

Long-Term Posttreatment Functioning Among Patients With Unipolar Depression: An Integrative Model

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This study tested an integrative structural equation model of posttreatment functioning among 165 depressed patients followed for an average of 9 years after the end of an episode of treatment. The model examined (a) the link between life change and psychosocial resource change and (b) the role of resource change in mediating the relationship between life change and change in depression. An increase in the preponderance of negative over positive life events was associated with a decline in resources and an increase in depressive symptoms. A decline in resources was associated with an increase in depressive symptoms. The association between changes in events and depressive symptoms was completely mediated through resource change. These findings indicate that life stressors contribute to posttreatment depression through an erosion of personal and social resources.

Most studies of the psychosocial aspects of depression have focused on the onset and treatment phases of depressive episodes. Much less is known about remission or the failure to recover after treatment. However, because 50% to 60% of depressed patients relapse after treatment (Nezu, Nezu, Trunzo, & McClure, 1998), long-term follow-up is essential for a full understanding of depressive disorders. The purpose of the present study was to test an integrative structural equation model of posttreatment functioning among 165 depressed patients followed for an average of 9 years after the end of an episode of treatment.

Negative life events are related to poorer outcome of treatment for depression (Monroe, Kupfer, & Frank, 1992). For example, negative events during the year after hospitalization lengthened time to recovery among depressed patients (S. L. Johnson & Miller, 1997). Moreover, undesirable events after recovery predicted more negative clinical outcomes up to 3 years postrecovery among individuals with recurrent depression (Monroe, Roberts, Kupfer, & Frank, 1996). Positive events during treatment have

been associated with better 1-year treatment outcome (J. G. Johnson, Douglas, Han, & Russell, 1998).

Psychosocial resources are related to better outcome for treatment of depression. More social support predicted fewer depressive symptoms among depressed outpatients at 6-month (Lara, Leader, & Klein, 1997) and 2-year (Sherbourne, Hays, & Wells, 1995) outcomes. Negative family relationships predicted poorer 1-year recovery among hospitalized depressed patients (Miller et al., 1992). Low personal resources (e.g., self-critical attitudes and low self-esteem) are also related to poorer remission among depressed individuals (Bothwell & Scott, 1997; Fairbrother & Moratti, 1998).

A key limitation of existing research on posttreatment functioning among depressed patients is a failure to consider more dynamic interrelationships between predictive factors. The few studies that have addressed this issue have been limited almost exclusively to nonclinical samples. For example, "support deterioration" (Kaniasty & Norris, 1993) and "wear and tear" (Park & Folkman, 1997) models have been proposed to explain how life stressors can deplete social resources. Life stressors may also be associated with a depletion of personal resources, such as hardiness (King, King, Fairbank, Keane, & Adams, 1998).

An important reconceptualization of the stress process postulates that such resource loss operates as a mediator between life change and functioning (Kaniasty & Norris, 1993; Quittner, Glueckauf, & Jackson, 1990). King et al. (1998) found that the relationship between stressful events and posttraumatic stress disorder among Vietnam veterans was partially mediated by a lack of hardiness and social support. Holahan, Moos, Holahan, and Cronkite (1999) demonstrated that the association between changes in life events and functioning in a community sample was completely mediated through change in psychosocial resources.

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The present study was part of a longitudinal project on an initial group of 424 patients who entered treatment for unipolar depression. We have described predictors of 1-year outcomes (Billings & Moos, 1985a, 1985b; Krantz & Moos, 1988) and long-term outcomes, 4 (Swindle, Cronkite, & Moos, 1989) and 10 years (Cronkite, Moos, Twohey, Cohen, & Swindle, 1998; Moos, Cronkite, & Moos, 1998) after treatment intake. These studies document the key roles of life stressors (Billings & Moos, 1985a, 1985b; Cronkite et al., 1998) and psychosocial resources (Billings & Moos, 1985a, 1985b; Cronkite et al., 1998; Moos et al., 1998; Swindle et al., 1989) in remission and nonremission.

In the only study we are aware of that has examined resource depletion with a clinical sample, Mitchell and Moos (1984) found in a 1-year analysis with the present sample that decreases in stressors and increases in positive events during the year patients entered treatment were associated with increases in family support. In addition, the inverse association between negative events and family support was reduced in the context of positive events. However, Mitchell and Moos's study did not examine depression and was limited to the initial treatment phase prior to the 9-year posttreatment period studied here.

This report extends prior research with the present sample by testing an integrative structural equation model of posttreatment functioning among 165 depressed patients during the 9-year interval after the end of the index treatment episode. The model examined (a) the link between life change and psychosocial resource change and (b) the role of resource change in mediating the relationship between life change and change in depression.

Following previous research with two community samples (Holahan & Moos, 1985, 1986, 1990, 1991; Holahan, Moos, Holahan, & Cronkite, 1999), a latent construct for psychosocial resources was indexed by family support and personality strengths of self-confidence and an easygoing disposition. On the basis of the conceptualization that negative events are more strongly associ-

ated with maladjustment (see Suh, Diener, & Fujita, 1996; Hobfoll & Lilly, 1993) and resource loss (see Mitchell & Moos, 1984; Holahan, Moos, Holahan, & Cronkite, 1999) "when losses outweigh gains" (Hobfoll, Freedy, Green, & Solomon, 1996, p. 325), we focused on excess negative events (i.e., negative events in excess of positive events).

It was hypothesized that an increase in excess negative events would be associated with an increase in depression and that an increase in psychosocial resources would be associated with a decrease in depression. In addition, it was predicted that an increase in excess negative events would be associated with a decline in psychosocial resources and that change in psychosocial resources would operate as a mediator between change in life events and change in depressive symptoms (see Figure 1).

Method

Sample Selection and Characteristics

The initial sample of patients involved 424 depressed persons who began a new treatment episode at one of five facilities (two community mental health centers, a university hospital, a health maintenance organization, and a Department of Veterans Affairs medical center). All of the patients had a major or minor unipolar depressive disorder according to the Research Diagnostic Criteria (RDC) for depression (Spitzer, Endicott, & Robins, 1978) and were age 18 or older. Patients with concurrent neuropsychological, metabolic, manic, or alcohol abuse disorders were excluded.

The present analyses used data from two posttreatment follow-ups. The Time 1 follow-up was conducted 1 year after patients entered treatment, by which time almost all of the patients (93%) had completed the treatment episode. The Time 2 follow-up was conducted 9 years later. Of the patients who were alive at follow-up, 84% were successfully followed at both assessments. Because family support was central to the proposed model, and following Mitchell and Moos (1984), the present sample included the

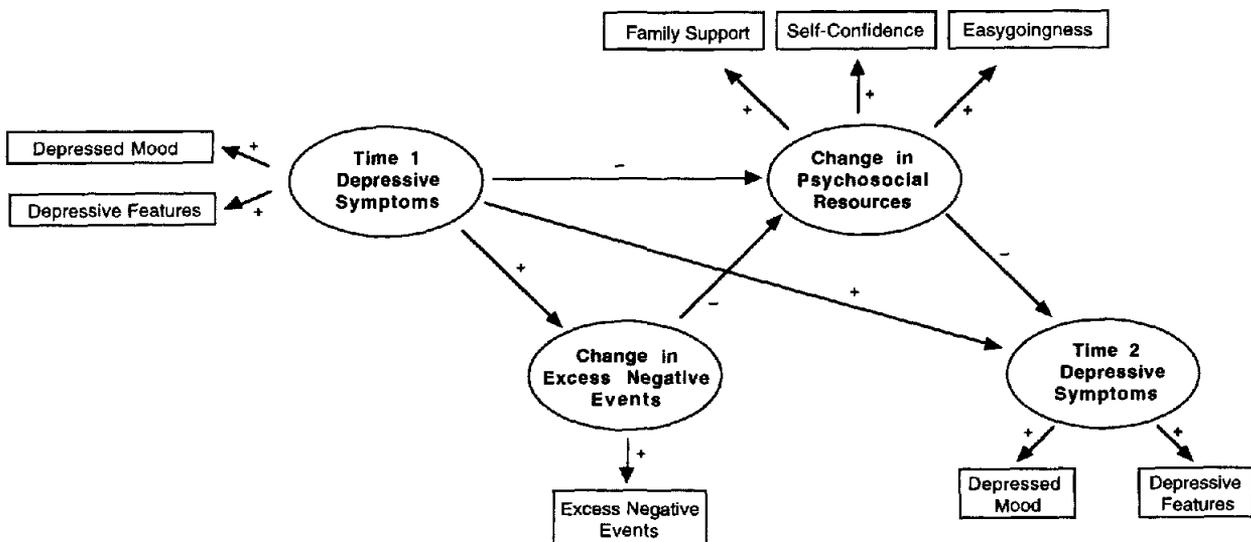


Figure 1. Hypothesized structural equation and measurement models for an integrative model predicting depressive symptoms over a 9-year period. Latent constructs are shown in ellipses, and observed variables are shown in rectangles. Excess negative events index negative events in excess of positive events.

165 patients who lived in families at both assessments.¹ The present sample included 103 women (62%) and 62 men (38%), with a mean age at Time 1 of 36.6 years ($SD = 12.3$). A total of 64% of the respondents were married, and the ethnic distribution of the sample was primarily Caucasian (85%). Mean number of years of education was 13.5 ($SD = 2.2$), 57% of the respondents were employed, and mean annual individual income was \$11,600 ($SD = 8,700$).

Measures

Information on the measures is available in the following sources. The manual for the Health and Daily Living Form (HDL; Moos, Cronkite, & Finney, 1992) includes the personality resources, depressive symptoms, and life change events measures. The manual for the Family Environment Scale (FES; Moos & Moos, 1994) includes the family support measure. The measures were administered by mail.

Life change events. The survey ascertained the number of relatively serious negative life events (0–15) that the respondent had experienced during the previous 12 months (e.g., death of a close friend, divorce, and laid off or fired from a job). The survey also ascertained the number of positive life events (0–8) that the respondent had experienced during the previous 12 months (e.g., marriage, promotion at work, and income increased substantially). Following Holahan, Moos, Holahan, and Cronkite (1999), we created a measure of excess negative events, operationalized as negative events minus positive events, reflecting the number of negative events in excess of positive events (at Time 1, $M = 1.39$, $SD = 2.20$; at Time 2, $M = 1.11$, $SD = 1.85$).

Family support. Family support was measured by the Family Relationships Index, that is, the three subscales that compose the FES (Moos & Moos, 1994) relationship domain: (a) Cohesion, the degree to which family members are helpful and supportive of each other; (b) Expressiveness, the extent to which family members are encouraged to act openly and express their feelings directly; and (c) Conflict, the extent to which the expression of anger and conflict-laden interactions are characteristic of the family (reversed scoring). Each of these subscales consists of the sum of nine true-false items endorsed in the designated direction; the family support measure has high internal consistency (for the present sample, Cronbach's $\alpha = .84$) and good construct validity (Holahan & Moos, 1983).

Personality resources. Personality resources were measured by persons' self-perceptions of a general and enduring nature on two dimensions—self-confidence and an easygoing disposition. Respondents rate the self-descriptive accuracy of a series of adjectives on 5-point scales ranging from 0 (*not at all accurately*) to 4 (*quite accurately*). The self-confidence dimension consists of six adjectives: *confident*, *ambitious*, *energetic*, *outgoing*, *successful*, and *aggressive* (for the present sample, Cronbach's $\alpha = .83$). The easygoing dimension consists of three adjectives: *easygoing*, *calm*, and *happy* (for the present sample, Cronbach's $\alpha = .61$). The score for each dimension is the total of the ratings of the adjectives that constitute it. These measures are adapted from earlier work by Gough and Heilbrun (1965).

Depressive symptoms. Depressive symptoms were tapped by two indices—depressed mood and ideation and depressive features—that measure mood-related and behavioral manifestations of depression, respectively. These measures are from the HDL (Moos et al., 1992) and are derived from the RDC (Spitzer et al., 1978). For examples of research using these two measures of depressive symptoms, see Holahan and Moos (1991); Holahan, Moos, Holahan, and Brennan (1997); Holahan, Moos, Holahan, and Cronkite (1999); Schutte, Moos, and Brennan (1995); and Schutte, Hearst, and Moos (1997). The depressed mood and ideation index is the sum of 7 items (e.g., feeling guilty, worthless, or down on yourself; brooding about unpleasant things; and thoughts about death or suicide; for the present sample, Cronbach's $\alpha = .91$). The depressive features index is the sum of 11 items (e.g., poor appetite or weight loss; loss of energy, fatigue, or tiredness; and crying; for the present sample, Cronbach's $\alpha = .84$). For each item, respondents indicate how often they experienced the

Table 1
Means and Standard Deviations for the Study Variables at Times 1 and 2

Variable	Time 1		Time 2	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Excess negative events	1.39	2.20	1.11	1.85
Family support	5.57	1.87	6.24	1.75
Self-confidence	13.02	4.88	13.36	4.94
Easygoing disposition	6.54	2.49	6.96	2.28
Depressed mood	11.40	6.68	10.21	6.09
Depressive features	18.73	8.58	17.04	7.82

Note. $n = 165$.

symptoms during the past month on a scale ranging from 0 (*never*) to 4 (*often*). In a validity check with a different sample of depressed patients, the depressive symptoms measure was highly correlated with the Beck Depression Inventory at treatment intake ($r = .88$, $N = 54$) and posttreatment follow-up ($r = .92$, $N = 31$).

Results

We tested the hypothesized model using LISREL analyses (Jöreskog & Sörbom, 1993). An exogenous variable (a variable not receiving causal inputs from any other variable) for Time 1 depressive symptoms was measured by two indicators (depressed mood and depressive features). Time 2 depressive symptoms were also measured with two indicators (depressed mood and depressive features) and were included in the model as an endogenous outcome variable (a variable receiving causal inputs from one or more variables).

Two additional endogenous variables were included in the model between initial and subsequent depressive symptoms. Change in excess negative events was measured with one indicator. Change in psychosocial resources was measured with three indicators (family support, self-confidence, and easygoingness) and was included in the model as a mediator between change in excess negative events and depressive symptoms at follow-up. Following previous research (Holahan, Moos, Holahan, & Cronkite, 1999; Valentiner, Holahan, & Moos, 1994), we indexed these two endogenous variables using residualized change scores. For each resource, follow-up resources were regressed on initial resources in simple regressions. Similarly, follow-up excess negative events were regressed on initial excess negative events in a simple regression. The resulting residuals were used in the analyses.

To provide a metric for the latent constructs and to identify the measurement model, we set the first indicator loading for each latent construct to 1.0 in the unstandardized solution. Several standard assumptions were included in the models. We assumed that the construct loadings in the measurement model were identical across measurement times for depressed mood and for depressive features. We assumed that unique variances would be correlated across measurement times for the two measures of depressed mood and for the two measures of depressive features. Means and standard deviations for the study variables at Times 1 and 2 are presented in Table 1. Zero-order correlations for the

¹ One participant was excluded who did not provide complete data on all of the measures used here.

Table 2
Zero-Order Correlations Among Variables in the Model

Variable	1	2	3	4	5	6	7	8
1. Time 1 depressed mood	—	.79	-.06	-.10	-.03	.04	.33	.27
2. Time 1 depressive features		—	.05	-.03	.04	.04	.23	.37
3. Change in excess negative events ^a			—	-.13	-.16	-.19	.25	.32
4. Change in family support ^a				—	.25	.27	-.43	-.34
5. Change in self-confidence ^a					—	.42	-.37	-.30
6. Change in easygoing disposition ^a						—	-.40	-.33
7. Time 2 depressed mood							—	.77
8. Time 2 depressive features								—

Note. $n = 165$.

^a Following previous research (Holahan, Moos, Holahan, & Cronkite, 1999; Lepore et al., 1991; Valentiner et al., 1994), these variables were computed as residualized change scores.

variables in the model are presented in Table 2.² The pattern of intercorrelations was comparable for women and men. Variance-covariance matrices were used in the LISREL analyses.

The results of the LISREL test of the hypothesized mediational model are presented graphically in Figure 2, which includes standardized estimates of parameters in the measurement and structural models.³ The model provided a good fit to the data, overall $\chi^2(15, N = 165) = 20.00, p > .10, GFI = .97, AGFI = .93, NFI = .96, NNFI = .98$.

All the parameter estimates in the measurement model were significant at the .01 level. In addition, the hypothesized parameter estimates in the structural model were significant at the .01 level. Change in excess negative events was inversely related to change in psychosocial resources. In turn, change in psychosocial resources was inversely associated with depressive symptoms at follow-up. These effects control for the influence of initial depressive symptoms on all three endogenous variables. Initial depressive symptoms were not significantly related to changes in either resources or events. Thus, as predicted, an increase in excess negative events showed an indirect relationship to an increase in depressive symptoms at follow-up, mediated by a decline in psychosocial resources.⁴

To further examine the adequacy of the hypothesized model, we compared it with two alternative models. First, we compared the hypothesized model to a full model. The full model postulated that change in excess negative events related to depressive symptoms at Time 2, both directly and indirectly, through change in psychosocial resources. This full model added a parameter reflecting a direct path between change in excess negative events and Time 2 depressive symptoms to the hypothesized model. Consistent with the proposed mediational model, including the parameter reflecting a direct path between change in excess negative events and Time 2 depressive symptoms in the full model did not significantly improve model fit compared with the hypothesized model, $\Delta\chi^2(1, N = 165) = 1.86, p > .10$.

Because change in excess negative events occurred simultaneously with change in psychosocial resources in the hypothesized model, the direction of relationship might plausibly have gone from resources to events. Thus, we tested an alternative, reversed mediation model in which change in psychosocial resources related to depressive symptoms at Time 2 indirectly through change in excess negative events. Initial depressive symptoms were included again to control for the stable component in depressive

symptoms. In essence, this alternative model reversed the order of the excess negative events and resources constructs in the hypothesized model. In contrast to the good overall fit of the hypothesized model, the alternative mediational model showed a poor fit to the data, $\chi^2(15, N = 165) = 68.62, p < .001$.

Discussion

These findings integrate previous work on long-term posttreatment functioning among depressed patients with an emerging reconceptualization of the stress process developed with nonclinical samples. An increase in the preponderance of negative over positive events was associated with a decline in personal and social resources. In addition, in an integrative structural equation model, the association between changes in life events and depressive symptoms was completely mediated through resource change.

Including Time 1 depressive symptoms in the model made the test of the model more conservative in two ways. First, this controlled for the stable component in depressive symptoms in predicting outcome depressive symptoms. Thus, the outcome measure reflects change in depressive symptoms. In addition, includ-

² Each of the resource variables at both assessments was significantly associated ($n = 165, \alpha = .05$, one-tailed test) with overall depressive symptoms (total of depressed mood and depressive features) at follow-up in the expected direction. Correlations between depressive symptoms at 9 years and family support, self-confidence, and easygoingness, respectively, were $-.22, -.14$, and $-.21$ at Time 1 and $-.45, -.35$, and $-.45$ at Time 2.

³ We first tested a direct model to show that change in excess negative events was significantly related to Time 2 depressive symptoms (controlling for Time 1 depressive symptoms) when psychosocial resources were not included in the model. The direct model provided a good fit to the data, overall $\chi^2(2, N = 165) = 5.81, p > .05$, goodness-of-fit index (GFI) = .99, adjusted goodness-of-fit index (AGFI) = .90, normed fit index (NFI) = .99, nonnormed fit index (NNFI) = .95. The hypothesized parameter in the structural model showing a direct link between change in excess negative events and follow-up depressive symptoms was significant at the .01 level ($\beta = 0.32$).

⁴ Consistent with earlier findings (Holahan, Moos, Holahan, & Cronkite, 1999), changes in both the negative and positive events components of the excess negative events measure were related to resource change. Individuals who gained in overall resources showed a decline in negative events, $F(1, 147) = 5.66, p < .05$, whereas individuals who declined in resources showed a decline in positive events, $F(1, 155) = 7.65, p < .01$.

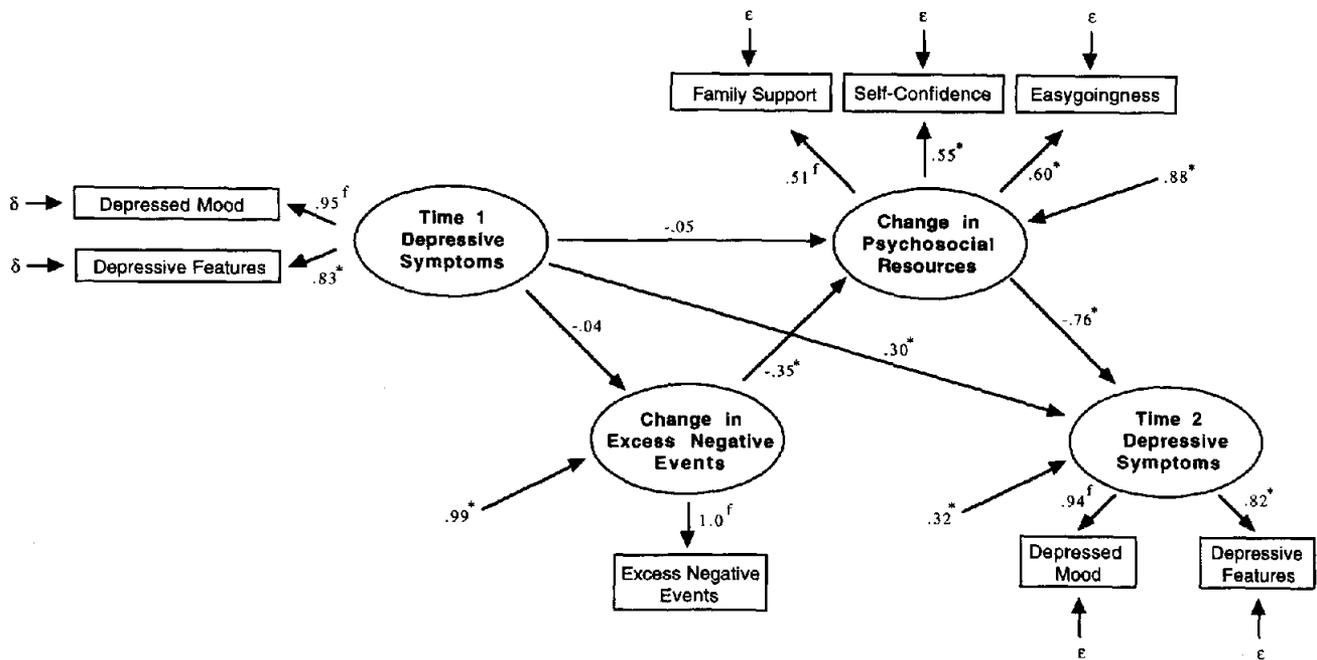


Figure 2. Results of the LISREL test (standardized estimates) of the structural equation and measurement models for an integrative model predicting depressive symptoms over a 9-year period ($n = 165$). Latent constructs are shown in ellipses, and observed variables are shown in rectangles. Excess negative events index negative events in excess of positive events. δ and ϵ represent unique variance in the observed X and Y variables, respectively. The unlabeled arrows pointing to the three endogenous latent variables show the residual (unaccounted-for) variance for each of these variables. A superscript f indicates a parameter set to 1.0 in the unstandardized solution. * $p < .01$.

ing Time 1 depressive symptoms in the model prior to changes in events and resources assured that changes in events and resources were independent of initial depressive symptoms (see Joiner, 1994).

We found that an increase in the preponderance of negative over positive events across 9 years was associated with an increase in depressive symptoms. This finding is consistent with research focusing on the adverse effects of negative life events (S. L. Johnson & Miller, 1997; Monroe et al., 1996) and on the salutary role of positive life events (J. G. Johnson et al., 1998) in recovery among depressed patients. It is also consistent with research demonstrating the importance of examining the combined effects of negative and positive events on psychological functioning (Hobfoll et al., 1996; Holahan, Moos, Holahan, & Cronkite, 1999; Mitchell & Moos, 1984; Suh et al., 1996).

Consistent with research on the role of personal (Bothwell & Scott, 1997; Fairbrother & Moretti, 1998) and social (Lara et al., 1997; Miller et al., 1992; Sherbourne et al., 1995) resources in follow-ups with depressed patients, we found that increases in family support and in personality strengths of self-confidence and an easygoing disposition were associated with a decline in depressive symptoms. Hobfoll and his associates' (see Hobfoll et al., 1996; Hobfoll & Vaux, 1993) conservation of resources theory provides a general theoretical framework for understanding the adaptive importance of change in psychosocial resources. As Hobfoll et al. (1996) observed, "loss is the primary operating mechanism driving stress reactions" (p. 324).

Emerging research on "support deterioration" (Kaniasty & Norris, 1993) and "wear and tear" (Park & Folkman, 1997) models of the stress process has pointed to the role of life stressors in depleting psychosocial resources. In accord with prospective research with nonclinical samples (Kaniasty & Norris, 1993) and Mitchell and Moos's (1984) 1-year analysis with the present sample, we found that an increase in the preponderance of negative over positive events across 9 years was related to a decline in resources.

In part, the link between life change and resource change may be tangible—stressful life events often entail real reductions in resources. As Hobfoll et al. (1996) noted, "negative change means loss, such as when respondents report poorer health, loss of income, reduced health status, or loss of loved ones" (p. 325). However, the event–resource link may also have a cognitive component. In the social domain, perceived support appears to be especially vulnerable to deterioration after crises (Kaniasty & Norris, 1993). In the personal domain, increases in adversity may undercut personal beliefs involving control, optimism, and self-esteem (see Taylor & Brown, 1994).

An important reconceptualization of the stress process based on research with nonclinical samples postulates that resource loss may operate as a mediator between life change and a decline in psychological functioning (Kaniasty & Norris, 1993; King et al., 1998; Quittner et al., 1990). Congruent with research with nonclinical samples (Holahan, Moos, Holahan, & Cronkite, 1999; Kaniasty & Norris, 1993), we found that the association between

changes in life events and depressive symptoms was completely mediated through resource change.

These findings encourage a reframing of the traditional stress and coping framework. Stress and coping theory posits that adaptation is influenced by the stressful life circumstances to which a person is exposed and by the personal and social resources available to manage them. The present results and those of other researchers pertaining to the deterioration of psychosocial resources (see Kaniasty & Norris, 1993; Park & Folkman, 1997) underscore that the very resources that buffer stressors are themselves susceptible to erosion from stressors.

Future research is needed to provide a more detailed understanding of how different types of events are associated with resource change. A key issue involves differentiating when stressors erode and when they mobilize resources. Resource deterioration may be positively associated with stressor chronicity (see Quittner et al., 1990). Resource deterioration may also be more likely in the context of emotional distress (Bolger, Foster, Vinokur, & Ng, 1996).

The need for a fuller understanding of adaptive mechanisms during the posttreatment period is accentuated by increasing pressures to rely on short-term forms of therapy. Stressful circumstances and a lack of psychosocial resources can negate the benefits of treatment, especially when treatment is brief. Contextual and personal factors that characterize the posttreatment interval may be better predictors of long-term treatment outcome than those that typify the interval prior to treatment (Cronkite et al., 1998). Recognizing that stressful or relapse-inducing life situations inevitably occur, clinicians can identify resources that clients can use to help them deal with these situations more effectively (Holahan, Moos, & Bonin, 1999). For example, patients might profit from continuing care groups focusing on those life domains most likely to entail negative change (Nezu et al., 1998).

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