items as ''Was there a serious accident or injury?,'' ''Was there trouble with the law?,'' and ''Was [a family member] fired or layed off?'' We asked respondents to indicate which of the 31 events they had experienced personally over the preceding 12 months. We also asked whether their spouse or partner had experienced any of 18 of these negative events, whether their children had experienced any of 11 of these events, and, for 7 events, whether other relatives or friends had been affected. In the analyses presented here, we estimate exposure to eventful stressors by a simple count of events that happened to the respondent or to someone close to her.

We assessed enduring or chronic stressors using 36 items drawn from the inventory developed by Wheaton (1991, 1994; see also Turner et al., 1995). These items provide a subjective assessment of life conditions and situations in such areas as general or ambient stress, financial stress, work stress, marital or relationship stress, and parenting stress. Examples from the 10-item marital or relationship stress section are: ''Your partner doesn't understand you,'' ''Your partner expects too much of you,'' and ''Your partner is always threatening to leave or end the relationship.'' Wheaton (1991) has argued that the subjective component in these stressors is an inherent part of what they are, and he presented evidence that the observed association between his measure of chronic stress and mental health outcomes cannot be attributed to either measurement or causal confounding.

We obtained data on major lifetime events or traumas by means of an 18-item inventory that asked whether each event had ever occurred and, if so, the respondent's age at the last occurrence. This measure, which is a slightly shortened version of Turner and colleagues' checklist (1995), addresses such experiences as parental death, physical abuse by a parent, physical abuse by a spouse or partner, and a life-threatening accident or illness. Because this instrument and related issues have been discussed in some detail elsewhere (Turner & Lloyd, 1995), we will summarize just two points that are pertinent for our purposes. First, there is good evidence that most of the major events considered, both singly and in combination, can have important long-term mental health consequences. Second, respondents report these potentially traumatic experiences with reasonable reliability even when very distant in time.

In this paper we consider only measures of social stress obtained at Time 3. We added the major life trauma and chronic stress inventories to the questionnaire only at Time 3, and, because evidence suggests that the effects of stressful life events are limited to a year or less (Brown & Harris, 1978; Murphy & Brown, 1980), effects over a 7-year interval could not be expected and, in fact, were not observed in the present data.

Personal resources. We assessed personal control or mastery using a 7-item scale developed by Pearlin and Schooler (1978). Respondents rate each item on a 5-point scale ranging from *strongly agree* to *strongly disagree*. In this study, the internal reliability of this measure as estimated by Cronbach's alpha is .71 in both the Time 1 and Time 3 data. We administered a number of items from the interpersonal dependency measure developed by Hirschfeld, Klerman, Gough, Barrett, Korchin, & Chodoff (1977) at Time 3. These included four items from the ''emotional reliance'' subscale and three items from the ''assertion of autonomy'' subscale. Factor analysis confirmed the distinctiveness of these two subscales as measured, and Cronbach's alpha was .61 and .74 for emotional reliance and assertion of autonomy, respectively. These two subscales are inversely correlated ($r = -.08$), and we hypothesize that high levels of emotional reliance increase risk for depression, whereas high levels of autonomy decrease the risk. These measures are available only within the Time 3 data.

Social support. As noted above, available evidence has suggested that perceived social support is likely to be of substantial relevance for the outcome assessed in this paper. The initial interview, conducted during pregancy, included the Provisions of Social Relations Scale (PSR) (Turner et al., 1983). This measure was selected because of its demonstrated reliability and construct validity and because of evidence for a stable factor structure that effectively distinguishes between support experienced from family and support experienced from friends (Turner et al., 1983). At Time 3, we measured family and friend support by separate 8-item scales developed on the basis of the PSR scale for use in the Toronto Mental Health Study (Turner & Marino, 1994). The reliability coefficients were .96 and .97 for family support and friend support, respectively. ''Family'' was left undefined within both of these measures. Thus, participants answered based on whatever ''family'' meant to them.

During the course of pregnancy (Time 1), we

Table 1. Regression of Current Depressive Symptoms ($CESD_{T3}$) on Dimensions of Social Stress and Prior Symptomatology

Predictor	Model 1 β	Model 2 β	Model 3 β	Model 4 β
Recent events	.29****	.21***	.08	—
Chronic stress		.23***	.20***	.16**
Lifetime traumas			.30****	.28****
$CESD_{T2}$				.31****
Adjusted R^2	.08	.12	.19	.27

Note: $N = 204$.
$^{**}p < .05$. $^{***}p < .01$. $^{****}p < .001$.

selected 9 of the 12 items from the ''care dimension'' of the Parental Bonding Instrument (Parker, Tupling, & Brown, 1979) to estimate the extent of parental support each adolescent percieved as having been available during her developmental years, as distinct from level of family support experienced in the context of the pregnancy. We administered this measure separately with respect to fathers and to mothers. Analyses confirmed a single underlying dimension and identified 6 items that demonstrated the property of factor invariance when compared across scales describing relationship with father and relationship with mother. These 6 items were also sufficient to achieve internal reliabilities between .75 and .94 when describing father or mother at both Time 1 and Time 3.

Results

Our initial analyses of risk and protective factors involved the separate consideration of sets of measures comprising each domain of the stress process model (stress exposure, personal resources, and social resources). The goal was to assess the individual predictive power of each domain and to identify the minimum set of measures that could effectively represent each domain within combined analyses.

Stress exposure. Table 1 presents the result of stepwise analyses in which we regressed Time 3 depressive symptomatology on the three measured dimensions of social stress. It is noteworthy that the standardized coefficient of .29, observed at the first step matches closely relationships between recent events and psychological distress that have typically been reported in the literature (Thoits, 1983). However, when chronic stressors and lifetime traumas are also considered (Model 3), the results are far from typical and clearly challenge the conventional wisdom that differences in exposure to social stress are of only minimal explanatory significance. The variance accounted for (nearly 19%) represents about double the upper range of previous reports that have considered only stressful events (Rabkin & Struening, 1976). Consistent with the findings of Turner and colleagues (1995), these results suggest that social stress might represent a more important mental health risk factor than has generally been assumed. Recent events no longer contribute to the prediction of depressive symptomatology once both chronic stress and lifetime traumas are considered. The significance of these latter stress indices remains clear when prior levels of depression are controlled (Model 4), indicating their relevance for changes in depressive symptomatology over time. These findings provide clear support for Hypothesis 1.

Personal resources. The relevance of mastery at Time 1 and Time 3, and that of the two measured subdimensions of interpersonal dependency (emotional reliance and assertion of autonomy), are considered in Table 2. Level of mastery assessed during the course of pregancy shows a clear relationship (−.26) with depressive symptomatology measured more than 7 years later. Subsequent models in this stepwise analysis illustrate that the effects of Time 1 mastery are largely indirect through Time 3 mastery and that mastery is an even stronger predictor than is previous level of depressive symptomatology. Moreover, the apparent significance of mastery is little attenuated when previous depression is controlled. With Time 3 mastery controlled, the coefficient for emotional reliance does not achieve statistical significance by the usual criterion, whereas assertion of autonomy shows a significant inverse association with depressive symptoms independent of mastery, emotional reliance, and previous symptom level. Collectively, the personal resources considered in these analyses account for a substantial 28.6% of observed variation in depressive symptomatology.

Social support. As noted earlier, our assessment of social support involved measures of support from family and from friends during the course of the pregnancy and 7 years after the index birth, as well as retrospective reports, at both of these time points, of the warmth experienced from each parent when the respondent was growing up. In considering these latter data we were confronted

TABLE 2. REGRESSION OF CURRENT DEPRESSIVE SYMPTOMS ($CES\text{-}D_{T3}$) ON PERSONAL RESOURCES AND PRIOR SYMPTOMATOLOGY

Predictor	Model 1 β	Model 2 β	Model 3 β	Model 4 β	Model 5 β	Model 6 β
Time 1: mastery	−.26****	−.09	—	—	—	—
Time 3: mastery		−.47****	−.46****	−.44****	−.38****	−.40****
Time 3: emotional reliance			.13*	.11*	.08	—
Time 3: assert. of autonomy				−.17***	−.18***	−.18***
$CESD_{T2}$					.30****	.30****
Adjusted R^2	.06	.25	.26	.29	.37	.36

*$p < .10$. **$p < .05$. ***$p < .01$. ****$p < .001$.

with the fact that more than 10% of these young women indicated that they had no father or father substitute with whom to relate. Thus, the use of continuous scores on the warmth dimension would result in a significant loss of sample size and of the capacity to evaluate the effects of having no father within the analyses.

We addressed this problem by employing a latent class model (Clogg, 1981; McCutcheon, 1987) to develop categorical measures of parental warmth. This approach conceptualizes the underlying contructs of paternal and maternal warmth in terms of two or more latent categories or classes, rather than as a continuous latent scale. In all four cases (at Times 1 and 3, with respect to both mother and father), a three-class model was adequate to account for the observed association among five of the items measuring parental warmth. In each case, the data were consistent with the hypothesis that responses were generated by a single latent variable describable by three categories. Although the model does not rely on the assumption of an ordered relationship among the categories, inspection of the conditional probabilities of a positive response to each individual item within each of the three latent classes suggests one category of respondents highly likely to affirm a relationship with an affectionate parent who ''spoke warmly,'' ''enjoyed talking with them,'' and ''could make them feel better''; that is, a parent not remembered as being emotionally cold. At the other extreme, latent probabilities suggest another category of respondents who were quite unlikely to report these positive aspects of the parental relationship and who were quite likely to recall the parent as having been emotionally cold toward them. Finally, we observed an intermediate class of respondents whose experience fell between these two extremes of parental warmth.

In the regression analyses presented in Table 3, each of the three categories describing paternal or maternal warmth, along with a category describing mother or father absence, is treated as a dummy variable, scored 1 if the respondent is assigned to that category and 0 otherwise. As the omitted category describes those with a ''very warm'' relationship, our parameter estimates contrast this most desirable circumstance with lesser levels of maternal or paternal warmth or with the absence of the parental figure.

Models 1 and 2 evaluate the mental health relevance of maternal and paternal warmth as reported during the course of pregnancy. Those who reported having experienced their mother as ''not warm'' exhibited significantly higher levels of depressive symptoms more than 7 years later. Although this relationship is no longer observed when Time 1 social support from family and friends is considered (Model 3), level of parental warmth from mother or from father, as remembered at Time 3, makes a significant independent contribution even when other measures of social support from family and from friends are controlled (Model 6).

It appears that a respondent's relationship with her mother or father that was recalled as being emotionally cold is associated with greater mental health risk than is the absence of that parent. With all nontrimmed social support measures considered, more than 20% of the variability in depressive symptoms is accounted for by this resource, with clear contributions from friend support at both Times 1 and 3 and from Time 3 accounts of parental warmth during childhood. Morover, each of these dimensions remains statistically significant when Time 2 depression is controlled.

Tables 2 and 3 directly address Hypothesis 2, confirming an inverse relationship between current depression levels and both mastery and social support. These relationships are also observed with respect to changes in depressive symptoma-

TABLE 3. REGRESSION OF CURRENT DEPRESSIVE SYMPTOMS ($CESD_{T3}$) ON INDICES OF SOCIAL SUPPORT

Predictor	Model 1 β	Model 2 β	Model 3 β	Model 4 β	Model 5 β	Model 6 β	Model 7 β
Time 1: mother[a]							
Absent[b]	.10	—	—	—	—	—	—
Not warm[b]	.27***	.22****	.10	—	—	—	—
Somewhat warm[b]	.08	—	—	—	—	—	—
Time 1: father[a]							
Absent[b]		.03	—	—	—	—	—
Not warm[b]		.04	—	—	—	—	—
Somewhat warm[b]		.08	—	—	—	—	—
Time 1: PSR							
Family			−.16**	−.14*	−.12*	−.09	—
Friends			−.20***	−.19***	−.20***	−.14**	−.13**
Time 3: mother[a]							
Absent[b]				.08	—	—	—
Not warm[b]				.21***	.16**	.14**	.16**
Somewhat warm[b]				.08	—	—	—
Time 3: father[a]							
Absent[b]					.00	—	—
Not warm[b]					.25***	.21***	.15**
Somewhat warm[b]					.02	—	—
Time 3: relatives support							
						−.09	—
Time 3: friends' support						−.17**	−.18***
$CESD_{T2}$							.30****
Adjusted R^2	.05	.04	.11	.13	.17	.20	.27

Note: $N = 204$.
[a]A very warm relationship is the omitted category. [b]1; 0 otherwise.
*$p < .10$. **$p < .05$. ***$p < .01$. ****$p < .001$.

tology. Also apparent is a positive, though marginally significant, zero-order association between emotional reliance and depression.

The stress process model. Each of the analyses so far involves stepwise procedures in which measures of the particular stress process construct at issue were added and in which nonsignificant measures were trimmed at each successive step. These results provided the basis for the analyses reported in Table 4. We regressed Time 3 depressive symptomatology on those measures of social stress, social resources, and personal resources that demonstrated significant independent associations within the separate analyses reported above.

When we consider all surviving measures simultaneously (Model 3), this refined stress process model accounts for fully 42% of observed differences in CES-D scores, with Time 3 mastery and lifetime traumas representing the most powerful predictors. Controlling Time 2 depressive symptomatology (Models 4 and 5) renders childhood relationship with father statistically nonsignificant in its effects on Time 3 depression, a finding consistent with the expectation that important earlier experiences are more likely to play a role in shaping previous levels of depressive symptoms than in predicting subsequent changes in such symptomatology. The remaining coefficients are highly consistent when predicting changes in depressive symptoms.

The unstandardized regression coefficients presented in Table 4 allow us to evaluate Hypothesis 3, that personal and social resources mediate the linkage between stress exposure and depression. The coefficient for lifetime traumas is reduced by 20% with the inclusion of social support measures (Model 2) and by nearly 29% when the personal resources of mastery and autonomy are also considered (Model 3). However, the primary relationship is clearly direct rather than indirect, with a strong association continuing to be observed after all other factors are controlled. When both social support and personal resource measures are controlled, the coefficient for chronic stress declines by 60% and is no longer statistically significant.

TABLE 4. DEPRESSIVE SYMPTOMS ($CES\text{-}D_{T3}$) REGRESSED ON SOCIAL STRESS, SOCIAL SUPPORT AND PERSONAL RESOURCES

	Model 1		Model 2		Model 3		Model 4		Model 5	
Predictor	*b*	β	*b*	β	*b*	β	*b*	β	*b*	β
Lifetime traumas	1.22	.34****	.97	.27****	.87	.24****	.87	.24****	.90	.25****
Chronic stress	.63	.22****	.45	.16**	.25	.09	—		—	
T1 friends support			−.27	−.15**	−.21	−.09	—		—	
T3 mother not warm			2.61	.10*	1.96	.07	—		—	
T3 father not warm			3.69	.17***	2.67	.13**	1.66	.08	—	
T3 friends support			−.26	−.17***	−.17	−.14**	−.25	−.16***	−.26	−.17***
T3 mastery					−.68	−.32****	−.69	−.32****	−.71	−.33****
T3 assert. of autonomy					.43	−.18****	.45	−.19****	−.46	−.19****
$CESD_{T2}$							.21	.23****	.23	.25****
Adjusted R^2	.19		.29		.42		.45		.45	

Note: $N = 204$.
*$p < .10$. **$p < .05$. ***$p < .01$. ****$p < .001$.

Thus, the effects of chronic stress are substantially mediated through the social support and personal resource dimensions of the stress process model. A minor portion of the lifetime trauma–depression relationship is also indirect through these resources.

Results presented thus far confirm our hypotheses with respect to the additive effects on depression of stress exposure and of other dimensions of the stress process model that we considered. In order to address the possibility that personal resources and social support moderate (as opposed to mediate) the impact of stress exposure on depression, we created multiplicative interaction terms that combine each of the resource variables shown in Model 3 with each of the social stress measures represented in that model. We tested these interactions one at a time in the context of these main effects. None was statistically significant, which disconfirms the moderating or buffering hypothesis. The stress process model postulates that personal and social resources condition stress vulnerability, and thus it predicts stronger associations in the presence of high stress. However, within our sample of young women 7 years after their transition to motherhood, the importance of these resources for depression appears independent of the level of stress exposure and vice versa.

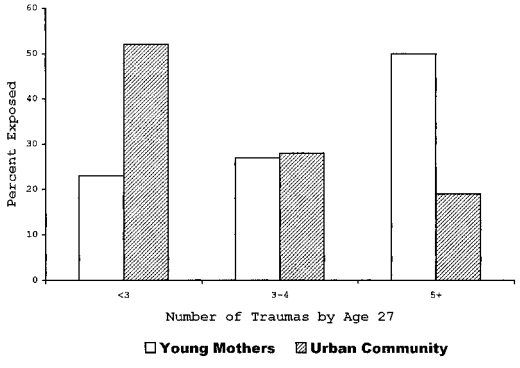
Life Traumas and Teenage Motherhood

The apparent importance of life traumas in our results, and the fact that they represent the most powerful factor among dimensions of social stress (Table 1), are findings unique in the literature. Moreover, they are suggestive with respect to the kinds of risks that might tend to characterize the lives of women who become mothers as teenagers. This is so because they contrast rather sharply with findings from a general community study that empoyed essentially the same three measures of social stress. Turner and colleagues (1995) studied nearly 1,400 men and women, 18 to 55 years of age, randomly sampled from an urban community a short distance from the location of our sample. Although the risk of both depressive symptoms and depressive disorder were found to increase with number of life traumas, no direct effects were observed for this variable when chronic and eventful stressors were also considered. In the general community, the impact of major traumas that occur over a lifetime appears to be mediated through more contemporaneous stress experiences.

It might be that the clear difference in the mental health significance of life traumas across these two samples can be accounted for by gender differences, by age differences, or by associated differences in temporal proximity to the experience of these major childhood stressors. Because the women in the present sample were 27 years old or younger at the Time 3 interview, less time would have elapsed on average since they experienced the reported traumas. It is also possible that the greater significance of potentially traumatic events is associated with a greater frequency of such events in the experience of that subgroup of young women defined in terms of teenage motherhood.

To assess this latter possibility, we distinguished a subsample of 191 young women, also between the ages of 21 and 27, within the community sample of Turner and colleagues (1995),

FIGURE 1. TRAUMA EXPOSURE LEVELS IN TWO YOUNG FEMALE POPULATIONS



and we examined their cumulative exposure to the 17 trauma items common to both studies. The Figure 1 provides a representation of the dramatic contrast between these two samples in their lifetime experience of major adversities. The women who were pregnant as teenagers are two and a half times more likely than their age-matched counterparts to have experienced 5 or more traumatic events, and they are less than half as likely to have experienced two or fewer such events. Neither teenage pregnancy nor childbearing was included within the trauma list, and exclusion of the two items involving a respondent's child produced little change in the distributions shown, with the number of teen mothers who had experienced five or more life traumas declining by only about 3%, to 46.5%. Thus, these striking differences are substantively important.

An obvious question that arises in relation to these results is the extent to which observed exposure differences are an artifact of differences in socioeconomic status. Data available on the occupational prestige (Hollingshead, 1957) of the main wage-earning parent, while respondents in both studies were growing up, allows us to consider this issue. As anticipated, socioeconomic status (SES) of origin, thus indexed, is distributed quite differently in these two populations. Women who were pregnant as teenagers were more than twice as likely as their age-matched counterparts to have grown up in families whose main wage earner worked at semi-skilled or unskilled jobs. Correspondingly, they were less than one quarter as likely to have had a parent who was a major or minor professional.

To assess the role of SES in accounting for the differential experiences of adversity displayed in the Figure, the teenage mothers were differentially weighted to standardize the distribution of parental occupational prestige to that of the comparison group. The distribution of life traumas in data weighted to control on SES differences varied little from those shown in the Figure. The proportion of teenage mothers who reported fewer than three such events increased only 1.3% (from 23.5% to 24.8%); those who reported three or four such events decreased from 26.8% to 26.3%; and those who reported five or more traumas decreased only from 49.7% to 48.9%. The socioeconomic status of family of origin, at least as estimated by our index of parental occupational status, appears to explain little of the differential risk of life traumas experienced by the two groups—a conclusion supported by the fact that parents' occupational level is only very weakly correlated with number of lifetime traumas reported ($r = .09$ in the teen pregnancy sample and .12 for the age-matched comparison group).

Thus, the women who were pregnant as teenagers came disproportionately from lower socioeconomic backgrounds, with whatever implications that fact might have for health, well-being and life chances. In addition, these women's previous experience is characterized by significantly elevated risk for multiple, potentially traumatic adversities. Because our measures of cumulative life traumas and SES are essentially independent, their associated mental health risks are clearly additive rather than redundant.

Our work suggests that exposure to social stress represents an important mental health contingency in general. The high risk of exposure to traumatic events experienced by women who became mothers as teenagers suggests the need for special consideration of the role of social stress in this group. Table 5 compares the responses to specific traumas of the teen pregnancy sample and the age-matched community sample. The comparison suggests a rather specific pattern of events that contribute to these elevated levels of lifetime trauma. During childhood and early adolescence, the teenage mothers were no more likely than their age-matched peers to have experienced a major illness or accident, long-term parental unemployment, or even major difficulty in school. However, they were more than twice as likely to have had parents who divorced and nearly four times as likely to have experienced physical abuse by a parent.

With respect to events that could have occurred either when the respondent was a child or an

TABLE 5. PROPORTION OF POSITIVE RESPONSES TO MAJOR LIFE EVENTS, WOMEN 21–28 YEARS OF AGE. TEENAGE MOTHERS AND COMMUNITY SAMPLE

	Teenage Mothers (n = 213)	Community Sample (n = 191)
While a child or teenager:		
Major illness or accident	25.8	18.3
Parents divorced	33.8	14.1****
Repeated a year of school	22.5	15.7
Long-term parental unemployment	18.3	11.5
Physical abuse by parent	19.8	5.2****
Lifetime:		
Divorced or ended relationship with someone still loved	46.0	42.4
Parent died	19.2	18.3
Own child died or given up	23.0	2.5****
Spouse or other loved one died	30.3	41.1**
Witnessed violent event	33.8	23.7**
In a natural disaster	9.9	9.9
Disabling or life-threatening accident, injury or illness	23.0	12.1***
Own child had life-threatening illness or accident	19.9	1.6****
Spouse or partner unfaithful	36.8	23.2***
Sexual abuse or assault	39.6	15.5****
Physical abuse by spouse or partner	39.0	12.6****
Immediate family member addicted to alcohol or drugs	36.0	14.8****

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

adult, the two samples are nearly indistinguishable on the experiences of divorcing or ending a relationship with someone they were still in love with, losing a parent in death, and going through a natural disaster. In the realm of other close interpersonal and familial relationships, however, clear differences are apparent. Teenage mothers were significantly more likely to have discovered that a spouse or partner was unfaithful, more than twice as likely to have been sexually abused or assaulted, more than three times as likely to have been physically abused by a spouse or partner, and more than three times as likely to have had an immediate family member addicted to alcohol or drugs.

DISCUSSION

The results of this study support a number of conclusions that are suggestive with respect to both future research and the focus of future intervention efforts. At the most general level, stress exposure and social and personal resources as measured here appear to effectively specify crucial mental health contingencies within this important high-risk population. Social stress and social and personal resources accounted for fully 42% of observed differences in depression.

As the final equation of Table 4 reveals, the social resource of support from friends and the personal resources of mastery and assertion of autonomy represent potential targets for interventions aimed at fostering emotional well-being and preventing depression among these young women. These factors tend to be conceptualized as coping resources and to be seen as defining individual differences in vulnerability to stress.

The importance of vulnerability differences for understanding variations in mental health risk has been emphasized by reports that differential exposure to stressful life events is substantially less important than differential vulnerability to stress for explaining social status differences in mental health (Kessler, 1979; Kessler & Cleary, 1980; Thoits, 1987). These findings, along with the perception that social stress is only weakly associated with mental health, have focused the attention of researchers on the task of understanding individual differences in responsiveness to stress and the attention of interventionists on the goal of decreasing such responsiveness through the enhancement of coping resources.

Although the findings presented here provide additional support for the promise of such efforts, there are grounds for questioning the nearly exclusive preoccupation with vulnerability differences that appears to characterize current thinking. We argued earlier that research that considers only recent life events has encouraged the perception that social stress is of only minimal mental health

significance. In counterpoint to this perception, we contend that our Hypothesis 1, that level of social stress is an important determinant of mental health status, has never been effectively tested because variations in exposure to social stress have never been adequately estimated.

With a more comprehensive estimate of stress exposure than has been typically available, this study, and the findings of Turner and colleagues' (1995) community study, have demonstated that social stress accounts for substantially more variability in depressive symptoms than previous research has suggested. Moreover, these results are likely to represent a conservative estimate of the role and significance of social stress. This is so because, whatever advance might be involved in this more comprehensive measurement effort, it seems clear that a fully adequate estimate of variations in stress exposure remains to be achieved.

In our view, the conclusion is warranted that exposure to social stress represents a crucial mental health contingency. Thus, there is a need to develop an understanding of the factors that influence or condition exposure to stress and to take seriously the prospect of developing interventions to reduce such exposure. It seems clear that some stressors are adventitious or fateful in nature. The fact that very low correlations were observed between SES and exposure to potentially traumatic events (r = .09 in the teen mothers sample and .12 for the age-matched community comparison group), suggests that many of the traumatic experiences we have assessed might be of this nature. However, it is equally clear that stressful circumstances and events, as distinct from major life traumas, are differentially distributed across social statuses (Turner et al., 1995), suggesting that such circumstances and events are socially conditioned and potentially amenable to social or programatic modification.

To this point, the efforts of prevention scientists, whether the outcome of interest is depressive symptoms, psychiatric disorders, substance abuse, delinquency or criminality, or violence, have concentrated on the goal of modifying individual social, motivational, and behavioral characteristics. This largely exclusive focus has been encouraged by the assumption, which seems pervasive in the behavioral sciences, that the conditions that influence stress exposure are immutable. It is our view that this assumption should be rejected. We are not suggesting that efforts aimed at improving personal effectiveness and social competence should be abandoned. Indeed, our findings demonstrate their importance. We believe, however, that it might be possible to identify social, structural, familial, or developmental factors that influence levels of exposure to stressful events and circumstances. Research is needed that aims at developing a greater understanding of socially or programatically modifiable determinants of stress exposure. Such an understanding is necessary in order to take seriously the prospect of developing interventions that reduce stress exposure as well as interventions that ameliorate the consequences of such exposure.

Finally, findings based on a simple count of major experienced events or traumas suggest a potentially important point. The kind of cumulative adversity we have observed among young women in our study signifies elevated risk for depressive symptoms later in life and has elsewhere been shown to constitute a marker for elevated risk for lifetime psychiatric and substance disorders (Turner & Lloyd, 1995). In addition, high levels of early adversity appear to represent a marker for increased risk for various subsequent adversities such as teenage pregnancy. Thus, assessment of trauma exposure might represent an additional effective strategy for identifying those most in need of intervention.

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